

The RDA Knowledge Base

Documentation on the Knowledge Base and
related assets

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1. Background and aims

[RDA TIGER](#) is an Horizon Europe (HE) -funded project that aims to increase the impact of RDA Working Groups, by providing services that support and facilitate their work. Within its Output Support work package (WP4) led by DANS, the project has developed a set of software tools and supporting guidance materials. These aim to address a number of needs and deficiencies in respect of RDA output management and the processes that create them. In broad terms, there are two focus areas:

1. Ensuring that RDA outputs (recommendations, support materials, and related outputs) are properly curated and preserved, and that they are adequately tagged and characterised to improve their future findability and reuse; and
2. Providing mechanisms for describing and persisting the effort that goes into landscape assessments and desk research during especially working group activities, effectively also turning these efforts into reusable and easily findable digital resources.

This document aims to provide documentation for the Knowledge Base and associated assets. It should serve as the starting point for learning about how the Knowledge Base is set up and managed, as well as a means to navigate related assets.

2. Knowledge Base

The **RDA Knowledge Base (KB)** is a suite of applications and infrastructure, that acts as a mechanism for the publication and cataloguing of the RDA's body of work, e.g. outputs, supplementary materials, and other useful publications. In addition, it provides prior art, specifications, applications and services, recommendations and good practice, or any other resource that were identified by group participants in RDA as being useful in an RDA-related context.

A demo version of the KB is currently hosted by DANS at rda.dansdemo.nl. DANS is currently in discussions with the RDA and their website developers, Maraméo, to explore how the KB and its web interface can be embedded and further integrated into the RDA website, www.rd-alliance.org.

In addition to the main applications and infrastructure components listed below, the KB also includes supplementary resources. This includes supporting materials and a Helpdesk to provide assistance to RDA WGs and their members on how to use the KB, and adopt best practices to maximise the impact of their work; as well as metadata-related assets that are applied to RDA Outputs and annotations.

2.1. Assets overview

The RDA Knowledge Base provides a set of interrelated resources:

1. **The Knowledge Base** suite of applications and infrastructure described above, comprising the following 4 main components:



- a. The **RDA Discovery** application provides a means to search for and access any and all RDA-related resources in the RDA Graph, and provides dashboard-like overviews of available resources (see Dashboard and Search tabs on at the [KB Website](#)).
 - b. The **RDA Graph**, a graph-like database containing all RDA-related outputs and web-based materials that could be catalogued to date - including all resources formally published in Zenodo and the RDA websites (legacy and current). The contents of the Graph can be browsed using the above-mentioned Discovery application.
 - c. The **RDA Publisher** application assists with the publication of RDA resources (outputs, supplementary materials, or any other resource) to both Zenodo and the RDA Graph. The approach has several advantages, including the ability to accommodate more than one metadata schema that may depend on the type of content, and to link to any number of LOD-type vocabularies and registries to better contextualise the resources. The Publisher can be accessed under the [Deposit tab of the KB Website](#).
 - d. The **RDA Annotator** application is a browser plugin that can be invoked to create annotations for web resources, linking them via free-text and vocabulary-based annotations to the RDA Graph. See the [RDA Annotator tab of the KB website](#).
2. **Metadata-related assets:**
- a. A **metadata schema** for RDA outputs and annotations, based on a composite of DataCite, Zenodo, and RDA-specific elements
 - b. A set of **curated vocabularies**, defining the scope of topics and concepts that are of interest and importance to RDA and its community and that are used to qualify and classify metadata elements.
3. A collection of **support and guidance documentation** that describes the use of the software resources by RDA groups and members, and assists RDA groups with structuring their work in such a way that rework when publishing the results of their efforts is minimised.

