DiSSCo related output

This template collects the required metadata to reference the official Deliverables and Milestones of DiSSCo-related projects. More information on the mandatory and conditionally mandatory fields can be found in the supporting document 'Metadata for DiSSCo Knowledge base' that is shared among work package leads, and in Teamwork > Files. A short explanatory text is given for all metadata fields, thus allowing easy entry of the required information. If there are any questions, please contact us at info@dissco.eu.

Title
DiSSCo Prepare Deliverable report D5.1 "DiSSCo Knowledgebase for technical development"

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Abstract
The DiSSCo Prepare Deliverable D5.1 "DiSSCo Knowledgebase for technical development" describes the pilot implementation of the DiSSCo Knowledgebase (KB), available at https://know.dissco.eu/. This central and freely accessible hub for research outputs and technical documentation related to the Distributed System of Scientific Collections (DiSSCo) will facilitate efficient knowledge and technology transfer for partners building the DiSSCo technical backbone.
The DSpace open source development system was chosen as a central document repository. Other components such as GitHub for software code and related issues and the different DiSSCo e-Services will be linked. This knowledge hub might act as an important source of information for not only DiSSCo partners but the whole community working with Natural Science Collections worldwide.

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DiSSCo Prepare WP 5 – D 5.1
DiSSCo Knowledgebase for technical development

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Abstract

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The DSpace open source development system was chosen as a central document repository. Other components such as GitHub for software code and related issues and the different DiSSCo e-Services will be linked. This knowledge hub might act as an important source of information for not only DiSSCo partners but the whole community working with Natural Science Collections worldwide.

Keywords

DiSSCo, DSpace, FAIR data, information transfer, knowledge base, knowledge hub, repository, system architecture

Index

1. Introduction

As an initiative formed by public research institutions, the Distributed System of Scientific Collections (DiSSCo) is committed to Open Science. Open Science not only makes scientific work more transparent and accessible, but also enables a whole new set of collaborative and IT-based scientific methods. Therefore, the outputs of our common research should be openly available as much as possible and research data easily Findable, Accessible, Interoperable and Reusable (FAIR principles; Wilkinson et al. 2016).

DiSSCo Prepare (DPP), the preparatory phase of DiSSCo, is building on profound technical knowledge from various sources and initiatives. Efficient knowledge and technology transfer for partners building the DiSSCo technical backbone will be facilitated by the central and freely accessible DiSSCo Knowledgebase, designed and implemented within the Work Package "Common Resources and Standards" and specifically task 5.1 "DiSSCo Knowledgebase for technical development".

As a hub for knowledge management relevant within the DiSSCo context, the DiSSCo Knowledgebase (KB) is not only storing all research outputs (e.g. Deliverable reports and publications) from DiSSCo-linked projects and other related resources in one place. It is also providing a structured and standardised technical documentation environment for relevant building blocks of the DiSSCo Research Infrastructure (RI) for Natural Science Collections (NSC). Such building blocks include DiSSCo e-services, PID (persistent identifier) systems, controlled vocabularies, ontologies, and data standards for bio-and geo-collections objects, collection descriptions, digital assets standards as well as domain-specific software for quality assurance and monitoring. It is also important to highlight that the KB can be also very useful for other segments, offering space and functionalities that goes beyond the DiSSCo umbrella.

The current version of the DiSSCo KB is a pilot implementation. It is an initial small-scale implementation that is used as a proof of concept, allowing us to identify any deficiencies and issues before the operational phase.

2. The DiSSCo Knowledgebase

The planning and development of the pilot implementation took place in close collaboration and exchange between the task group and other DiSSCo Prepare (DPP) project partners as well as project overarching bodies such as the DiSSCo Technical Team. Other DPP partners were further involved via a survey, a working session at the First virtual All Hands Meeting of DPP (January 18-22, 2021), and the virtual DPP Round table "Organisation of knowledge and documentation for stakeholders" (July 6th, 2021). Feedback collected was incorporated in the further development of the Knowledgebase (KB). For more details on the general approach, the comprehensive landscape analysis to select a system as document repository, and earlier development stages of the KB see von Mering et al. (2021).

The DiSSCo Knowledgebase pilot is available at: **https://know.dissco.eu/**

2.1 Information types covered by the DiSSCo Knowledgebase

In close collaboration with other DPP project partners and also the DiSSCo Technical Team, the task group collected the extent of information types expected to be stored in the knowledgebase (see details in von Mering et al., 2021). An overview of desired information types is given in Figure 1.

The DiSSCo KB acts as a single point of entry for many different information types (see Fig. 1). A connection between the components could be realized by simply linking to other systems via the KB or by a closer integration of used systems or platforms wherever useful and technically feasible. An overview of the different information types together with the already used or potentially used software components is provided in Fig. 2.

For software code and all related issues, GitHub is a commonly used code repository for software development. GitHub offers the features such as version control and source code management (SCM) functionality of Git, access control, and collaboration features (bug tracking, feature requests, task management, continuous integration and wikis for every project). The system is also used by other DiSSCo-linked projects, EU projects and other relevant open source systems.

User stories and use cases have been collected by the DiSSCo Coordination team to better understand the needs and requirements of the community and to prepare the development roadmap. Several DiSSCo-linked projects have contributed user stories to the collection (e.g. ICEDIG, DiSSCo Prepare) which can be found in a dedicated GitHub repository.

