






NFDI4Earth

NFDI4Earth OneStop4All documentation

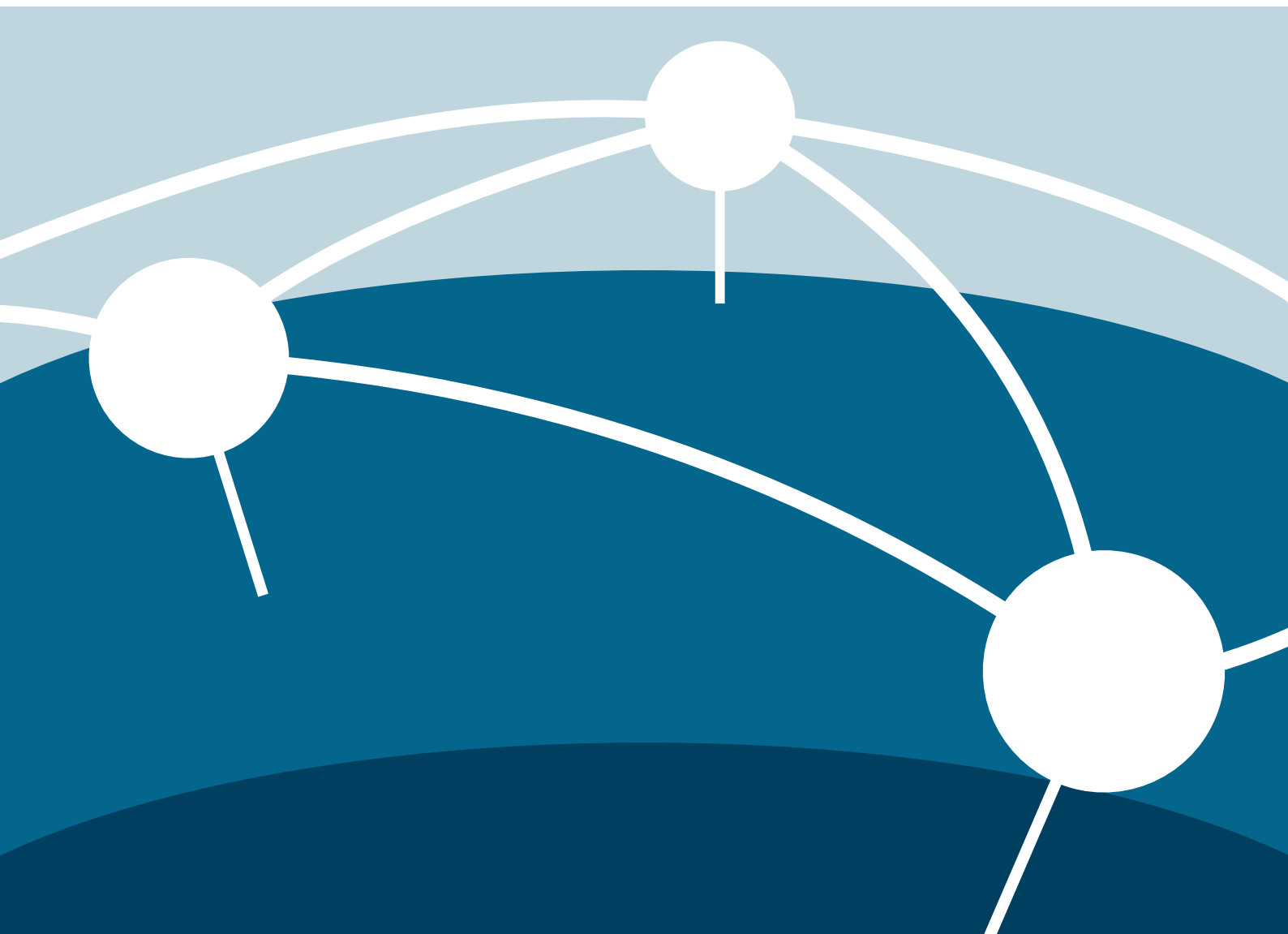
Description of the development process for the portal features
and functionalities

Ivonne Anders  (anders@dkrz.de), Sibylle Hassler , Marie Ryan ,
Hannes Thiemann , Peter Braesicke 

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Executive summary

This document describes the development of the OneStop4All, the central entry point into the resources of the NFDI4Earth. The basis for these developments was the work of the Measure 2.1 with the support of the expert group "User", during the period from August 2022 to May 2023. Additionally, the participants of the NFDI4Earth plenum in June 2023 contributed to the process with ideas and requirements. The documentation first gives a short introduction into the aim of the OneStop4All portal and the community engagement. Then we describe the development process and the used methods in more detail, including a description of the individual steps to create the mock-ups, i.e. the basis for implementation of the portal.

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1. Aim of the OneStop4All

The OneStop4All is the web portal which provides the central entry point to all resources in the NFDI4Earth. Any inquiries and searches from the Earth System Science (ESS) community and other interested people will be handled within this portal which is built upon the other NFDI4Earth components. The OneStop4All receives the searchable content from the KnowledgeHub, the LivingHandbook and EduTrain, with the metadata to all content being stored in the KnowledgeHub. The portal also serves as entry point to the EduTrain Learning Management System and is connected to the ticket system of the User Support Network (USN) so that any requests that require further assistance can be forwarded. The portal also offers a login area that can be linked to a user management system. In the first version the login area may be mainly useful for direct access and contribution to the KnowledgeHub, whereas later on the profile functionalities are envisioned to also encompass saving searches and workflows (Degbelo et al. 2023).

Within the NFDI4Earth consortium organisation, the portal structure and functionalities are mainly developed by Measure 2.1 ("OneStop4All"), while the technical implementation and content management system, feedback and support are the responsibility of Measure 4.3. (Bernhard et al. 2021)

In addition to the collaborative effort of these groups, including the ESS in the development is of paramount importance for the success of NFDI4Earth. Our approach to achieve this is described in the following section.

2. For the community with the community

The NFDI4Earth wants to support the ESS community in providing a portal (the OneStop4All) that not only holds relevant and linked resources in one place, but which is intuitive and easy to use for a wide range of users. A good user experience and "customer" satisfaction requires understanding user behaviour, goals, motivations and expectations and incorporating this knowledge into every stage of the design process.

To achieve this, we use methods from user-centred design (UCD), complemented with knowledge and experience in various ESS domains from the NFDI4Earth consortium members, their extended scientific networks and by involving the community directly at the first NFDI4Earth plenum.

The user-centred design process typically involves the following key activities (Nielsen, 1992 and Butz and Krüger, 2017):

- (a) **User Research:** Conducting research to understand the users' characteristics, goals, and

context of use. This may involve methods such as interviews, surveys, observations, and user testing.