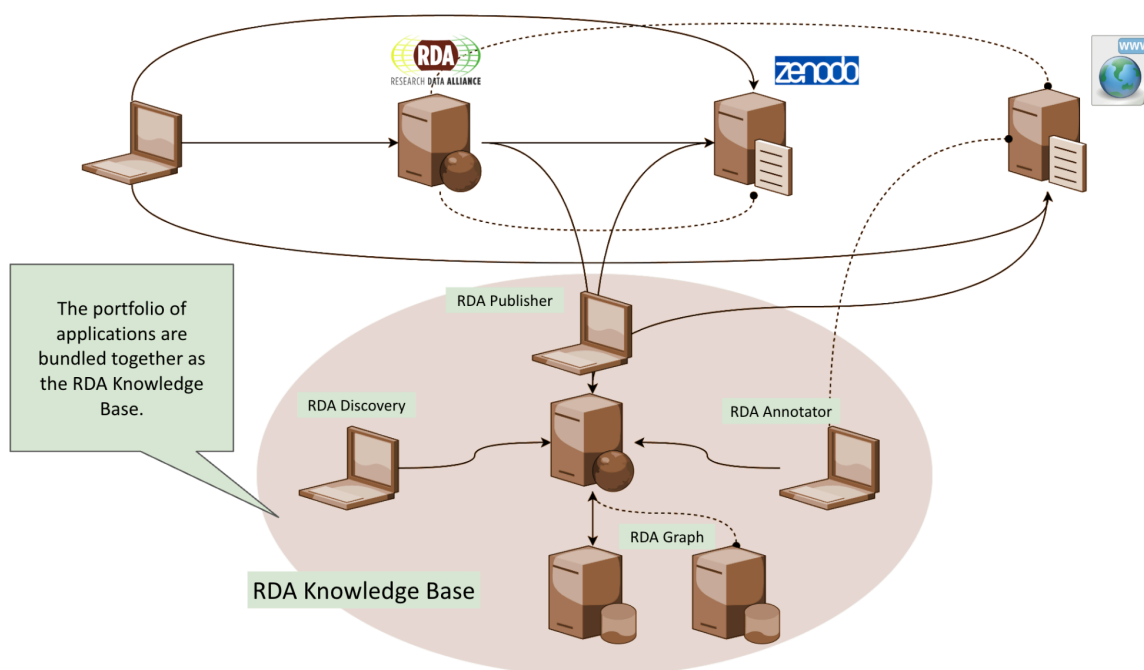


Figure 1: RDA Applications in the RDA Knowledge Base suite, and its relation to e.g. Zenodo

The suite of applications automates the workflows involved in publication of RDA outputs by integrating the registration of a DOI in DataCite, submission of a copy of the output to Zenodo (or other appropriate repositories), and updating the RDA Graph with the additional information. It implements versioning approaches defined by the RDA Secretariat.

1.2. RDA Discovery and WebFrame

The Knowledge Base is currently hosted by DANS at <https://www.kb-rda.org>. DANS is currently in discussions with the RDA and their website developers, Maraméo, to explore how the KB and its web interface can be embedded and further integrated into the RDA website, www.rd-alliance.org.

The Knowledge Base is a composite application that uses several components in the DANS Front-End Framework ('WebFrame'):

1. The Discovery Application (which incorporates a Dashboard sub-component and a Catalogue View sub-component). The application currently works for ElasticSearch-based catalogues, but porting it to SOLR or other catalogues should be fairly simple.
2. A Configurable UI Form that is created based on a metadata schema, form component definition, and help/ tooltip/ completeness information. This form can be deployed for a wide variety of schemas, and can select, optionally pre-process, and verify files for deposit and upload.

3. An authentication and authorisation component that is integrated with federated identity management (at present supplied by SURF in the Netherlands - it allows authentication e.g. via ORCID and Google Accounts, as well as Edugain Accounts), linked to a Keycloak implementation as middleware to manage identities and tokens associated with an account. With a little bit of work, this facility can, for example, be used to log in via ORCID, but store credentials for the RDA Website and Zenodo so that interactions with these services can be automated.
4. These components are embedded in a Web Framework that takes care of layout and branding configuration, navigation and menu settings, and footer configuration.
5. The DANS Frontend Framework is linked to the Deposit Pipeline application, which takes care of metadata and data preparation and transformation, asynchronous uploads for large files, and similar concerns. The Deposit Pipeline can be configured for multiple deposit targets - in the case of RDA, one might want to deposit copies of a resource to Zenodo, to a long-term preservation platform, and possibly the RDA website in one automated execution.

Technology choices and stack includes Javascript/ TypeScript, React, json and json-ld, KeyCloak, Python, and XSLT.

The following sections highlight the features of the Knowledge Base:

1.2.1 Webframe and its Configuration

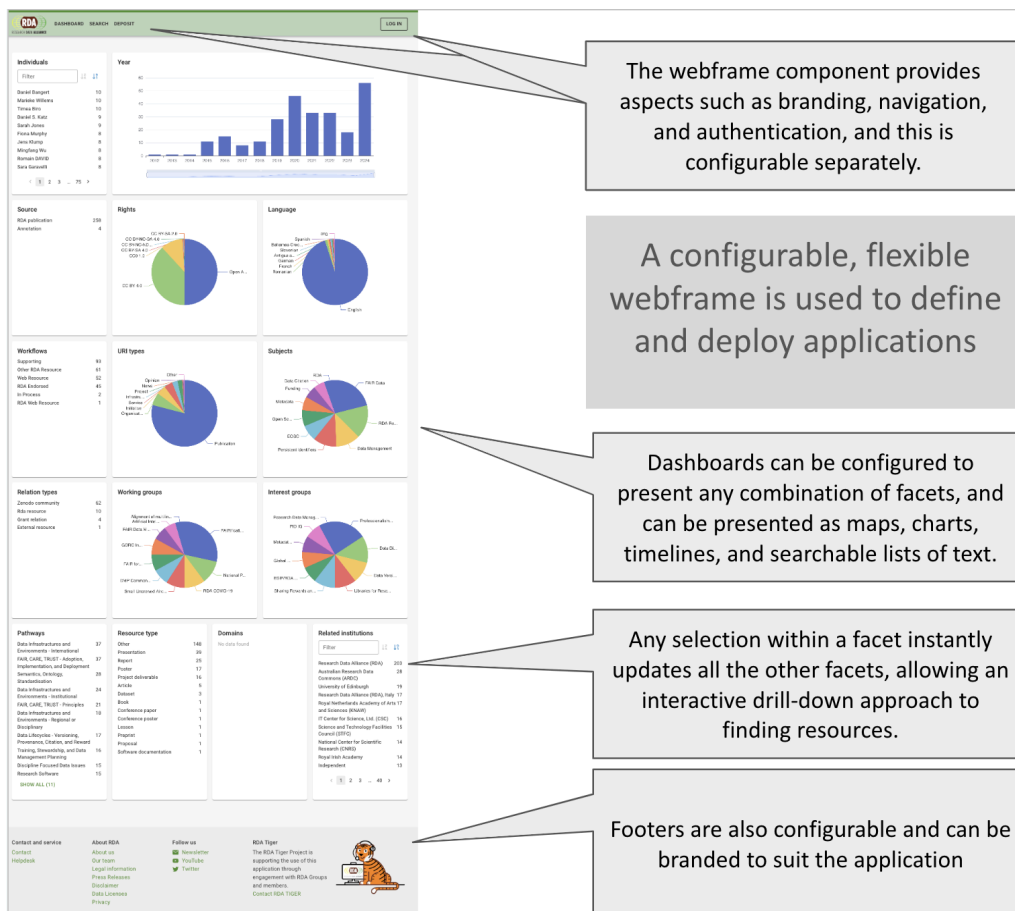


Figure 2.1 Webframe Application Configured and Branded for RDA TIGER

The Webframe application can be deployed as a single application, but it is also possible to deploy individual components (dashboard, search and discovery, and deposit form) as stand-alone apps or embed it into any other TypeScript/ React application with some rework and adjustment.

1.2.2 Dashboard¹

One or more Dashboard views can be configured and deployed, and each of these can support one of the following variations in terms of content:

1. The source of content can be based on a single ElasticSearch instance, but configured for multiple indices and facets. This supports the situation where more than one entity in a catalogue is of interest (e.g. web resources, individuals, organisations, RDA outputs and supplementary materials, and so on). The applicable facets and detailed views for each of these entities will be different.

¹ The dashboard can be accessed on: <https://www.kb-rda.org>

- Each dashboard can alternatively be wired to a separate ElasticSearch instance, but this is not likely to be used by RDA.

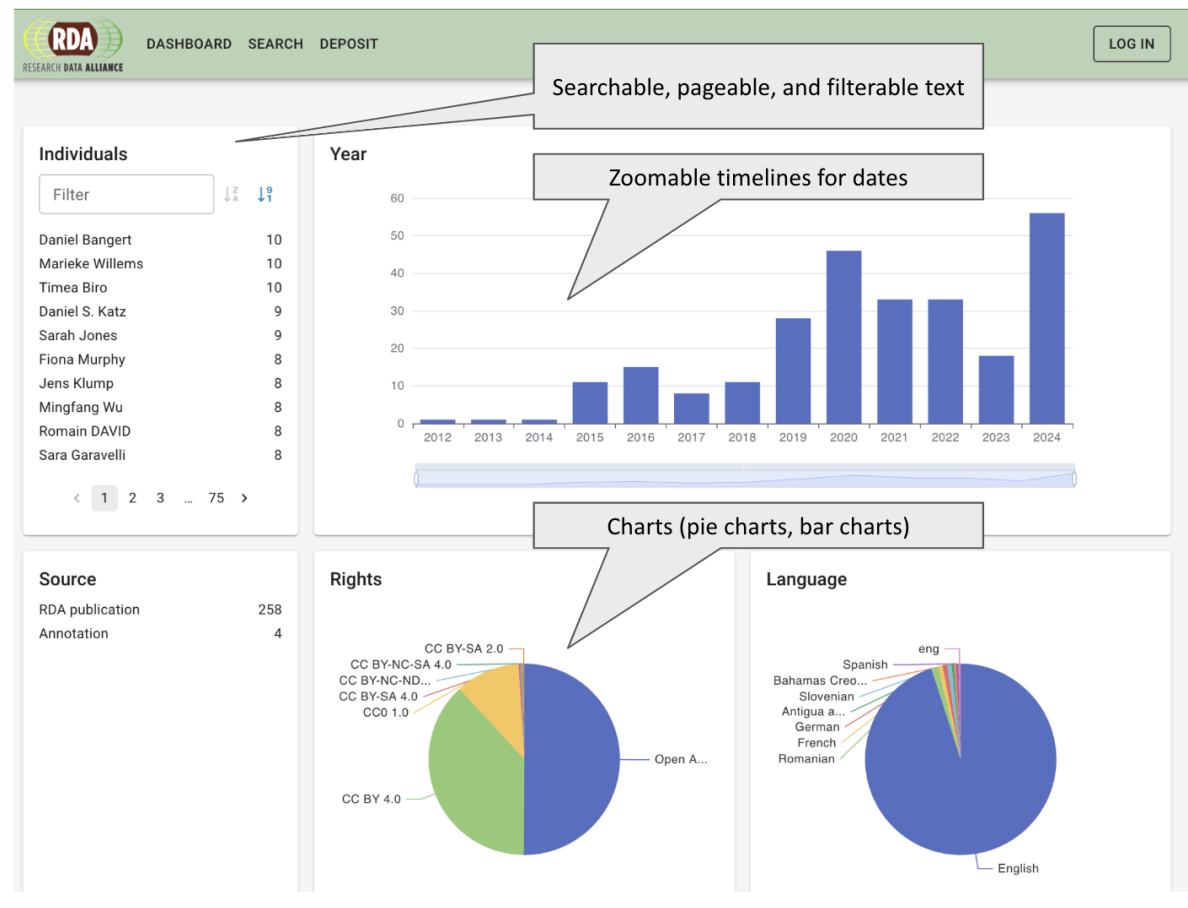
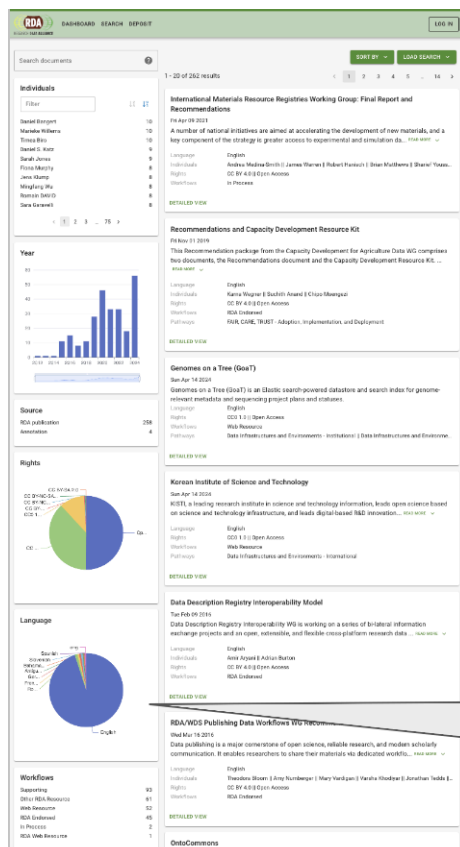