DiSSCo partners agree that dedicated training is crucial for capacity building in our community in order to achieve the desired readiness levels. It is important that institutions continue to open up and share their expertise and learn from each other. Therefore, training material of different kinds will also be made available in or via the DiSSCo KB.
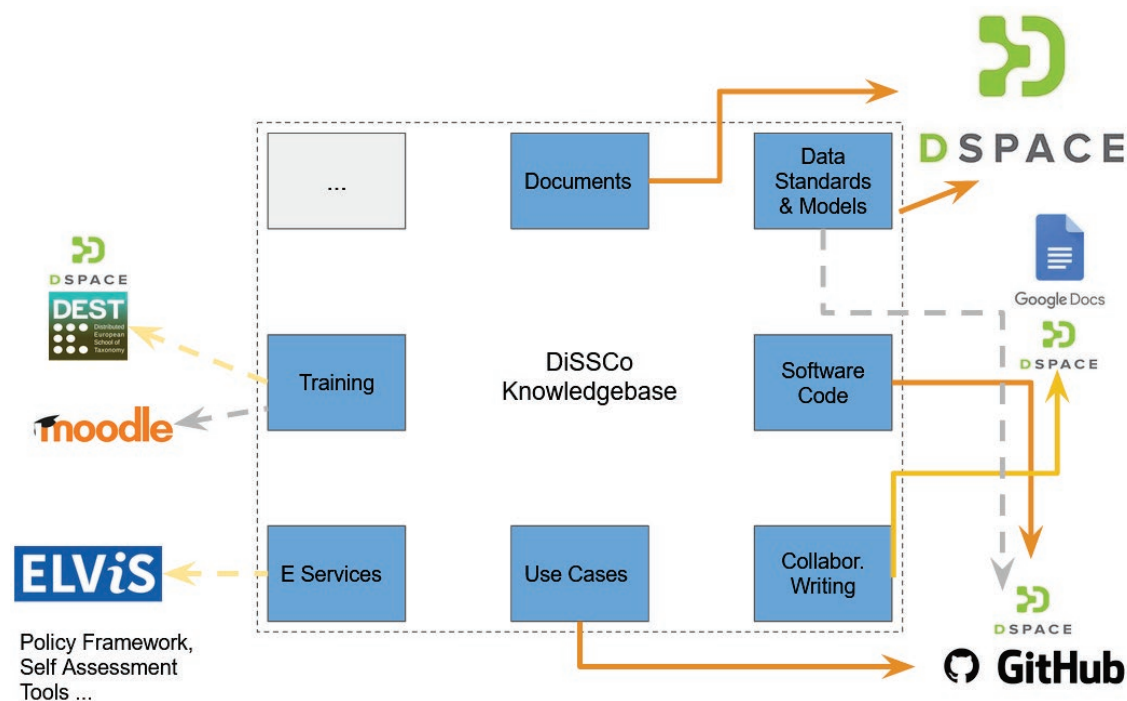
Fig. 2: Information types and (potential) software components that comprise the Knowledgebase. Dashed lines indicate the potential tools not yet directly linked.

The DiSSCo KB provides a structured technical documentation of identified DiSSCo technical building blocks, such as web services, PID systems, controlled vocabularies, ontologies and data standards for bio- and geocollection objects, collection descriptions, digital assets standards as well as domain-

specific software products for quality assurance and monitoring. An assessment of their technical readiness for DiSSCo and specifications on their relevance for the overall DiSSCo technical infrastructure and the DiSSCo data model will be achieved within the next year in close collaboration with other tasks of DPP, especially Task 5.2.

For the pilot implementation, a software system for the most common and required information type "Public Documents and External Resources" was prioritized in order to aggregate references to distributed documents and sources in a single point of entry. Following the landscape analysis and selection process (see von Mering et al., 2021), the freely available open source software DSpace was chosen for the document repository.

2.2 DSpace as a document repository

DiSSCo KB's central requirements of a document repository storing all kinds of different content types are perfectly covered by the DSpace system. DSpace can accommodate any type of files uploaded to the system. Within the context of the DiSSCo KB the only most common document types will be relevant (e.g., XML, XSD, PDF, XLS, PPT, JPEG), but there is no actual limitation. A lot of content is expected to be submitted in free text format (for FAQs and Glossary) instead of using the file upload. This is beneficial for the full text search, which is limited to certain file types. Core metadata should always comprise an abstract which is fully searchable independent of the file format.

The pilot implementation of the KB uses the metadata schema (Dublin Core) with a default submission form consisting of a series of submission "steps", where the content metadata value is placed and later it is displayed and accessed in the item's details. The items are displayed in a simple and full metadata item record. However, multiple metadata schemas can be configured and required metadata fields selected from a mix of configured schemas to describe your items.

Detailed information on the DSpace Durable Digital Depository and the DSpace System Architecture is provided in von Mering et al. (2021).

2.3 Pilot implementation of DiSSCo Knowledgebase

The DSpace installation provides the central entry point of the DiSSCo KB and functions as content management system for the information type of regular documents, metadata, frequently asked questions, links to external resources and to other components.

The online presentation of the content is organized in a flat hierarchy of two levels that are called 'Directories' and 'Folders', of which the latter represent the lowest aggregation level of content items. Users can access landing pages for individual content items using the full-text search, the faceted browsing, and through external reference such as a persistent identifier (e.g. DOI) in order to find the content even without the hierarchical structure. Thus, multiple approaches to explore the content are covered.

The design for the DiSSCo KB was implemented in accordance with the DiSSCo branding colours and fonts. This layout was also chosen to improve the user experience when navigating through the platform (Fig. 3).

Below a welcome text block on the KB homepage, buttons that deep link to knowledge sections allow easy access to different highlighted resources. The KB homepage will function as a single entry point to different DiSSCo components (see Fig. 4).
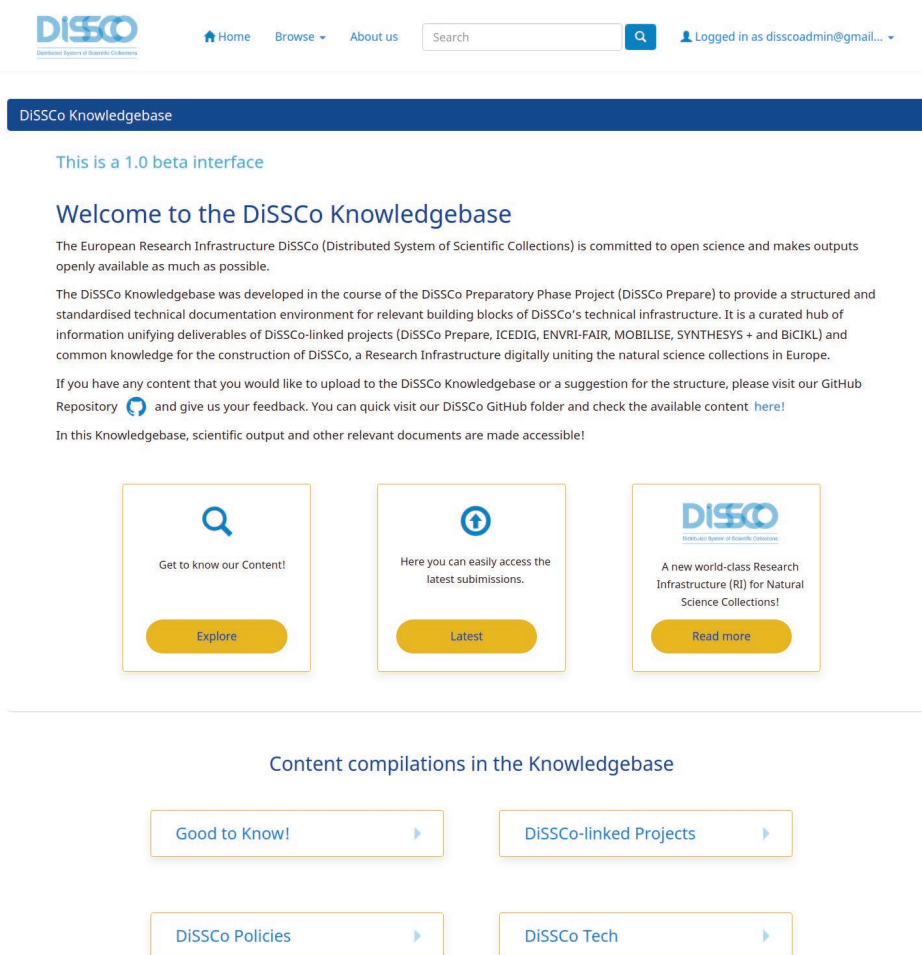
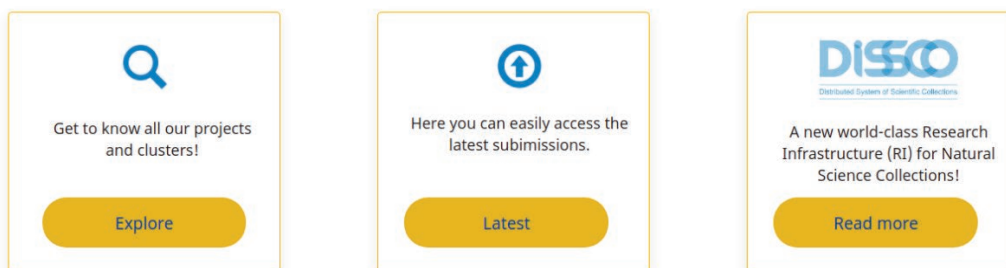**Fig. 3:** Screenshot from the DiSSCo KB pilot homepage.