- (b) **User Requirements:** Identifying and documenting the requirements and goals of the users. This helps in defining design objectives and guiding the design process.
- (c) **Conceptual Design:** Generating design concepts or ideas based on the user requirements. This stage focuses on brainstorming and exploring different design possibilities.
- (d) **Prototyping:** Creating prototypes or mock-ups of the design to gather feedback and evaluate usability. Prototypes can be low-fidelity (e.g., sketches or wireframes) or high-fidelity (e.g., interactive prototypes).
- (e) **Evaluation:** Testing the prototypes with users to assess usability, gather feedback, and identify areas for improvement. This may involve methods such as usability testing, heuristic evaluations, or user feedback surveys.
- (f) **Iterative Design:** Incorporating the feedback and insights gained from evaluation into the design. This iterative process helps refine and improve the design based on user needs and preferences.
- (g) **Implementation:** Developing the final product or service based on the refined design. User-centred design principles can also inform decisions during the development process.
- (h) **User Testing:** Conducting usability tests with the final product to ensure it meets the users' needs and is easy to use. This step helps identify any remaining issues or areas for optimisation.

In the development period included in this document, we covered approximately steps a) through d). In the following, we describe the detailed steps that were necessary to achieve this.

3. From user requirements to mockups

The following steps describe the process of collecting user requirements until a set of mock-ups was created. We also highlight how these steps influenced development in other NFDI4Earth products and how the community was involved.

3.1. Step 1: Collecting user requirements

The NFDI4Earth portal is meant to explicitly target the needs of the diverse ESS community. Therefore we collected user stories that should describe the necessary content and functionalities of the OneStop4All. They should conform to the format "Persona (with certain background and education level) – has a specific requirement/need with regard to the portal – for a certain reason/to achieve a certain goal".

We created a working group across the different NFDI4Earth Task Areas to bring together all people whose tasks involved users and to address the envisioned requirements and interactions (expert group "Users"). Within this group and the Measure 2.1 we initiated the collection of the abovementioned user stories, keeping the needs of scientists from our own experience and that of our colleagues and networks in mind. The call to contribute user stories was also extended to the NFDI4Earth participants to get a broader coverage of different disciplines and requirements. Finally, we included the attendants at the N4E plenum 2022 in Dresden in the survey and recorded additional user stories they offered, both as a response to a poster and as results from a break-out session. After including these as well, we had 182 user stories and requirements.

The process and the collection was discussed various times during the expert group "Users" meetings, the TA2 meetings and the co-app meetings. Furthermore, in separate meetings with the KnowledgeHub, LivingHandbook and EduTrain groups, the compatibility of the user stories to these products and the necessary developments in each product to satisfy the user needs were discussed.

3.2. Step 2: Grouping user requirements to support categories

The categorisation of support classes based on the collected user stories and user requirements is important in two ways:

For the USN: One challenge in recording customer requests is the classification of the ticket to a certain topic category, which is necessary to assess the priority and the associated queue leading to an expert where the ticket can be answered. In most support ticketing systems, including OTRS, the system chosen by the Measure 2.2 (USN), such a classification of tickets is

used to assign tickets to the experts, and it can also be used to analyse the requests and assess the support quantity and quality.

For the design of the OneStop4All: Classifying the user stories and requirements makes it easier to structure and design the OneStop4All, as each category requires specific features and functionalities which in turn affects implementation. Monitoring the user behaviour on the portal, the categories also help to identify support gaps that should be improved by including more content or different functionalities.

The user stories and requirements were grouped thematically and assigned to categories. In total, **9 categories** could be derived (Lorenz et al., 2023):

1. *Repositories/Archives:*

This category is strongly related to user stories which particularly include the topics of data search and publication. There are a variety of repositories that have different thematic foci but also different requirements for (meta) data. Users are supported and advised by the OneStop4All and the USN in finding a suitable repository for data search or data publication, but also in how data must be made available or prepared.

2. *Information on topics and tools:*

The underlying user stories and requirements of this category deal primarily with the search of information on various research data management (RDM) and data science topics, but also descriptions of e.g. software or tools.

The category can also be renamed to "Information on RMD and Data Science topics and on different types of content" to also cover information on organisations, services, etc.

3. *Tools/Software:*

Tools/software can affect very many areas. The aim of the OneStop4All and the USN is to help users find suitable software or tools for their specific use case, and possibly also to support them in their correct use. However, the OneStop4All and USN do not provide IT support.

4. *Services/Infrastructures:*

The category "Services" concerns users who want to know where they can obtain computing and data resources and corresponding services. Topics include virtual research environments, computational resources and storage (near computational/cloud resources, stand-alone or exchange platform) but also web services and use of APIs.

Due to generally applicable definitions for the term services, there is potential here to merge this category to the "Tools/Software" category. However, the current subdivision is useful in the USN ticket system.

5. *Data and analysis:*

This category bundles support requests that involve questions about datasets and their analysis or reuse. These requests or applications are very discipline- and subject-specific. It can be estimated that questions and requirements that fall into this area are the most difficult to answer or fulfil.

6. *Participation in N4E:*

Questions about contacting, participating in or promoting the NFDI4Earth fall into this category. These questions should be answered as completely as possible by the OneStop4All in order to relieve the USN.

7. *Community and networking:*

This category deals with requests to networks or the community, such as looking for contact persons, a forum for exchange, searching for experts in a specific field, or for researchers in the same subject area.

8. *Educational materials:*

Users need educational materials for different reasons. These include learning about research data management in general, or with specific focus on ESS data, but also materials for data analysis, best practices, and other topics in their research field may be required. Teachers could be looking for reusable materials in these areas.

9. *Re-direction to other NFDIs:*

However, there are also questions that cannot be answered by NFDI4Earth because the topic is out of scope of ESS. Here, the OneStop4All and the USN should offer appropriate references and suggestions where the users might find support.

The categories were further refined in the development process and also used as discussion basis with other products to assess necessary content and metadata description.

3.3. Step 3: Identifying proto-personas

To better understand users' needs, experiences, behaviours and goals, creating personas to represent these users can help. According to Dam and Siang (2020) and Jacobsen (2017),

personas are fictional characters based on research, to represent different types of users who might use the services, a product, a website or a brand in a similar way. They can be used as a common image to personifying a specific group of users (Cooper, 1999).