Figure 2.2 Dashboard View in the Maintenance Platform - Detail

1.2.3 Discovery

The Search and Discovery component is configured separately, based on the same indices and facets used for the Dashboard component. The Search and Discovery component provides the same features as typically found in similar applications, and these are highlighted in Figures 2.3 - 2.7.

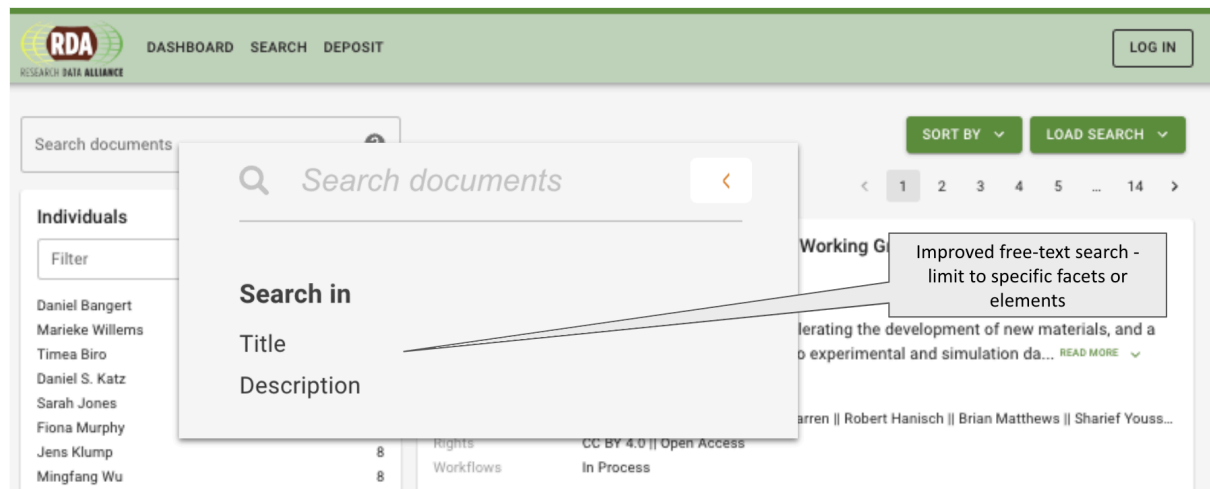


Entries in the catalogue are constrained by the current filter settings, and can be ordered based on any of the facets. Paging of large catalogue views is available.

The Search and Discovery Component

The Search and Discovery component is presented in a typical and very common layout - facets for filtering towards the right-hand, and instances of catalogue entries on the left.

Figure 2.3. Layout of the Search and Discovery Component.