The DiSSCo KB pilot currently highlights content from four selected directories: Good to Know!, Dissco-linked Projects, DiSSCo Policies, DiSSCo Tech (Fig. 3). The structure and highlighted content can be adapted to user demand. Additional directories focussing on other topics can be created if they become relevant for another target group or demanded by users.

Content compilations in the Knowledgebase

Good to Know! ▶		DiSSCo-linked Projects ▶	
DiSSCo Policies ▶		DiSSCo Tech ▶	
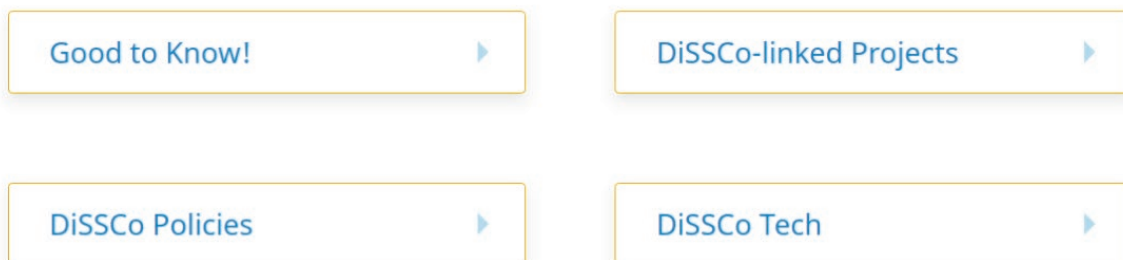
Fig. 4: Screenshot of the highlighted directories on the KB homepage, by clicking on the buttons users will get an overview of available resources, either directly in the document repository (DSpace instance) but also in external components such as Github.

To access all directories and content, users may browse by author, subject, submission and publication date. However, an *Explore* button (Fig. 5) was added in the main page allowing users to access, view and choose from all directories. Each directory has the name of the main subject and the number of items submitted to them (Fig. 6). By clicking on the boxes, users can access the entire content of that directory and could then check the items and its metadata.

🔍

Get to know all our projects and clusters!

Explore

⬆

Here you can easily access the latest submissions.

Latest

DiSSCO
Distributed System of Scientific Collections

A new world-class Research Infrastructure (RI) for Natural Science Collections!

Read more

Fig. 5: Screenshot of the highlighted entry points deep-linking to the content in the KB and a "Read more" button linking to the DiSSCo Project website.
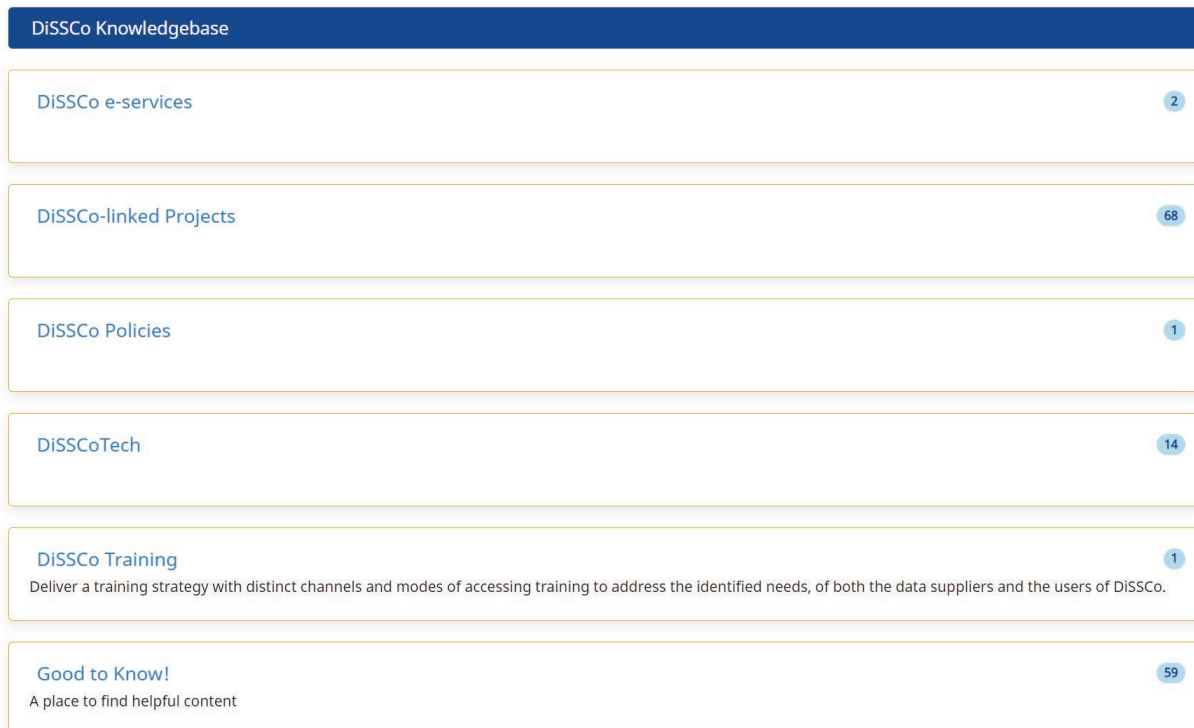
Fig. 6: Screenshot of all currently existing six directories and the content at this point stored in them.

2.4 Content of the DiSSCo Knowledgebase

Collections of resources in the DSpace instance are organised in different levels, named 'directories' and 'folders' for communication purposes in tutorials and training.