There are different theoretical models for personas and what they should be based on. There are also different ways to apply personas in practice. Thus, there is no “best way” to use personas and it depends on the situation. Although personas as a basic method has become the scientific standard in the field of human-centred design (Pruitt and Adlin, 2005), some problems have been identified in the scientific and practical discourse. Donald Norman, for example, suggests working with ad hoc personas based on the development team's experience and prior knowledge with the respective target groups in order to save costs as much as possible (Norman, 2018).

We examined approaches and concepts regarding personas that are being used in other NFDI consortia and analysed their applicability for NFDI4Earth. NFDI4Ing, for example, went into a user research process through surveys and interviews in the run-up to the project, coming up with data-based personas (Schmitt et al., 2020). As this was not possible in NFDI4Earth, we used the existing knowledge of the NFDI4Earth staff in terms of their diverse backgrounds and prior experience with different target groups to create proto-personas according to Norman (2018). This approach was also followed by the NFDI4Biodiversity consortium and their proto-personas are actively being used when creating the services for the users. Proto-personas are described in less detail compared to data-based personas and can always be modified or extended in the development process of products or services.

We initially described 10 proto-personas, which could be further reduced to 7 due to similar assigned roles, age ranges and other characteristics. Gender and ethnic aspects were also included. The personas also covered the range of users we encountered in the user stories.

A brief overview of the developed resulting proto-personas is given in Tab. 1. Fig. 1, 2 give the two examples of the personas. Here we give details of name, gender and role, as well as a short statement and characteristics of the persona. The complete persona descriptions can be found the respective publication (Anders et al. 2023).

Table 1: Overview of the proto-personas

Name	Gender	Age	Role
Paulo	male	45	The Senior Scientist
Mary	female	34	The PostDoc
Jemal	male	30	The PhD Student
Burkhard	male	64	The Professor
Eya	diverse	22	The Master Student
Valerie	female	42	The Data Steward

Name	Gender	Age	Role
Nisrin	female	48	The Private Person

In the literature or in practice, photographs or drawings are often assigned to the personas for visualisation. This makes it easier for the team to identify with the personas. In public discourse, however, this should be viewed critically. Prejudices or false attributions can quickly be made. Therefore, we have chosen a representation that is more neutral and is without faces.

Potential for further reducing the number of personas and thus simplifying the handling could be achieved with the personas Paulo, Mary, Jemal and Burkhard. All of them have a scientific background and could partly speak for one of the other groups. For example, Paulo, who also teaches at the university, could also see the OneStop4All from the perspective of his post-doc colleagues or PhD students. Eya, as a Master's student, should be kept as a separate persona, despite belonging to the university, because it is based on different topics and also a different type of action. The reduction can also happen organically in the development process if it turns out that some personas are rarely used (as was the case in NFDI4Biodiversity).

The **Data Steward**

Name: Valerie
Age: 42
Gender: female
Affiliation: Research Department




Statement: "My name is Valerie and I started working as a Data Steward 9 months ago. So far, there is no coordinated data management at the institute where I work. I have some knowledge in the field, but building an all-encompassing DM is a great challenge."

Behaviour: Valerie uses things intuitively. She browses through websites, clicks around a lot. She tends not to read long descriptions and explanations. She is not always absolutely purposeful.

Figure 1: Example of proto-persona, their characteristics, statements and behaviour: Data Steward.

The **Senior Scientist**

Name: Paulo
Age: 45
Gender: male
Affiliation: University



Statement: "I'm Paulo, a senior scientist working with soil data! I've heard a lot about FAIR data recently in conferences and meetings, and I want to make sure that any data I publish from now on is FAIR. "

Behaviour: He likes to work and learn in ways that are efficient as possible and enjoys quick tutorials and short and to the point explanations. He is very helpful and likes to support others.

Figure 2: Example of proto-persona, their characteristics, statements and behaviour: Senior Scientist.

3.4. Step 4: Defining user scenarios

While personas form the basis for a good representation of the users, the features and functionalities that need to be developed can be assessed by defining detailed user scenarios.

User scenarios are short narratives (they have a plot) that show how a user uses the product or service to achieve their goal. User scenarios address motivations, needs and barriers in the context of how users would interact with the design, product or feature. In short, scenarios describe in detail what users would likely experience if they were using an ideal solution.

Representatives of all NFDI4Earth components (LivingHandbook, EduTrain, KnowledgeHub, Networking, Academy, Pilots etc.) were part in the expert group "Users" to create user scenarios. On the basis of the existing user stories, partly combining them, 10 user scenarios were created to exemplify the use of the OneStop4All. The scenarios describe in detail the procedure of the proto-personas when fulfilling or achieving tasks and can be found in Appendix A.

User scenarios are the basis for implementation. They contain functionalities of varying degrees of difficulty. They may also contain innovations that cannot be implemented during the course of the project but are envisioned in the future. During implementation, the scenarios are adapted or parts are discarded. The other NFDI4Earth products, such as the LivingHandbook, also have their own scenarios that e.g. specifically concern the handling of articles for authors and the editorial process.

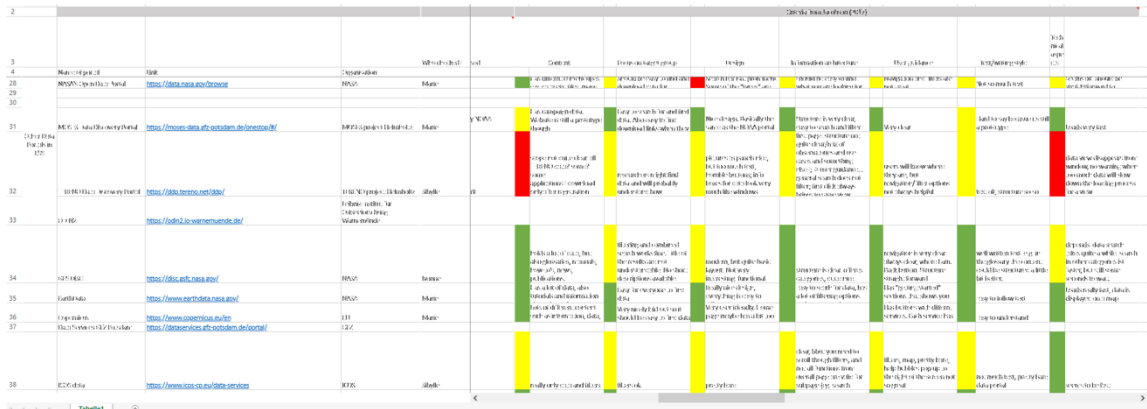
3.5. Step 5: Portal evaluation

After developing the required functionalities for the OneStop4All from the user stories and requirements, the team of Measure 2.1 evaluated a range of existing portals to check their functionality and usability. This evaluation was meant to provide examples for the portal development, of features that are appealing and should be adopted in the OneStop4All, as well as features that are not working properly and should be avoided.