Improved free-text search - limit to specific facets or elements

Figure 2.4. Improved Support for Free-Text Search

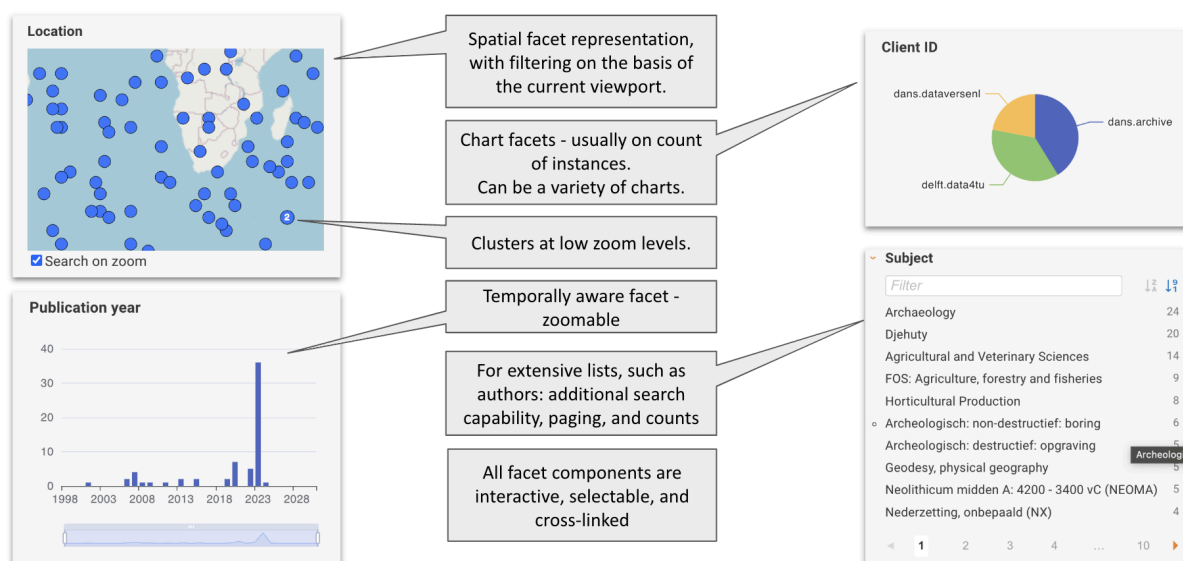


Figure 2.5 Facets Can Be Configured In a Number of Type-Related Presentations

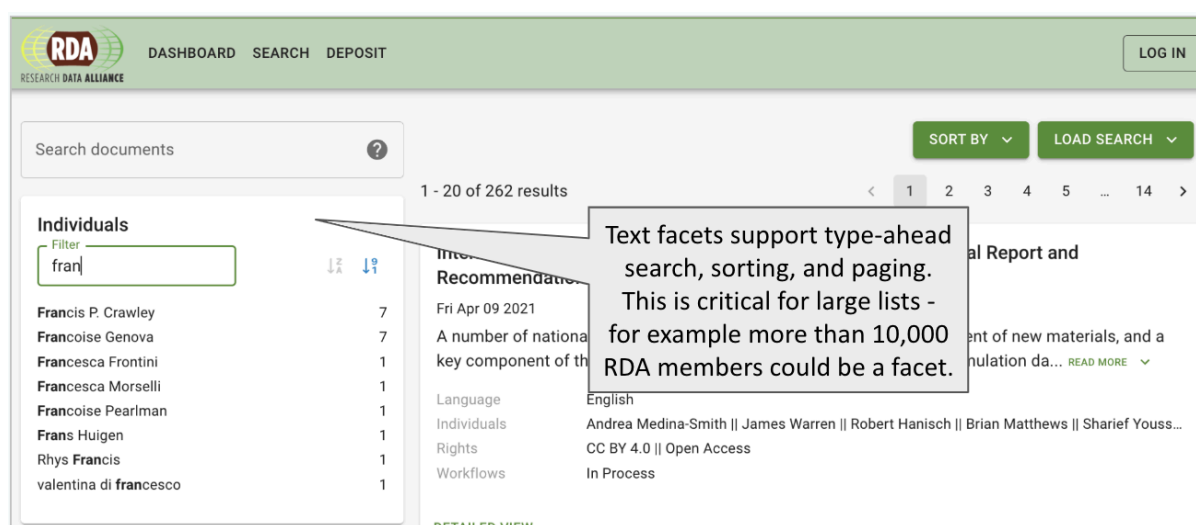


Figure 2.6 Filtering Text Facets

The ability to filter individual text-based facets based on a type-ahead search is an important feature for large lists - for example lists containing all RDA Members.