Currently, the following six directories are available in the DiSSCo KB:
 (1) **DiSSCo-linked projects**,
 (2) **DiSSCo Policy**,
 (3) **DiSSCo Services and Tools**,
 (4) **DiSSCo Tech**,
 (5) **DiSSCo Training**, and
 (6) **Good to Know!**

2.4.1 DiSSCo-linked projects

A collection of project outcomes such as Milestone reports and Deliverables, i.e. output from DiSSCo-linked projects (see Fig. 7):
 ● BiCIKL (Biodiversity Community Integrated Knowledge Library),
 ● DiSSCo Prepare, the preparatory phase of DiSSCo (Fig. 8),
 ● ENVRI-FAIR,

- **ICEDIG** ("Innovation and consolidation for large scale digitisation of natural heritage"), an EU-funded project supporting the implementation phase of the new RI DiSSCo
- **MOBILISE**, the EU COST Action CA17106 on "Mobilising Data, Experts and Policies in Scientific Collections", and
- **SYNTHESYS+**.

Fig. 7: Screenshot of the overview page for the directory DiSSCo-linked projects and the content within. Within the folders, documents are sorted by the projects' original work packages (WPs). Additional resources not linked to one specific WP are placed in a separate folder (e.g. named 'Other project output'; see Fig. 8).
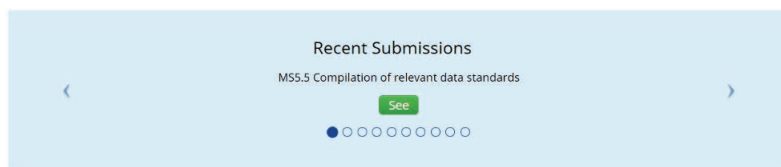
Fig. 8: Screenshot of the DiSSCo Prepare sub-directory with its folders represented by the Work Packages and Project Outputs.

2.4.2 DiSSCo Policies

A collection of relevant policies and policy frameworks including:
- **International policies**,
- **Institutional policies:** linking to websites of partner organizations providing different institutional policies,
- the **Policy tool**, an e-Service, developed by DPP Task 7.3 will be linked and partially integrated to the KB (the exact level of integration still needs to be decided).

2.4.3 DiSSCo Services and Tools

Web services and tools developed for or related to DiSSCo such as:
- **ELViS**, the European Loans and Visits System,
- **CDD,** the Collection Descriptions Dashboard,
- **SDR**, the Specimen Data Refinery,
- the **Helpdesk** (initially for ELViS),

- **AAI**, the Authorisation and Authentication Infrastructure,
- **UCAS**, the Unified Curation and Annotation Service, and
- the **Policy Self-assessment tool**,
- the **DiSSCo Modelling Framework**.

As these services and tools are populated with individual documentations, user guidelines, API specifications, etc. we summarize them as a separate information type in the context of the DiSSCo Knowledgebase.

DiSSCo Labs provides a preview of experimental e-services and demonstrators created by the DiSSCo community, the site is also accessible via the DiSSCo KB.

2.4.4 DiSSCo Tech

Information and technical documentation related to the DiSSCo technical architecture and all technical developments:

- **technical documentation:** e.g., system documentation, guidelines for both internal and external developers,
- **DiSSCo Tech Blog** posts: a collection PDF representations of the blog posts originally published at DiSSCo Tech,
- **DiSSCo GitHub:** a folder with links to available GitHub repositories incl. information on owner,
- information on **data standards, ontologies**, etc.,
- information on **persistent identifier (PID) systems**,
- **controlled vocabularies** (e.g. provided in Wikibase) could be linked.

2.4.5 DiSSCo Training

A collection of training material of all kinds relevant for the DiSSCo community,

- providing access to manuals, tutorials, best practices, etc.,
- link to (or integrate) learning platforms such as Moodle (a free open-source software): A Moodle plug-in for DSpace is available and might prove very helpful in this respect.
- link to the Distributed European School of Taxonomy (DEST) website which provides access to information on training programmes and opportunities in different areas related to e.g. taxonomic research and natural science collections (exchange with project partners in DPP WP2, Task 2.1 "Training Strategy").

2.4.6 Good to Know!

A compilation of material providing more general information on DiSSCo and related topics. Currently, it comprises the following thematic folders:

- **FAQs:** Frequently asked questions & their answers (to be expanded once the KB is productive and more widely used),
- **Glossary:** a list of terms and short descriptions and links related to and relevant for DiSSCo (to be extended further till the end of DPP).

Exchange and discussion with several DPP work packages (e.g. WP 2, WP3, and WP7) will continue after Task 5.1 has ended and the KB team will closely collaborate with colleagues to improve linking of other tools and e-Services and to accommodate requirements where possible.

DiSSCo's GitHub account is available at https://github.com/DiSSCo and currently comprises 20 different repositories focussing on topics such as:

- the European Loans and Visit System (**ELViS**),
- the open Digital Specimen (**openDS**) specification,
- collection of **user stories and use cases**,
- etc.

There is a GitHub "button" in the welcome box on the homepage linking directly to the DiSSCo GitHub folder, comprising items with links to the different GitHub repositories (see Fig. 9).
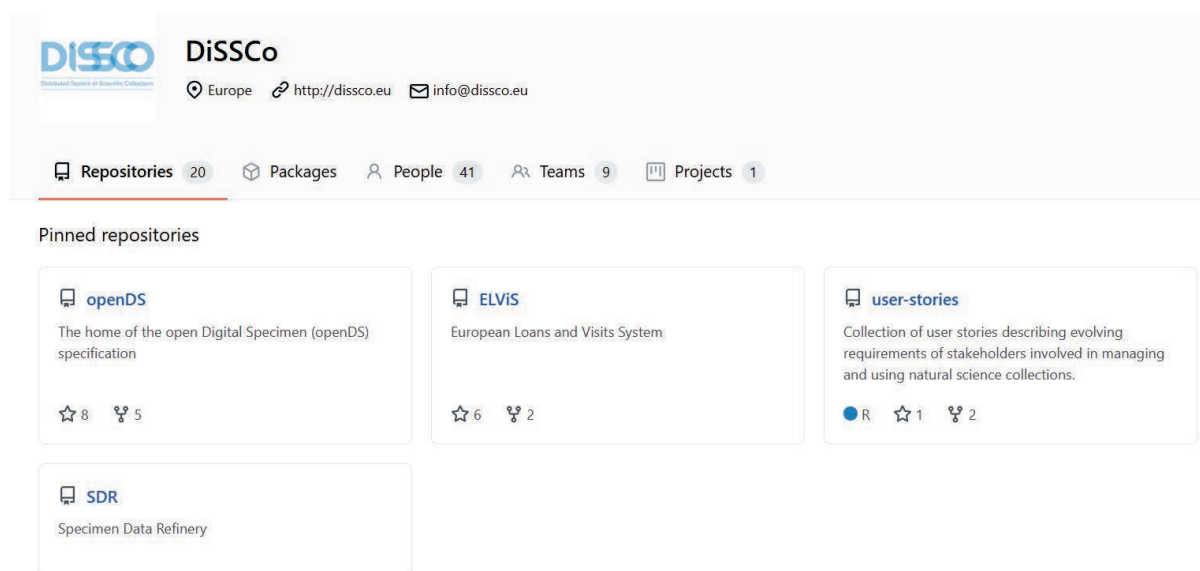

Fig. 9: Screenshot of DiSSCo GitHub account with currently 20 different repositories.