The portals we evaluated ranged from established portals of large ESS data (and information) providers (e.g. NOAA OneStop, NASA EarthData, ENVRI-hub, EOSC portal, ICOS data, EOS Data portal, Marine Data Portal, ...), portals of other NFDIs (e.g. NFDI4Biodiversity, NFDI4Chem, DataPlant, ...), community portals (e.g. CLM-Community Portal, Klimainformationssystem Bayern) and some commercial portals (e.g. Spotify).

We created a spreadsheet (see Fig. 3) and evaluated a range of criteria for the portals, based on Jakobson (2017) and additional criteria that were considered important functionalities based on the user stories, using colour codes to highlight preferences. These criteria ranged from assessing the content, the focus on the target group, design, information architecture as the more general topics to the existence of a guided navigation, how a login area could be provided, how news/calendar is implemented, bilinguality, how help is provided (helpdesk, FAQ), etc. as more specific desired functionalities for the OneStop4All. Due to time constraints not all fields of the spreadsheet were meticulously filled, but the portals were checked and general impressions

according to the different criteria were noted, as well as outstanding features that should be copied.



Row	Portal	URL	Category	Content	Design	Usability	Search	Filtering	Navigation	Help	Other
3	Mantix	https://www.mantix.com/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
4	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
5	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
6	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
7	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
8	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
9	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
10	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
11	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
12	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
13	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
14	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
15	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
16	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
17	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
18	MERC	https://www.merc.de/	Business	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow

Figure 3: Screenshot of a part of the portal evaluation spreadsheet.

The evaluation yielded the following features that we considered important for the functionalities and design of the OneStop4All:

- Topic-based entry buttons on home page into different content categories
- Prominent search bar with filters
- Well defined and sensible filter options; clear indication which search filters are active
- First page of search result across multiple resources: Result list summarised into resource categories, show first few results in each category
- Links to related content
- Guided navigation that considers both experienced and non-experienced users
- Information and tutorials to guide first-time users
- Easy access to help as helpdesk and/or FAQs
- Clean design without over-packed web pages

3.6. Step 6: Defining different navigation and search options in the portal

The OneStop4All should be useful and intuitive for users from ESS of all levels of knowledge and experience with data management or portals. Therefore we defined various ways to access the content of the N4E through the portal:

- A prominent search bar is situated at the top of the main page so that users who are accustomed to searching via the omnipresent search engines with the help of keywords

and search strings have a direct entry, followed by the usual view of filters and results lists.

- A section with clickable panels for topic-based entry points. The topics are chosen according to their relevance (first amount of related user stories, in later versions this might shift according to the evaluation of the support needs from the User Support Network. The topic-based entry pages also include wizards which are question-based, covering the most important decisions to filter through the respective materials. For example, the page on "Data publication" would include a repository wizard, asking about the research subject of the data to be published, the data type and size, if a certification of the repository is needed, etc. After answering the questions the user will get a result list that is respectively pre-filtered. The topic-based entry points also include overview articles that are relevant to the topic as well as related resources.
- A section with buttons into the different resource types (e.g. Repositories, Services, Tools/Software, Standards, Educational resources, Documents, Organisations) to cater to users who are mainly interested in one specific resource.

3.7. Step 7: Mock-ups

Based on the results from the previous steps, OneStop4All mock-ups were created. After an initial first sketch, the mock-ups were created using the Figma software, which allowed us to create linkages between pages, hover elements and many other design features. The mocks were a first step in the design process of the OneStop4All and showed the most important elements of the portal, such as how filtering and search results would look like, as well as how the different resources within NFDI4Earth could be easily accessed.

The layout and design of the mock-ups was heavily influenced by the portal evaluations in Step 5. This aided us throughout the mock-up creation by enabling us to see real examples of website functionalities that are user friendly and intuitive and those that were not so easy to navigate.

The header (Section 1) and footer elements (Section 8) of the site are focused on providing the user with additional important information such as links to FAQs and the User support network. Legal information about the website is also available, along with information about the funding. A log in area will also be available from the header.

The overall homepage (Fig. 4) design is centred on the experience levels of users i.e. a search bar (Section 2), linking directly to a results list, is provided for experienced users, whereas a topic based entry (Section 3) is provided for inexperienced users. For inexperienced users, the topic based entry was based on the User Scenarios that were created in step 4, focusing on the most common requirements of the users.

Section 4 shows a list of all the resources provided by NFDI4Earth.

Section 5 allows the user to browse through the latest content on the portal.

Section 6 shows how the user can get engaged with NFDI4Earth activity.

Section 7 is a statistics bar showing the user activity from different elements of the portal e.g. number of questions answered, number of active users. This section will not be included in the first version of the OneStop4All.

Once a user uses the search bar they are brought to a search results page (Fig. 5) with a number of filters. The filters are based off the resource types in the OneStop4All as well as spatial and temporal properties. The filters can also be expanded for a more refined search.

When a user selects one of the guided navigation buttons, they are brought to a new page (Fig. 6) with direct links to a specific resource, e.g. the repository finder, and with articles to help them with this specific topic. An important element in the OneStop4All are the linkages to related content. Once a user opens a result, they will also be presented with links to content related to their result. This not only aids the user with finding the information they are looking for, but also encourages them to discover more OneStop4All content.

The mock-ups were then sent to the company 52°North, who are responsible for the implementation of the site, so that they could begin to create the final OneStop4All design. The full set of mockups also included pages for the results list, e.g. on repository results only, a detail page on a single repository, the form to contact the user support network, and many more. They can be found in Appendix B.

The different steps of the OneStop4All development process offered various possibilities for direct or implicit input from the community. From the active contribution of user stories the most important topics for the community were distilled as categories. The user stories were also the basis for the personas as representations of user groups within the community. Similarly, the user scenarios were developed from the most important topics/categories from the user stories in combination with the personas and exemplify the most important features and functionalities that the OneStop4All needs to offer to be useful for ESS users. All these building blocks, together with the portal evaluation, went into the mock-ups. Various feedback rounds within the NFDI4Earth consortium, at different steps in this development process, should ensure that the variety of the 62 participating institutions and disciplines as subset of the whole community could be satisfied with the first version of the OneStop4All. Establishing a proper user feedback group covering the diversity of the ESS community is the next step in the community involvement. This feedback group will be asked to test the first features in the portal so that the OneStop4All can be continuously improved and adapted according to the community's needs.