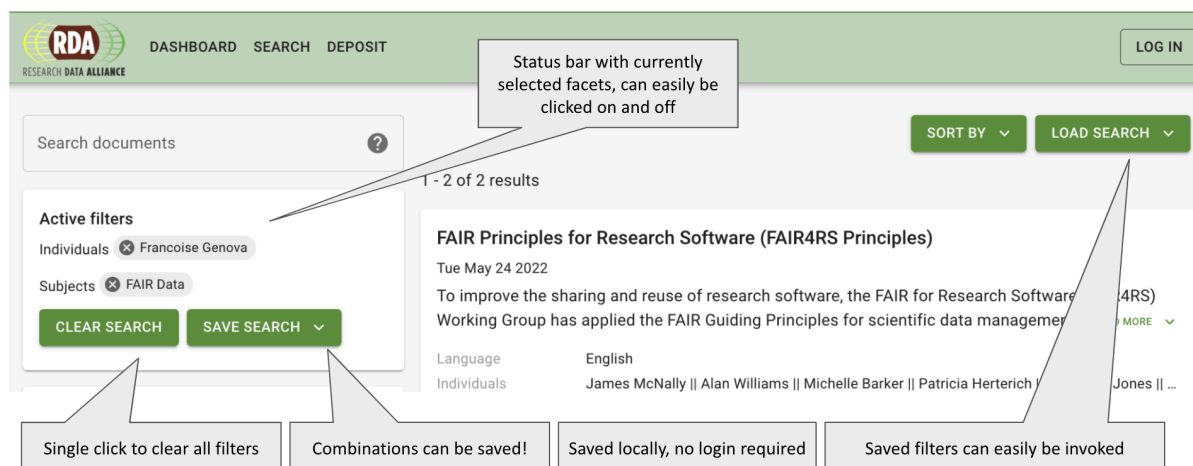


Figure 2.7 Saving, Changing, and Clearing Filters

1.2.4 Authentication Component

The Authentication Component allows use of federated identity, largely aligned with the research and higher education services worldwide via Edugain² in addition to popular identity providers such as Google and ORCID. At present, the configuration is limited to ORCID, but many other providers can be added.

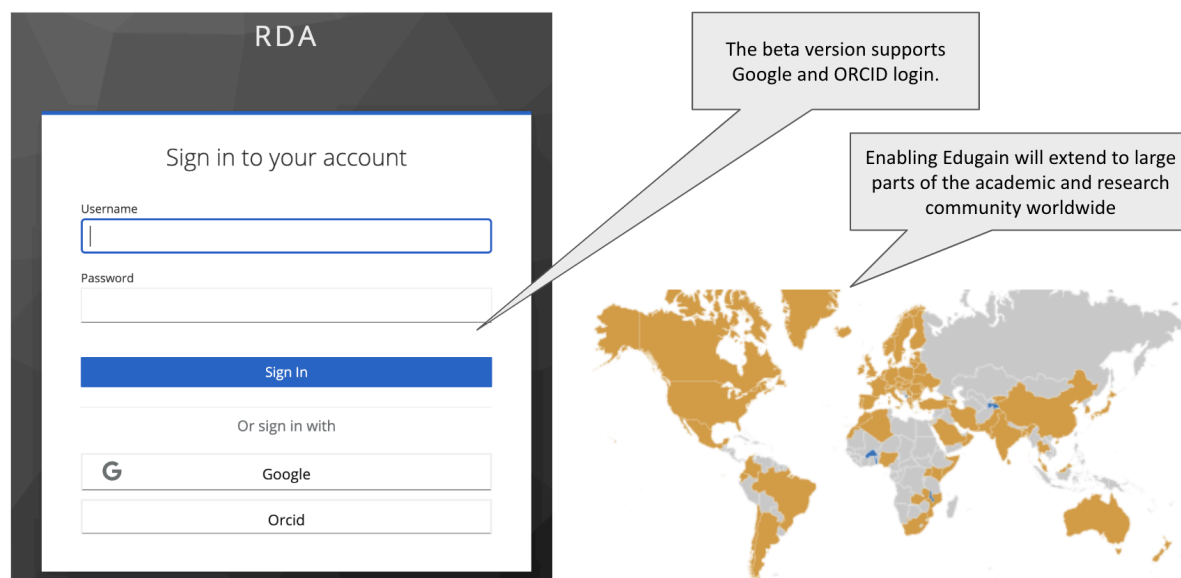


Figure 2.8 Authentication Options

² Edugain: <https://technical.edugain.org/status>

1.2. Associated Materials

Source Code: <https://github.com/DANS-KNAW/dans-frontend-framework>

RDA-specific code and configuration:

<https://github.com/DANS-KNAW/dans-frontend-framework/tree/main/apps/rda>

1.3. RDA Graph

The RDA Graph is a graph-like database of RDA-related metadata, including outputs, and web-based materials. The database uses PostGreSQL, and is currently hosted by DANS.

The RDA Graph includes all resources formally published by RDA Groups in Zenodo, and the RDA website. In addition, it contains related vocabularies and metadata from RDA-external sources that are relevant to RDA users.

The data has been undergone significant curation in order to standardise, deduplicate, and link RDA Vocabularies and Registry Data. The RDA Graph Database is based on the information model in Figure 1. The main nodes and relations in the graph are defined below.

Data is regularly synched with the RDA website via an API endpoint, ensuring that new outputs, WGs, RDA members, and other changes made to the RDA website is changed accordingly in the RDA Graph. WP4 have collaborated with the RDA, and their web developers Maraméo, to ensure that changes introduced through the aforementioned curation process is also reflected in the RDA Website, so that it and the RDA Graph will remain synchronised.

The RDA Graph is browsable via the RDA Discovery web interface. Annotations created through the RDA Annotator are also stored to the RDA Graph.