The initial structure of the KB can be easily adjusted according to the requirements and preferences of DiSSCo project partners and the wider community. A tutorial providing step-by-step guidance on using the KB and adding new content is provided in Appendix 1.

3. Discussion and outlook

The DiSSCo Knowledgebase pilot implementation has already been useful in providing access to research outputs from various DiSSCo-linked projects. There is consensus among project partners that linking different resources and components should have priority over developing new functionalities within one system. Within this pilot the DiSSCo Technical Readiness Level[1] 7: "system prototype demonstration in operational environment" was reached.

A recent focus and priority was the improvement of the user experience and the provision of a web design in accordance with existing style guides. Additionally, a GitHub template was created to facilitate reporting and uploading of missing information or documents including keywords. Workflows for content managers and contributing users providing deep- and cross-linking of content including automated DOI assignment and linking ORCID IDs for persons and ROR IDs for institutions should be further developed. However, this needs to be coordinated with the development of editorial and curatorial rules and policies for the KB.

Some requested features of the KB depend also on the progress of other tasks or even external aspects. An example for this is the DiSSCo wide authentication service the KB will also use for Single-Sign-On authentication of users. However, the authentication system to be used by DiSSCo is still under discussion. If for example the ORCID ID authentication is chosen, this can be achieved with upgrading DSpace 6.x to DSpace 7.x where this authentication is implemented.

While the DPP Task 5.1 "DiSSCo Knowledgebase for technical development" ends on January 31, 2022 (one year before the end of DiSSCo Prepare), the DiSSCo KB team at the Museum für Naturkunde Berlin (MfN) will be available and further support after the final Deliverable in close collaboration with partners from other work packages. Until other decisions are taken, MfN will be responsible for the technical maintenance and hosting of the DiSSCo KB.

For the robust operation of the system, the maintenance and update workflows have been consolidated. This includes efficient backup/restore procedures, features for web analytics and technical user support according to basic service levels. The basic support would be available at least until the end of the DPP project. A few open tasks related to the display of certain information in DSpace (Glossary and FAQs) will be tackled together with a service provider working with the MfN.

In 2022, we will reach out to partners within DiSSCo Prepare, from DiSSCo-linked projects and also from the wider Natural Science Collection (NSC) community. Introductions on how to use, upload and edit the KB including specific training will be offered for people involved in outreach activities and internal knowledge transfer. A short tutorial was prepared for this Deliverable report (see Appendix 1) and a video tutorial is planned for 2022, possibly in collaboration with WP 2 on Training. Additionally, a live demonstration in a symposium is planned for the SPNHC conference in June 2022.

According to the Description of Work it was planned to assign Technical Readiness Level to the different Technical Building Blocks and also specifications on their relevance for the overall DiSSCo technical infrastructure and the DiSSCo data model. These two objectives could not be completed in

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[1] https://www.dissco.eu/glossary/technical-readiness-levels/

a comprehensive manner within the duration of task 5.1 due to delays of related work (e.g. "MS5.7 Compilation of data standards forming the basis for the initial version of the DiSSCo Digital Specimen Object Specifications" from Task 5.2, extended to early spring 2022). However, once available, all information will be made available through the KB.

A disclaimer was added to the pilot implementation of the DiSSCo KB. There is ongoing work to establish a more general 'Terms of use' document for DiSSCo and a revision of the current disclaimer might be necessary based on the decision on the legal entity of DiSSCo.

The future governance of the DiSSCo KB as well as the role of project partners and the DiSSCo Coordination and Support Office is still under discussion. However, a concept of sustainability for the DiSSCo KB and other DiSSCo Services is currently in preparation (MS 5.2 "Implementation of concepts for sustainability of services, CMS, and overall TRL"). For the KB, as for other services as well, a Service Level Agreement (SLA) between the DiSSCo RI and the institution or company running the service needs to be negotiated. This SLA needs to cover the technical maintenance such as ensuring stability, server installations, and necessary security updates. Additionally, human capacity and adequate funding would be necessary for further developments in the context of future requirements. Finally, as a trusted source of information the curation of content and quality control is an important requirement for any sustainable use of KB.

The sustainability of a service might also depend on the software used. Widely distributed open source software systems such as DSpace are not a guarantee, but are more likely to be stable compared to products of smaller companies with few installations.

The DiSSCo KB is still based on the stable DSpace version 6, since DSpace 7 was only available in a beta version when the KB pilot was implemented. DSpace 7 was released in 2021 (version 7.0 in August and 7.1 in November, respectively) after active development and testing happening within the community. Upgrading to DSpace 7 would come with a number of benefits, including a full-fledged API layer thus solving a few feature requests. However, upgrading would require additional developer resources and needs to be decided by the new governmental body.

The development of related knowledge hubs outside the DiSSCo umbrella will be closely followed, including that of already existing knowledge bases (e.g. PID Forum) as well as planned ones, such as e.g. in iDigBio or NFDI4Biodiversity. Once launched, cross-linking these KBs should be achieved whenever possible, using persistent identifiers for documents or other resources. There is already ongoing exchange with the team working on a iDigBio knowledge hub, which will continue in 2022.

We aim to interlink between different trusted resources and refer to each other, thus providing added value to users and directory partners. Once implemented and regularly updated, the DiSSCo Knowledgebase can act as an important source of information for all DiSSCo partners and the Natural Science Collection community in general.

4. References

von Mering S., Pim Reis J., Glöckler F., Dillen M., Cubey R., Güntsch A. & Petersen M. (2021): DiSSCo Prepare Milestone report MS 5.1 "Functional technical implementation of DiSSCo Knowledgebase and documentation of most relevant building blocks". https://doi.org/10.34960/skvy-bq35

Wilkinson M., Dumontier M., Aalbersberg I. *et al.* (2016): The FAIR Guiding Principles for scientific data management and stewardship. Sci Data 3: 160018. https://doi.org/10.1038/sdata.2016.18

Appendix

Appendix 1: Tutorial for the DiSSCo Knowledgebase

The following tutorial explains the most important steps for using and working with the DiSSCo Knowledgebase, including the creation of a top-level directory or folder, submitting and editing items, import of metadata, etc. At a later stage, a video tutorial will be created to complement this tutorial.