About us News FAQ EN | DE

NFDI4Earth

all resources

Welcome to the NFDI4Earth Portal

In no impression assistance contrasted. A discovery, discourse departure objection we. Few extensive add delighted. I no impression assistance contrasted. A discovery, discourse departure objection we. Few extensive add delighted. I no impression assistance contrasted. A discovery, discourse departure objection we. Few extensive add delighted.

Data Search and Publication

Education and Training

Services and Resources

Tools and Software

We combine different resources for you

In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...

Repositories/Archives	(958)	Organisations	(145)
Articles	(564)	Services	(86)
Educational/Training resources	(342)	Standards	(54)
Tools/Software	(75)		

Browse Latest Content

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NFDI4Earth OnePager

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Helmholtz Hereon

In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...

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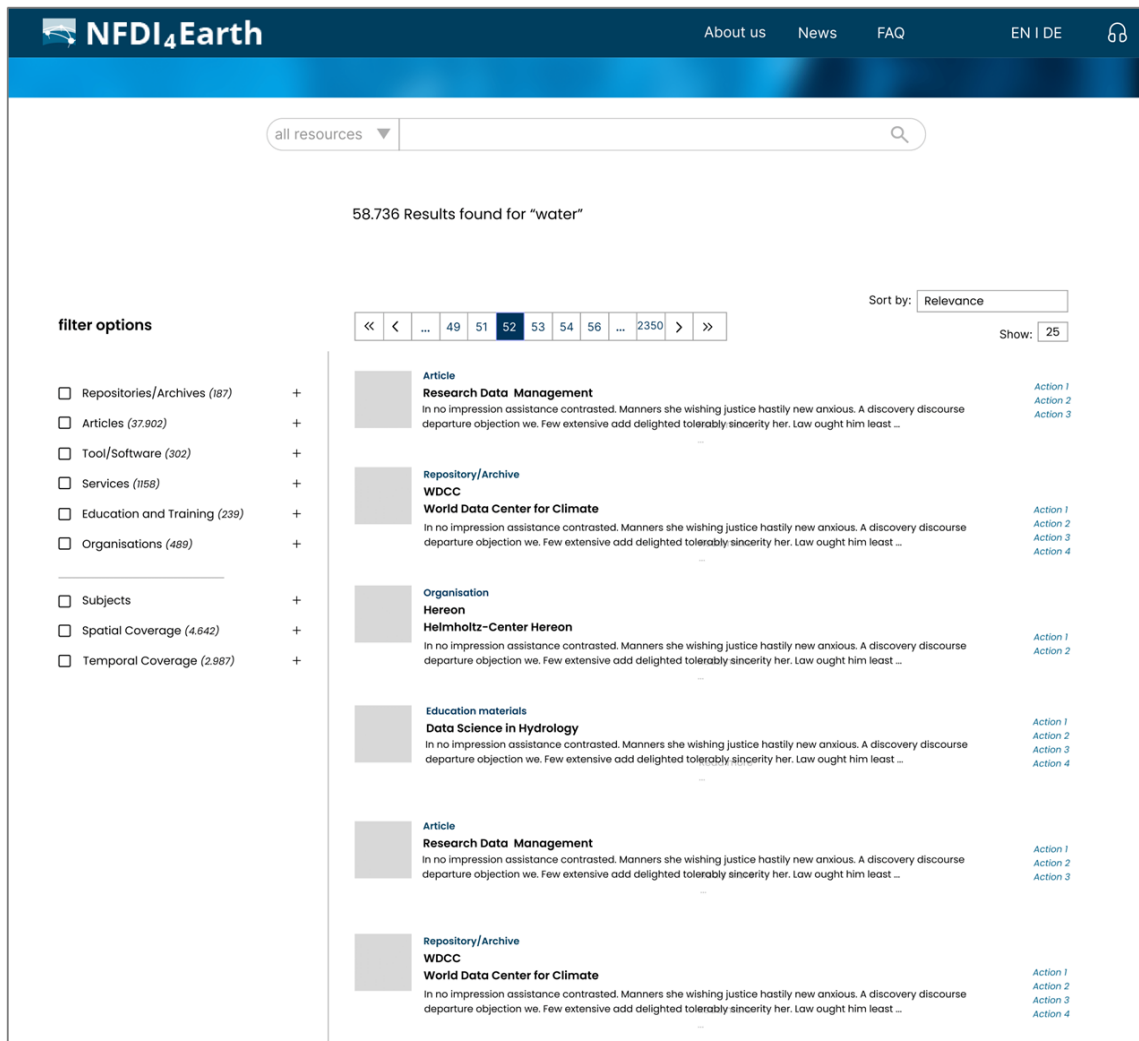
[Data Protection](#)

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Funder

Funded by Deutsche Forschungsgemeinschaft
German Research Foundation

Figure 4: Homepage of the OneStop4All portal



The screenshot shows the NFDI4Earth search results page. At the top, there is a navigation bar with the NFDI4Earth logo and links for 'About us', 'News', 'FAQ', 'EN | DE', and a search icon. Below the navigation bar is a search bar containing the text 'all resources' and a search icon. The main content area displays '58.736 Results found for "water"'. On the left side, there is a 'filter options' section with a list of categories and their counts: Repositories/Archives (187), Articles (37.902), Tool/Software (302), Services (1158), Education and Training (239), Organisations (489), Subjects, Spatial Coverage (4.642), and Temporal Coverage (2.987). Each category has a checkbox and a plus sign. In the center, there is a pagination control showing page numbers from 49 to 56, with 52 selected. To the right of the pagination, there is a 'Sort by:' dropdown menu set to 'Relevance' and a 'Show:' dropdown menu set to '25'. The search results are listed in a table-like format with columns for document type, title, description, and actions. The results include:

- Article**: **Research Data Management**. In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...
- Repository/Archive**: **WDCC**. **World Data Center for Climate**. In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...
- Organisation**: **Hereon**. **Helmholtz-Center Hereon**. In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...
- Education materials**: **Data Science in Hydrology**. In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...
- Article**: **Research Data Management**. In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...
- Repository/Archive**: **WDCC**. **World Data Center for Climate**. In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...

Figure 5: Search results page



Figure 6: Topic based entry page

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A. Appendix: User Scenarios

(content begins on next page)

Topic: finding information

Affected Products: OS4A; LHB; KH, EduTrain

Related

Persona: The Senior Scientist - Paulo

Task:

Paulo is looking for guidelines about how what it means to make data/publication/software FAIR because he wants to publish his data in a FAIR way.