Table 1. Nodes and relations in the RDA Graph

#	Resource	List of resources with simple attributes
1	Resource_Workflow	Relation between Resources and Workflow (Adoption state by the RDA)
2	Workflow	Workflow States (Adoption state by the RDA)
3	Resource_Pathway	Relation between Resources and Pathways
4	Pathway	Pathways, overarching topics that the resources support
5	Resource-Rights	Rights afforded to users of the resource, access level and licences by the Creative Commons
6	Rights	Rights - licences and access types
7	Resource-Relation	Links to other resources - external, communities, as well as internal/self-references
8	Relation	Types of relations resources have

9	Subject-Resource	Relation between keyword terms and Resources
10	Group-Resource	Relations between Working groups, Interest Groups, and Resources
11	Individual_Resource	Relation between Resources and Individuals - Authors of and Contributors to Resources
12	Individual	Individuals, including members and non-members that have contributed to or authored resources
13	Individual-Institution	Relation between individuals and institutions
14	Individual-Member	Individuals who are members of the RDA including their names and UUIDs
15	Individual-Group All	Individuals and their RDA group membership, including all members of all groups
16	Individual-Group	Overview of the co-chairs of the RDA groups
17	Institutions	Overview of institutions connected to the RDA including simple attributes
18	Institution_Country	Relation between institutions and countries
19	Institution_Organisation Type	Relation between institutions and their domains
20	Organisation_Types	Overview of overarching domains that institutions are related to
21	Institution-InstitutionRole	Relation between institution and role towards the RDA
22	Institution_Roles	Overview of roles that institutions have towards the RDA
23	WorkingGroup	RDA Working Groups including domains
24	InterestGroup	RDA Interest Groups including domains
25	Group-Group	Relation between groups, including both interest groups and working groups
26	GroupLinks	Links to groups on the RDA website
27	Additional Resources	Resources not created by the RDA or associated groups that have a relation to the RDA or groups
28	AdoptionStories	Relation between institutions and adoption stories (how institutions have adopted RDA projects)
29	Institution-Resources	Relation between institutions and resources

1.4. RDA Publisher

The RDA Publisher application assists with the publication of RDA resources (outputs, supplementary materials, or any other resource) to both Zenodo and the RDA Graph.

The approach has several advantages, including the ability to accommodate more than one metadata schema that may depend on the type content, and to link to any number of LOD-type vocabularies and registries to better contextualise the resources.

The DANS Frontend Framework is linked to the RDA Publisher application, which takes care of metadata and data preparation and transformation, asynchronous uploads for large files, and similar concerns. The RDA Publisher can be configured for multiple deposit targets - in the case of RDA, one might want to deposit copies of a resource to Zenodo, to a long-term preservation platform, and possibly the RDA website in one automated execution.

Currently, the Publisher is ready to be implemented on a technical level, but policies surrounding the implementation, including the relation between the RDA website and Publisher,

1.5. RDA Annotator

The RDA Annotator application is a browser plugin that can be invoked to create annotations for web resources, linking them via free-text and vocabulary-based annotations to the RDA Graph. See the [RDA Annotator tab of the KB website](#).

The main applications of the Annotation Tool are:

1. Allowing RDA members to make their landscape analyses and research during group activities reusable in the context of RDA and beyond;
2. Allowing RDA members to annotate and comment RDA outputs and supplementary materials, thereby improving its value.

Further information about the Annotator, including instructions on how to install and use it, can be found in the RDA Annotator Guidelines, available through the [Knowledge Base](#) Support Materials drawer (click “Support” in the bottom right corner of the screen). The source code for the Annotator can be found in the following [GitHub repository](#).³

1.6. Metadata schemas

Proper maintenance and curation of RDA resources and digital assets depend strongly on the quality and extent of use of definitive vocabularies and registries, listed below. The working latest version of this list is maintained separately. In addition to vocabulary commonly used by RDA, RDA-external assets that are of relevance to the RDA Community, such as the GORC Commons Model, were added.

1.6.1 Resource Metadata

This schema is applicable to deposits that are made to Zenodo (mostly RDA outputs and supplementary materials).

³ <https://github.com/DANS-KNAW/rawr>

Table 2. Deposit Metadata Schema (Resources and Supporting Materials)

Source	Category	Element	Description	Obligation	Vocabulary Source(s)/ definition
DataCite	Administrative	Identifier	Assigned by the system based on Zenodo, has to be unique by deposit	Mandatory	Zenodo allocates a PID
DataCite, Zenodo	Administrative	Depositor	Information about the depositor - can be an account identifier	Mandatory	
Zenodo	Administrative	Created	Creation time of deposition	Mandatory	
Zenodo	Administrative	Modified	Last modified date	Optional	
DataCite	Administrative	Available	In case of an embargo the embargo date, else publication date	Recommended	
DataCite	Administrative	UploadState	The state of the deposit	Mandatory	In progress, done, error
DataCite	Administrative	PublicationState	The state of the deposit	Mandatory	submitted, published
DataCite	Administrative	PublicationState	The state of the deposit	Mandatory	submitted, published
Zenodo	Administrative	Files	A list of deposition files resources	Mandatory	
Zenodo	Administrative	Files	A list of deposition files resources	Mandatory	
DataCite	Administrative	Language	Language of the deposited resource(s)	Recommended	Language List
Zenodo	Administrative	Metadata	Original metadata	Optional	
DataCite, Zenodo	Citation	Title	A title provided by the depositor	Mandatory	
DataCite	Citation	Subtitle	A subtitle provided by the depositor	Optional	