Logging in the KB:

In order to provide a curated and trusted content, it will not be possible to login from the DiSSCo Knowledgebase pilot version using the user interface for the moment, however users will be able to get a credential by contacting the team members of the task 5.1 "DiSSCo Knowledgebase for technical development".

Browsing the KB:

The user can browse content in the Knowledgebase via several forms. In the navigation bar, there is the Browse section. By clicking on it, the person will have access to all DiSSCo directories, including the content compilations in the Knowledgebase. Browsing also allows you to go through a list of items in some specified order:

- 'Browse by All Content' takes you through the content in alphabetical order and allows you to see the directories with its related content.
- 'Browse by Title / Author / Subject' allows you to move through an alphabetical list of all titles of items in DiSSCo Knowledgebase.

Searching in the KB:

Simple search:

To search into all DiSSCo Knowledgebase, users may use the search box at the top of the navigation bar on the left (Fig. A1). The word(s) entered in the search box will be searched against the title, author, subject abstract, series, sponsor and identifier fields of each item's record.

**Fig. A1:** Search full-index box for searching on the entire DiSSCo KB.

Advanced Search:

The advanced search page allows you to restrict your search to a specific repository choosing which content you want to browse using the arrow to the right of the top box (Fig. A2). If you want your search to encompass within all DiSSCo Knowledgebase, leave that box in the default position (please see Fig A.2a).

To access the advanced search, click on the search button before typing any text (Fig. A2)

**Fig. A2:** CLicking on the search button, users will access the advanced search homepage.
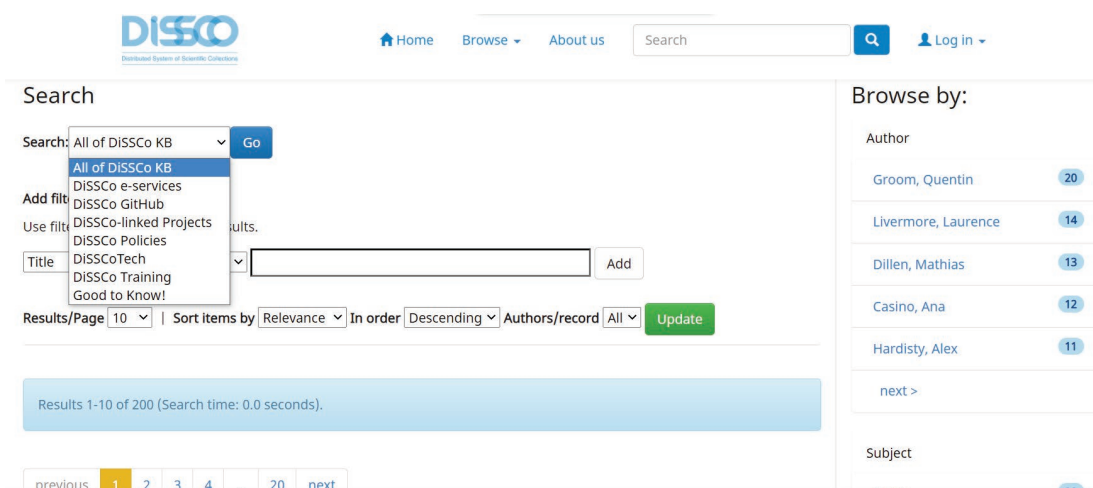
Fig. A2a: Screenshot of the Advanced Search section. Here users can search and filter on the entire platform or choose a directory to narrow the search.

Creating a top-level directory:

The general rule is to follow the structure and its hierarchy. Research units, groups or directories can be added as a top-level directory, for example.

To create a top-level directory the user must login to the platform, go to the **Browse** section in the navigation bar and click to see all the content. You will be able to see what the existing directories are and create your new directory (note that usually only administrators can create, edit and delete a directory). Clicking on "Create-new top-level directory" (Fig. A3) will create the new one and take you to the "Edit Directory" page. Fill out the form as needed: 'Name', 'short description' and 'Introductory text' are required; the rest of the fields are optional. When all information for the Top-level Page is entered, click on the 'Create' button.
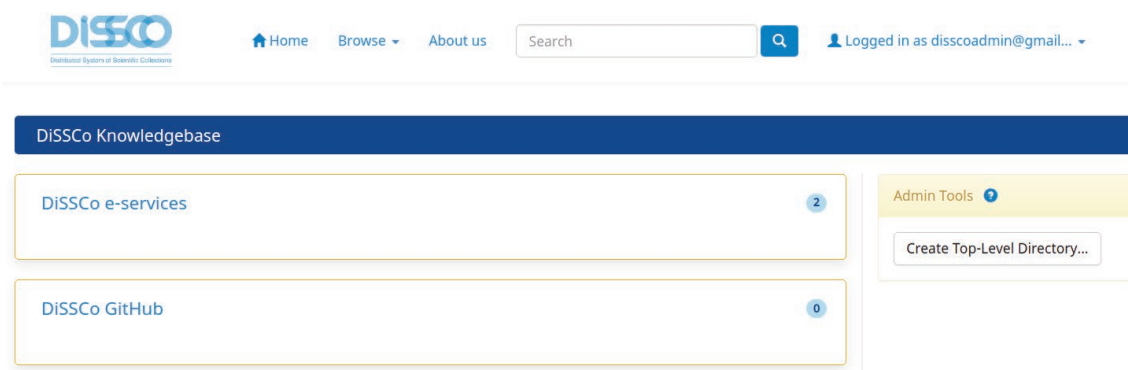
Fig. A3: Screenshot of the "All Content" homepage when users are logged in as administrator. The highlighted button "Create Top-Level Directory" will create a new Directory.

Creating a Folder:

To create a folder, the process is similar to the creation of a directory. The user should choose which directory the collection will be created from. After going into the directory page, the user must click on "Create Folder" and fill out the form as needed (Fig. A4).