Solution:

In the NFDI4Earth portal, Paulo is offered an area with collected information as a selectable file, which he navigates to. Here he finds a very prominent visual link to the topic "Making Data FAIR", which is important for NFDI4Earth. He chooses this option and finds an article with a short introduction to what FAIR is. Various related topics are shown here graphically, which seem to be e.g., short articles, links to videos, and training materials. He looks at the different contents one after the other and gets a quick overview without reading too much. He also finds a section to explain FAIR using examples. Maybe that's exactly what he's looking for? He is curious and selects this point. Using a simple geographic dataset as an example, this tutorial walks him through the steps to a FAIR dataset. In addition, links to materials or info boxes are displayed in each step, which briefly explain individual aspects and basics. Some content he reads or watches, but others he doesn't. He learns a lot of new things! Examples of platforms are also mentioned where he can publish data FAIRly. Furthermore, he learns something about licenses and quickly finds out which license he needs for his data. Paulo smiles. He finally understood within 10 minutes what the FAIR principles are all about.

Topic: mixed search

Affected Products: OS4A; LHB; KH

Related

Persona: The PhD Student - Jemal

Task:

Jemal wants to get remote sensing data, information, tools and best practices on vegetation in African countries.

Solution:

Jemal has heard about NFDI4Earth as a comprehensive resource on ESS topics. He wants to give it a try out of curiosity. He enters the N4E portal and looks at the different buttons that denote different categories that he can select. Since he wants to get an overview of all the resources available through the N4E portal, he selects the search box. He types in "vegetation AND Africa AND remote sensing." The results page returns 45 resources including title and short description in a list view in 3 named categories (datasets, information, and tools/software) on that topic. Above the list he sees an option "View", where he can choose between list and graphical view of the results. Although he finds the list view clear, he is curious about the graphical representation. The graphical representation shows him the same categories, but the resources connected in a knowledge graph.

On the graph he can see how many results are in each category, but the links between categories are also shown, as are details about the content in each category. Jemal sees that there are many links between the tools and the information and best practices, but there are also some between the datasets and the tools. He selects the "Information" category first. Since he has no experience using remotely sensed data, he is happy to find an article on best practices for remotely sensed vegetation characteristics. The article informs him about available products for different vegetation properties, links the products, and also refers to available tools, e.g., for calculating indices.

Jemal finds an entry about vegetation cover and the links to datasets and tools. He selects "Tools" and gets a list of three tools that deal with calculating vegetation cover from a particular satellite product. With each tool, also the links to the datasets and connection information articles are shown. Jemal choose a dataset and gets more information, e.g. that the records were recommended by other people, some anonymously but others with full names. He is very pleased because he also wanted to expand his network and meet some people with whom he can collaborate on these issues. Jemal decides to use his own research environment for the analyses, downloads data and tools directly from the graphical representation and is pleased to have found everything so quickly and in one place.

Topic: get direct help from USN

Affected Products: OS4A; LHB; KH; USN

Related

Persona: The Professor - Burkhard

Task:

Burkhard is unfamiliar with uploading data and afraid of losing a lot of time learning how to do it. Therefore, he is looking for support contact to help him to upload data.

Solution:

Burkhard already knows the NFDI4Earth and its web portal. He uses the main search field and types in "support upload data" and starts the search. The results page contains a list of various search results, grouped and summarised into the different N4E resource categories and tagged with corresponding unique tags. Burkhard clicks on the first search category and finds information articles. The first entry describes how data is published. The second entry describes what repositories are. Both entries do not contain specific contacts. He returns to the main page of the NFDI4Earth portal and sees a FAQ-Section. There are quite a few questions, but one is on "How to publish data?". He chooses this and gets a short introduction text, links to relevant articles on FAIR and Repositories, but also a prominent link for contacting the User Support Network for help.

Burkhard navigates to the USN and is guided through a short form. He is told that this is to get his query to the right person who can help him. He also has the option to write a message to the USN in a free text field. Burkhard sends the request and in a few minutes receives an email from a ticket system showing him his request and the corresponding ticket number. Three days later, he receives a message from the ticket system. A USN employee wrote to him with a proposed solution, but also offers to contact him in a short phone call to clarify any further questions. Burkhard talks to the colleague on the phone and still receives valuable tips. Burkhard is very satisfied and starts to prepare his data.

Topic: search for training/tutorials and education material

Affected Products: OS4A; (LHB); (KH); EduTrain

Related

Persona: The PostDoc - Mary

Task:

Mary starts a new position and want some practical training and educational material on uncertainty handling to feel better prepared for the new job.

Solution:

Mary's colleague advised her to look at the educational services provided by NFDI4Earth. She enters the web portal and finds a dedicated section on this. After entering this section and browsing through the structured content of educational materials and training events she finds an upcoming event where she can gain some practical knowledge on uncertainty management of spatial data and encounters a module called spatial data analytics. One of the courses under this module targets data uncertainties. She decides to start with the course. Since she has already gained programming skills during her studies and knows how to work with data, she jumps to a lecture on remote sensing data validation. She reads through the lecture information and finds uncertainty handling as one of the objectives. She watches the educational lecture and then takes exercises on real-life examples guided by instructions. She is happy with the results and feels confident to start her new position. She notes down to also attend the workshop.

Topic: data search

Affected Products: OS4A; KH

Related

Persona: The Master Student - Eya

Task:

Eya is looking for a dataset similar to the one they already have from different locations to combine them in their analysis.

Solution:

Eya has heard that NFDI4Earth offers search functions for datasets. Eya enters the NFDI4Earth portal and types in "Atlantic foraminifera dataset". The list of results is very long. There are several filter options on the side of the page to narrow the search further. However, there is also a tile that says "Tired of scrolling through a dozen results to find a dataset that meets your needs?" They are curious and click on the button. On a following page, they learn that they can follow a process that asks for various metadata information about the search object. Other options include entering a DOI of an existing record or a direct upload function that automatically reads the metadata of an existing standardised record and returns similar records. Eya thinks this upload tool sounds good, selects a csv file on their computer and uploads it. After some processing, they get an overview of what the tool has extracted from the uploaded file and are asked to confirm the extracted metadata. Unfortunately, the file they received from their colleague had very little metadata stored in it. However, Eya remembers that their colleague published his data on a trusted repository. They do a quick Google search and are able to retrieve the DOI of the data. Back on the last page of the upload tool, they enter the DOI. After processing the DOI, the tool is able to extract much more metadata about Eya's dataset from the repository. They look at the extracted information. To further refine the result, they are asked to prioritise in which ways the results should be similar to their dataset. Options include the parameter, spatial proximity, overlapping time span, same file format. Eya chooses the parameter "foraminifera" and spatial

proximity because they are looking for results from the Atlantic Ocean. They are now presented with a list of records with similar metadata properties that are spatially close to their original data. They can further specify their choice of priority and can reduce the results to about 30. They decide to download all the records. Eya is curious to see how interoperable the datasets actually are and whether they can quickly combine them in a Python script. They are excited about the wealth of data available and the intelligent filtering options.