DataCite, Zenodo	Citation	Contributors	Name of authors and contributors, as well as a PID (e.g. ORCID)	Mandatory	ORCID
DataCite, Zenodo	Citation	ContributionType	The type of contribution made by individuals	Mandatory	Zenodo contributor types
DataCite, Zenodo	Citation	Description	Some context on the deposit. Guidelines to be provided by RDA.	Mandatory	
DataCite	Citation	Publisher	Institution - often the rights holder	Mandatory	RoR Registry
DataCite, Zenodo	Citation	Publication Date	The date of publication of the resource	Mandatory	
DataCite	Coverage	Location (Geolocation)	The location(s) that the material deals with	Recommended	Geonames
DataCite	Coverage	Data Time and Date	The start and end times that the interview deals with	Recommended	
DataCite	Coverage	Keywords	Selected from a predefined list applicable to RDA activities and resources	Mandatory	Multiple Vocabularies
RDA Schema	Coverage	Keywords - Domain	RDA-Specific Keywords	Mandatory	Domain Vocabulary
RDA Schema	RDA-Specific	Keywords - Origin	A working group, interest group, other group or BoF in RDA	Mandatory	RDA Groups
RDA Schema	RDA-Specific	Keywords - Pathways	RDA Pathway classification	Recommended	Pathway vocabulary
RDA Schema	RDA-Specific	Keywords - GORC	Links to Global Open Research Commons Elements and Features	Recommended	GORC Vocabulary: Elements , Attributes , Features

DataCite	Relations	Related to	Other PIDs, publications, projects	Recommended	Relations Vocabulary
DataCite	Rights, Licencing and Reuse	Rightsholder	Name of the organisation or individual(s) owning the work	Mandatory	RoR Registry , ORCID
Zenodo	Rights, Licencing and Reuse	AccessType	The type of access provided to the resource	Mandatory	Zenodo Access Types
DataCite, Zenodo	Rights, Licencing and Reuse	Licence	One of a number of specific licences	Mandatory	Licence Registry
Zenodo	Rights, Licencing and Reuse	UploadType	Type of uploaded content	Mandatory	Zenodo Upload Types
Zenodo	Rights, Licencing and Reuse	PublicationType	If the upload type is a publication, a subtype must be specified	Conditional	Zenodo Publication Types
Zenodo	Rights, Licencing and Reuse	ImageType	If the upload type is media or images, a subtype must be specified	Conditional	Zenodo Image Types

1.6.2 Annotation Metadata

This schema is applicable to annotation of web resources.

Table 3. Annotation Schema

Source	Category	Element	Description	Obligation	Vocabulary Source(s)/ definition
System	Administrative	Identifier	Assigned by the system system	Mandatory	

System	Administrative	Depositor	Information about the annotator - can be an account identifier	Mandatory	
System	Administrative	Created	Creation time of annotation	Mandatory	
System	Administrative	Language	Language of the annotated resource	Recommended	Language List
Web Resource	Administrative	Fragment	Web URL or PID, with or without fragment definition	Mandatory	
System	Citation	Title	A title provided by the annotator	Mandatory	
System	Citation	Notes	Additional information	Optional	
System	Citation	Description	Some context on the annotation. Guidelines to be provided by RDA.	Mandatory	
System	RDA-Specific	Keywords - Domain	RDA-Specific Keywords	Mandatory	Domain Vocabulary
System	RDA-Specific	Keywords - Origin	A working group, interest group, other group or BoF in RDA	Mandatory	RDA Groups
System	RDA-Specific	Keywords - Pathways	RDA Pathway classification	Recommended	Pathway vocabulary
System	RDA-Specific	Keywords - GORC	Links to Global Open Research Commons Elements and Features	Recommended	GORC Vocabulary: Elements , Attributes , Features
System	Relations	Related to	Other PIDs, publications, projects	Recommended	Relations Vocabulary

1.7. Knowledge Base Supporting Materials

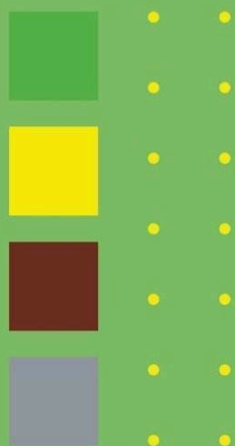
The [Knowledge Base](#) provides users with a corpus of supporting materials. These are designed to help users not only use the tools and services of the KB itself, but also to assist them with various activities associated with RDA engagement, including but not limited to:

- explaining the different stages of a WG lifecycle;
- guidance on how to publish output and maximising their impact;
- recommendations on the use of vocabularies;
- making outputs FAIR, and accessible,

Supporting Materials also include other outputs of the RDA TIGER project, which may be of use for a wider audience, such as the Facilitation Guidelines, and WG Welcome pack produced by the RDA TIGER Facilitation Service (WP5).

The Knowledge Base also provides a Help Desk, where users can submit support tickets for problems or assistance needed with KB services. This service is currently hosted by DANS.

For more information, and to browse available support materials, these are available through the **Support Materials Drawer**, accessed by clicking the “Support” button in the bottom-right corner of the [Knowledge Base Website](#).



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