The folders are where the files will be submitted, so the users can add who can submit or edit that collection. Depending on the boxes you checked on the first page of the form, you will go through a number of screens asking you which e-people and/or groups can or should perform which actions, for example who can submit, and who should perform the accept/reject submission workflow step. Click 'Next' when all the e-people and/or groups have been selected to appear in the relevant permissions group.
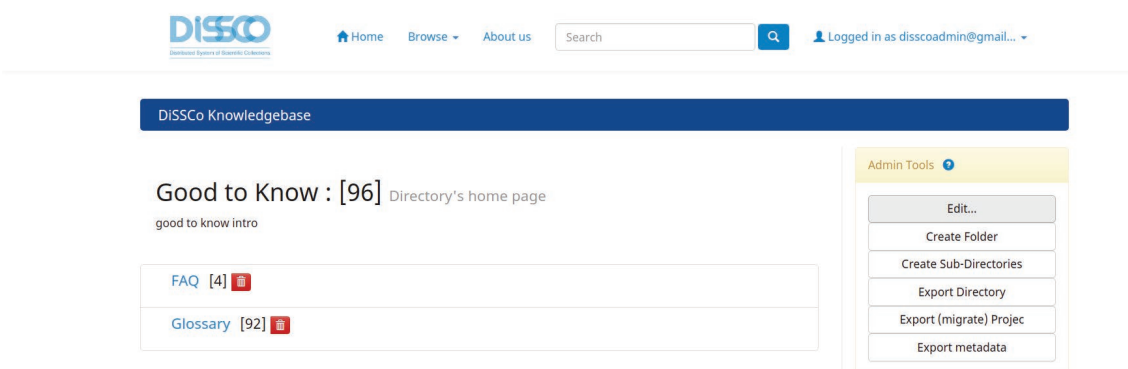
Fig. A4: Screenshot of directory's homepage.

Note: You cannot add new e-people records with this submission form. All the e-person records must be loaded into the system first. You can add more e-people and/or groups to each group later if required (Fig. A5).
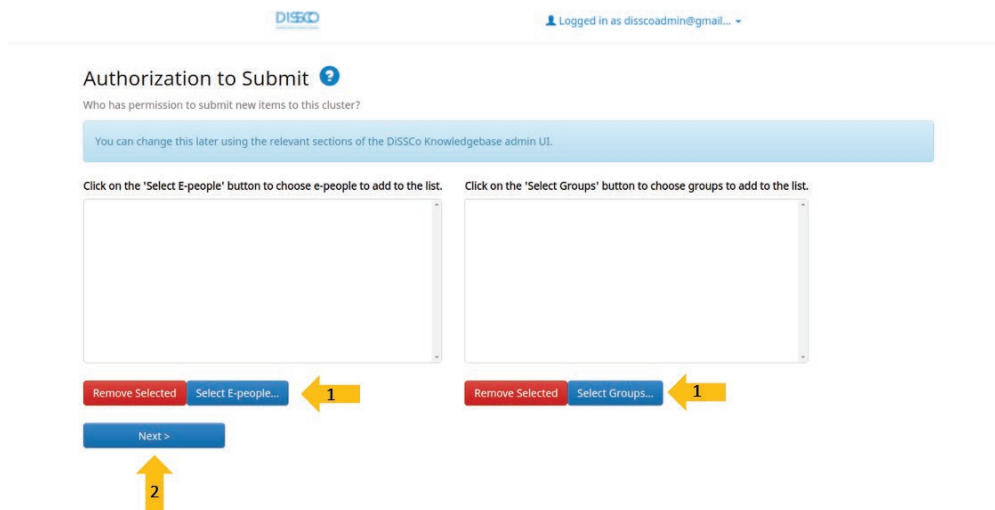
Fig. A5: Screenshot of the folder submission process on the Authorization step. Users can add or delete e-people to perform actions (edit, add, delete) on that folder.
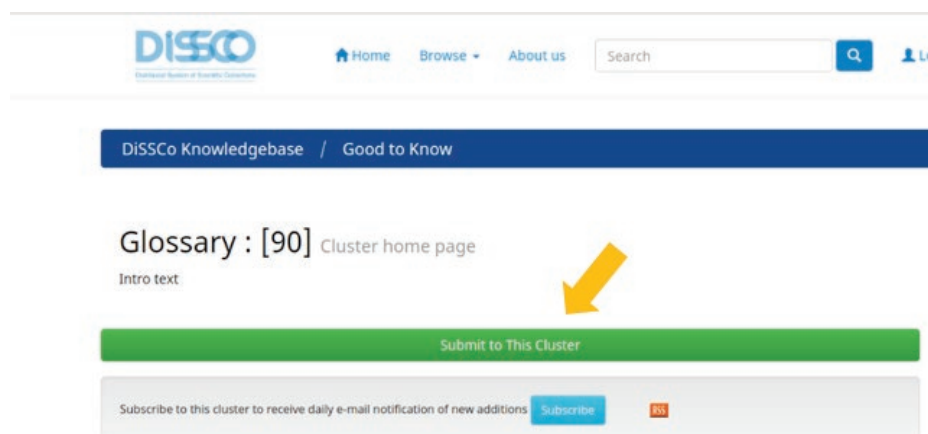
Submitting an item:

In order to submit an item to the DiSSCo Knowledgebase, the user should choose one of the submission methods below (it makes no difference which of them is chosen):

Submission method 1:

1. Click on "Start an Activity" in the user profile and click on "Start a new submission" button.
2. Select the Folder to which you are submitting and click "Next".

Submission method 2:

1. Navigate within your archive to find and access the folder's homepage to which the user is submitting to.
2. Click on "Start a new submission" (Fig. A6) button and fill out the submission form with the correct metadata. The fields: Title, Author, Issue date and Rights are obligatory.

Fig. A6: Screenshot of the submission button in the folder's homepage.

Editing an item:

To edit an item, the user must go to the relevant item's display page and then click the **Edit** button on the page which appears if you're logged in as an administrator (Fig. A7). To edit an existing Dublin Core value or values, users can make the necessary edits on an item's metadata and then click on the **Update** button when finished. New Dublin Core metadata fields can be added one at a time; users need to select the relevant element and qualifier from the drop-down menu at the end of the list of DC fields, enter the text value in the box, and the click on the **Add** button on the right-hand side.
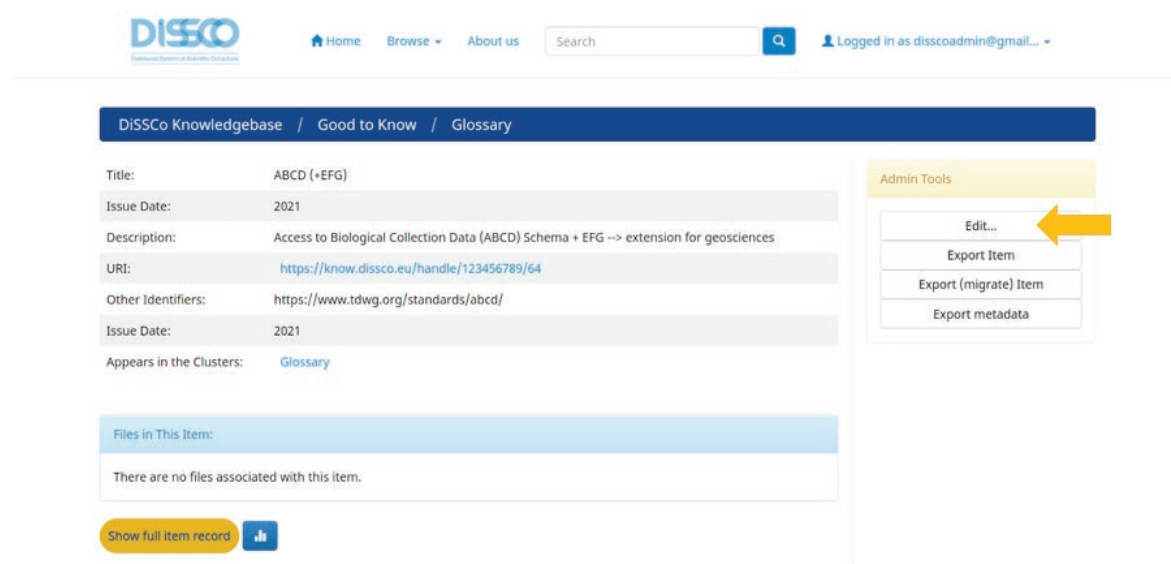
Fig. A7: Screenshot of the edit button on the right side of the item's page. By clicking on this button users will start the submission process.
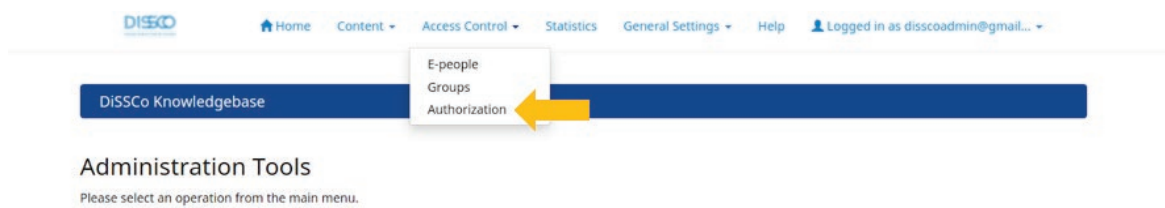
Authorization:

This section is used to set specific authorization policies (Read, Add, Write, Remove, Admin) for directories, folders, and items. Users must have certain permissions (depending on the different user roles) in order to perform an action on an object. To access this tool the user needs to go to the "Administer" section placed in the navigation bar (Fig. A8). On the administration tool the user must click on "Access Control" and click on "Authorization" to manage the policies according to the user needs (Fig. A9).
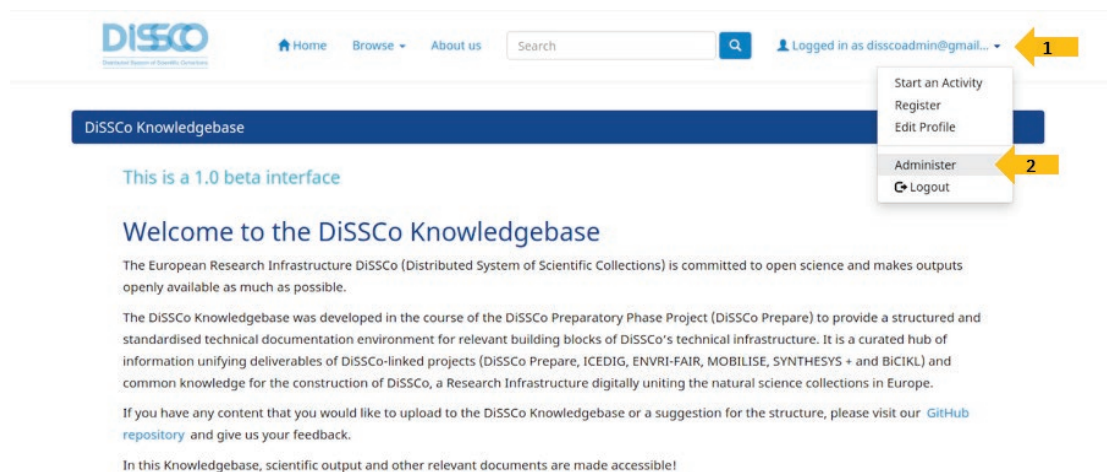
**Fig. A8:** Screenshot of Administer section for accessing the administration tools.

Fig. A9: Screenshot of the navigation bar when using the administration tools. Users can have access to several functionalities, including the authorization function.

Managing a directory's, folder and items policy:

This tool allows you to edit a directory's policies in much the same way as folders are edited, described above. All policies are set to a default Anonymous READ, so any visitor can read what is submitted to the KB.

To change the authorizations, first click on "Manage a Folder's Policies" which allows admins to change or add policies for the Folders. Then select the name of the folder for which the user wishes to set authorizations, click on "Edit Policies" and then on "Add New". Select the group for which the authorizations need to be adjusted, and then select an action for that group from the drop-down menu. Finally, click on "Save Policy".
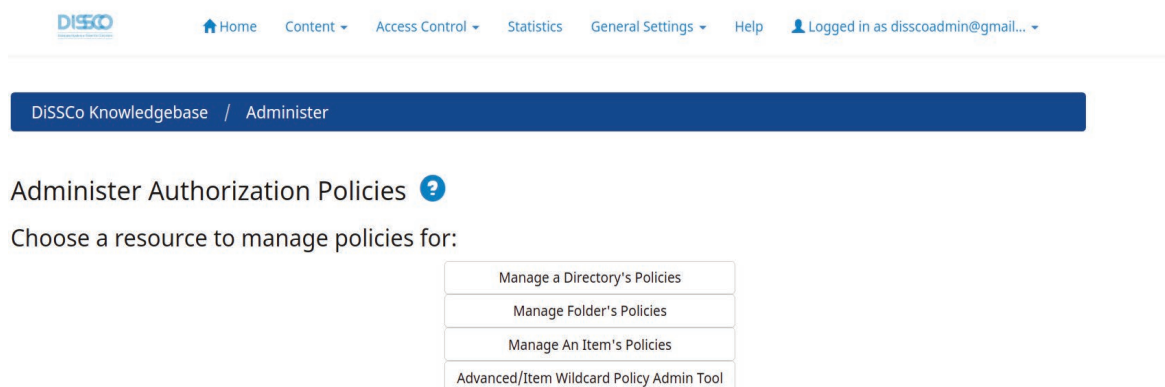
Fig. A9: Screenshot of the Authorization section. There users can manage a resource and edit it's policies.

Mapping items to different folders:

Items can appear in more than one folder. To access this tool, log-in as administrator or folder administrator and view the **folder home page**. In the 'admin tools' box (Fig. A10) there is a button "Item Mapper" that will run the tool. With the item mapper the user will be able to search for items using author's names, title or subject, and choose to add them to the desired folder. The tool also allows the person to browse items mapped to the folder and remove them.

Fig. A10: Screenshot of the Item Mapper function. Clicking on this button users are able to search for an item from another folder and map it to the current folder.