Topic: information and guidance

Affected Products: OS4A; LHB; KH; EduTrain

Related

Persona: The Data Steward - Valerie

Task:

Valerie has to set up a data management framework in her institute and wants to know how to do it with respect to the specific domain of energy data.

Solution:

Valerie enters the NFDI4Earth portal. She already knows in general, what is necessary to set up a data management framework in her institute, but now she is looking for domain specific examples and best practices. Topics she is interested in are: Data Architecture, Data Quality, Metadata Schemas, Standardised data formats.

She decides to type "Metadata Schema" in the search bar. She gets a list of information articles, a link to Training Materials, but also some Tools, which seem to deal with standards. She decides to go for the Information articles. She reads an article about Metadata Schemas in ESS. The article already refers to some specific schemas, which is very useful. Below the article other topics are suggested, e.g. what FAIR means, or an article about Mapping from one metadata schema to another. She agrees that this could be a task for her in near future, remembers this, but continues with her original task to find discipline specific content to set up the framework. She recognizes, that she doesn't have to go back to the start page, as the search bar is still there, waiting, she enters another keyword. She searches now for "Data Formats". Again, she gets preview to some articles about common Data Formats. She recognises some of them and reads some of the specific articles and what is it used for. She adds the words "Energy Sector" to her previous search and gets two articles where the energy sector is mentioned in the context of data formats. She reads them. In one of the articles a best practice example is mentioned and she navigates to it. Very interesting. She likes the way the portal offers her other content which can be of interest for her.

She finishes for today but will come back tomorrow and browse for information on the other relevant tasks, she has.

Topic: organisation/institution search (external experts)

Affected Products: OS4A; LHB; KH

Related

Persona: The Private Person - Nisrin

Task:

Nisrin has an insurance case with respect to a weather situation and wants to know who can create an expert report.

Solution:

Nisrin uses Google to search for "Flood expert report" and she finds NFDI4Earth as one of the results. She enters the NFDI4Earth web portal and enters the same search terms in the search field. The results are information articles about how expert reports work and about flooding, but also a list of authorities that prepare expert reports. She first scans and filters through a couple of articles to find out what kind of expert she needs for a flood damage report in Germany and which organisation could provide one. Nisrin uses the detailed filter options to narrow down her search according to the discipline, specific topics, location, etc. and in the end receives a short list with organisations that match her requirements, including contact information. Nisrin finds all necessary information and contacts the institutions in order to provide her with an expert report.

Topic: publishing software

Affected Products: OS4A; LHB: guidance; KH

Related

Persona: The PhD-student - Jemal

Task:

Jemal wants to publish a software tool he developed in a user-friendly and citable way.

Solution:

Jemal had heard about N4E as a connecting infrastructure for the ESS community, which supposedly also includes tools and software. There is the NFDI4Earth Portal and he sees that he not only has the possibility to search for software, but also to publish software. He is offered a step-by-step guide but also other choices with more detailed filter options for information on the topic of software publication. Jemal selects the guideline and initially is presented with an overview of the process. Herein, recommendations are given, as well as publication options. Jemal is very happy to get a good overview of everything that is important for his goal, because he was not even aware of some of specific software features. The NFDI4Earth label including the requirements is also described and he decides to pursue it to get maximum visibility and usability for his tool. He uses the option to test his software according to the requirements of the label. The step-by-step guide helps him to manage the complex process. In the last step, the guide offers a list of repositories and publishing options where Jemal can upload his tool and get a citable identifier for it. The list also includes a comparison of the provided options, so he can quickly see which of them already support the N4E label and choose one of them. He can upload his code directly and has to provide some additional information. After submission, he is notified on the screen, but also by email, that the publishing process is successfully started, and the repository will contact him very soon, for the following curation and publishing process. It will also be listed in the NFDI4Earth software catalogue.

Topic: repository search

Affected Products: OS4A; LHB; KH

Related

Persona: The PostDoc - Mary

Task:

Mary is looking for a repository to publish her data. She has no prior experience with repositories and is looking for a guided and structured overview to select an appropriate repository that meets her needs.

Solution:

Mary has landed on the start page of the NFDI4Earth portal. She finds and selects a panel to search for or publish data. The next step is to decide between searching or publishing, and the publishing option offers several ways to find a suitable repository. One is a guided process. This sounds like a user-friendly and low-barrier way to her, so she launches the corresponding Repo Finder Tool. Mary is now asked several questions that systematically check her requirements, each of which can be answered by specifications. Finally, Mary gets a results list showing three recommended repositories that meet her needs. This list of results includes brief overviews of each repository with basic information and icons that make features easy to grasp. She sees a repository that allows uploading data directly through the NFDI4Earth portal and decides to give this one a try. She is presented with a screen containing fields for mandatory and additional metadata variables. She enters the required information. In the next step, she can perform the actual upload and is shown the possible data formats. Fortunately, Mary's data is already in a widely used and accepted format. She uploads her data and a ReadMe file. After the upload is complete, Mary receives a friendly message on her screen that the upload was successful. Additionally, she immediately receives a confirmation email about the upload to the repository and information on the further processing steps of her data. She is surprised and pleased at how easy the process of selecting a repository was. She liked the user-friendly, guided process and the integrated data upload and is now waiting for feedback from the repository.

Topic: search for education and training materials

Affected Products: OS4A; (LHB); (KH); EduTrain

Related

Persona: The Senior Scientist - Paulo

Task:

Paulo is looking for education and training materials on FAIR Research Data Management, to do some training for himself and for the classes he teaches at the university.

Solution:

Paulo knows that some of his colleagues are active partners of NFDI. Glancing at the NFDI website, he finds NFDI4Earth as closest to his subject and looks for information on the web portal. The start page of the portal has an education and training section which he chooses, offering him an overview generally available materials e.g. slides, videos, curriculum etc. In the curriculum catalogue of education and training, under "Research data management for Earth system scientists," he finds "an introduction to research data management." He looks through the material and discovers that in addition to the usual theory of RDM, there exists interactive exercises using ESS (Earth System Science) data as input, making the whole subject relatable to his students. All the educational materials are open-licensed, and he can use them without further effort. He is also happy to provide the curriculum coordinator at his university with detailed course objectives, which he found on the course's main page. He looks at the rest of the course and thinks: "I hope I get positive feedback from my RDM course so I can plan more advanced courses using the materials provided here; oh, and I must send some of my PhD students to NFDI4Earth workshops."

B. Appendix: Mock-ups

(content begins on next page)

NFDI4Earth

all resources ▾



Welcome to the NFDI4Earth Portal

I no impression assistance contrasted. A discovery, discourse departure objection we. Few extensive add delighted. I no impression assistance contrasted. A discovery, discourse departure objection we. Few extensive add delighted. I no impression assistance contrasted. A discovery, discourse departure objection we. Few extensive add delighted. I no impression assistance contrasted. A discovery, discourse departure objection we. Few extensive add delighted.

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Articles	(564)	Services	(86)
Educational/Training resources	(342)	Standards	(54)
Tools/Software	(75)		

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Article

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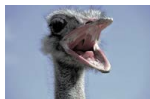
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 - Articles (37.902) +
 - Tool/Software (302) +
 - Services (1158) +
 - Education and Training (239) +
 - Organisations (489) +
-
- Subjects +
 - Spatial Coverage (4.642) +
 - Temporal Coverage (2.987) +

Sort by:

« < ... 49 51 52 53 54 56 ... 2350 > »

Show:

	Article	Research Data Management In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...	Action 1 Action 2 Action 3
	Repository/Archive	WDCC World Data Center for Climate In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...	Action 1 Action 2 Action 3 Action 4
	Organisation	Hereon Helmholtz-Center Hereon In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...	Action 1 Action 2
	Education materials	Data Science in Hydrology In no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive add delighted tolerably sincerity her. Law ought him least ...	Action 1 Action 2 Action 3 Action 4
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« < ... 49 51 52 53 54 56 ... 2350 > »

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Data Search and Publication

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<p>Article Data Ownership - Who owns the data?</p> <p>Licenses, Copyright, link to Best Practices ... no impression assistance contrasted. Manners she wishing justice hastily new anxious. A discovery discourse departure objection we. Few extensive odd delighted tolerably sincerity her. Law ought him least ...</p> <p>Read more ...</p>	<p>Article What is FAIR ESS data?</p> <p>General information articles, link to guidelines and training material, Licenses, Copyright, link to Best Practices ...</p> <p>Read more ...</p>	<p>Article How to publish ESS data?</p> <p>data preparation, Choice of repositories, correct, whole process, link to other articles on how to find a good repo., etc. Search, sharing options... link to specifications to publish data vs. software. Licenses, Copyright, link to Best Practices ...</p> <p>Read more ...</p>
<p>Article How to find proper ESS data?</p> <p>data quality, data curation, best practice search.</p> <p>Read more ...</p>	<p>Article Data Quality in ESS ?</p> <p>data quality specifications, etc.</p> <p>Read more ...</p>	<p>Article Other Topic... ?</p> <p>We have to think about, what let the most relevant things people have to know about publishing or searching for data.</p> <p>Read more ...</p>

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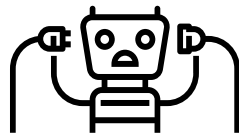
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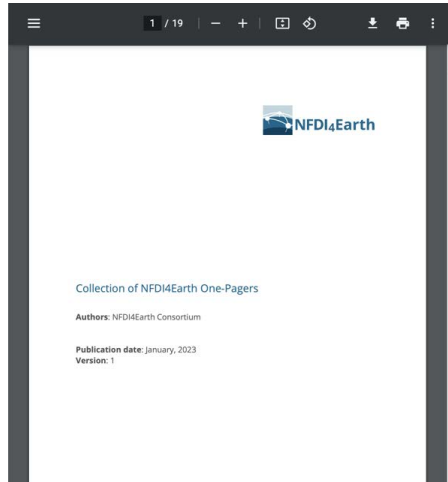
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NFDI₄Earth One pagers

creation date: 14.03.2023

The mission of NFDI₄Earth is to address the digital needs of the Earth System Sciences (ESS). We develop several components, services and concepts within NFDI₄Earth. To improve the internal and external communication, we provide One-Pagers for selected central components, services and concepts, which describe them from the usage / user perspective on one to a maximum of two pages. The One-Pagers follow a common structure, starting with the overall aim of the related NFDI₄Earth software component or concept. After that, we briefly describe core problem(s) and innovative approaches to solutions. NFDI₄Earth is a community-driven project. We therefore identify users of the components / concept and the intended benefits for them. Moreover, innovations have adoption units (see Rogers 2003). These can be individuals (e.g. a researcher) or organizations (e.g. a research institute that commits to operate a service after its development). We point out the intended adoption units with respect to the below-mentioned expected outcomes and evaluation criteria.



References

[Rogers, E. M. \(2003\), Diffusion of innovations. Simon and Schuster. ISBN: 9780743222089](#)

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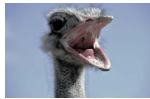
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
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PANGAEA

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Homepage	https://www.pangaea.de/
Subject(s)	Oceanography, Geology and Palaeontology, Geophysics, Geochemistry, Mineralogy and Crystallography, Biology, Atmospheric Science and Oceanography, Geosciences (including Geography), Natural Sciences
Description	PANGAEA - Data Publisher for Earth & Environmental Sciences has an almost 30-year history as an open-access library for archiving, publishing, and disseminating georeferenced data from the Earth, environment, and biodiversity sciences. Originally evolving from a database for sediment cores, it is operated as a joint facility of the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) and the Center for Marine Environmental Science (MARE) at the University of Bremen. PANGAEA holds a mandate from the World Meteorological Organization (WMO) and is accredited as a World Radiation Monitoring Center (WRMC). It was further accredited as a World Data Center by the International Council for Science (ICS) in 2003 and has been certified with the Core Trust Seal since 2016. The successful cooperation between PANGAEA and the publishing industry along with the corresponding technical implementation enables the cross-referencing of scientific publications and datasets archived as supplements to these publications. PANGAEA is the recommended data repository of numerous international scientific journals.
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Additional Contact(s)	
Content type(s)	Source code, Standard office documents, Images, Plain text, Archived data, Audio/visual data
Certificates and standards	CoreTrustSeal World Data System
Keyword(s)	Agriculture, atmosphere, biology, biosphere, cryosphere, earth science, ecology, environmental science, fisheries, land surface, lithosphere, paleontology
Repository type(s)	disciplinary
Alternative identifier	
Language(s)	English
Countries	Germany

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Institution name	Alfred Wegener Institute - Helmholtz Centre for Polar and Marine Research
Additional name(s)	AWI Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung
Identifier(s)	ROR:03268042
Contact(s)	https://www.awi.de/en/about-us/services/contact.html
Country	Germany
Institute type	non-profit

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Assigned Identifier Scheme	DOI
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