

How do the FC4E components improve our workflow? Perspectives from our user communities.

Fanny Adloff (DKRZ), Willem Ebers (CLARIN),
Anna-Lena Flügel (DKRZ) & WP7 partners



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the European Union





RDGraph

improves findability and re-use of research outputs and softwares.



DTR

allows machine actionable standardisation of metadata helpful to:

- analyse, compare and validate large data volumes
- define and register extended Mime-Types, taxonomies and subject classifications
- improve visibility and selection of data types



MSCR

provides machine-actionable metadata transformation jobs and findability of metadata schemas and crosswalks.



RAiDs

improves visibility and allows connectivity of research project data & related entities.



PIDGraph

offers discoverability of data collections and makes research objects connections visible.



PIDMR

resolves a large amount of PID types.



RSAC

component enhances research software discoverability and long-term preservation.



Case studies

How do the components benefit communities?

Components are co-developed and tested within domain-specific communities:

- Climate Change (DKRZ)
- European Integration of National-level Services (CSC)
- Mathematics (FIZ)
- Service Providers and Research Data Management Communities (EUDAT)
- Social Sciences and Humanities (CLARIN)



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FAIRCORE4EOSC project: *The mathematics case study*



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the European Union**



The RSAC integration



RSAC
EOSC Research Software APIs
and Connectors



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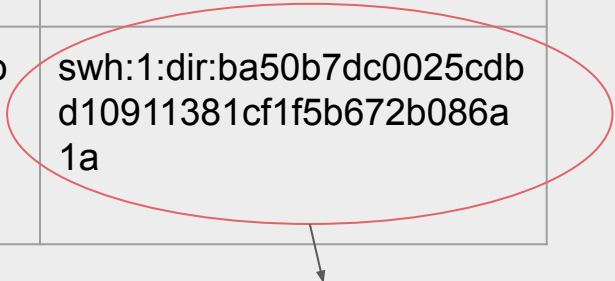
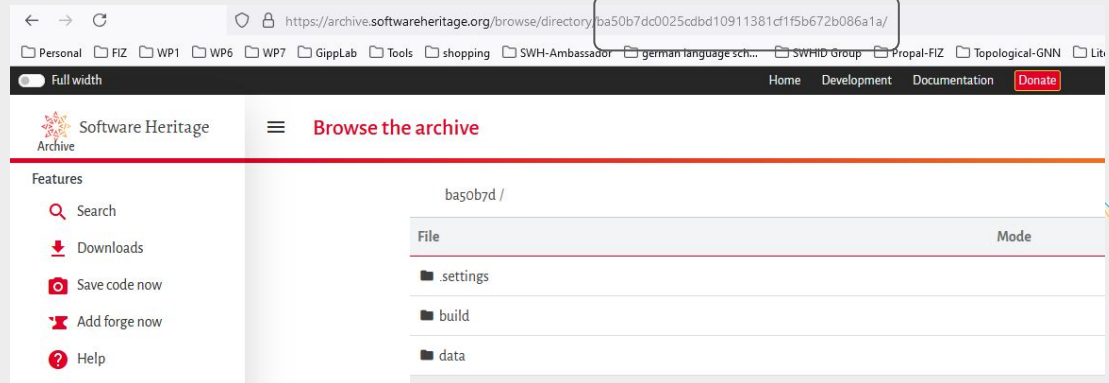
User story

- A mathematician which using the MaRDI infrastructure wants to find mathematical software for his scientific needs and the associated source code. With Software Heritage and the MaRDI portal, he can seamlessly access to both the source code and the associated metadata.



The archival and referential work

swMATH id	forge link	SWHID
8779	https://github.com/appliedtopology/javaplex	swh:1:dir:ba50b7dc0025cbbd10911381cf1f5b672b086a1a

15752 archived software



Funded by the European Union

The deposit work

- We processed a few sample of metadata deposit
- Now improving the metadata formatting with our last feedback of the SWH team

Metadata of deposit 4782

```

1 <entry xmlns="http://www.w3.org/2005/Atom" xmlns:codemeta="https://doi.org/10.5063/SCHEMA/CODEMETA-2.0" xmlns:swhdeposit="https://www.softwareher
2 <id>https://zbmath.org/8779</id>
3 <swhdeposit:deposit>
4 <swhdeposit:reference>
5 <swhdeposit:origin url="https://github.com/appliedtopology/javaplex"/>
6 </swhdeposit:reference>
7 <swhdeposit:metadata-provenance>
8 <schema:url>https://api.zbmath.org/v1/</schema:url>
9 </swhdeposit:metadata-provenance>
10 </swhdeposit:deposit>
11 <codemeta:author>
12 <codemeta:name>Vejdemo-Johansson, Mikael</codemeta:name>
13 <codemeta:givenName>Mikael</codemeta:givenName>
14 <codemeta:familyName>Vejdemo-Johansson</codemeta:familyName>
15 </codemeta:author>
16 <codemeta:author>
17 <codemeta:name>Adams, Henry</codemeta:name>
18 <codemeta:givenName>Henry</codemeta:givenName>
19 <codemeta:familyName>Adams</codemeta:familyName>
20 </codemeta:author>
21 <codemeta:author>
22 <codemeta:name>Tausz, Andrew</codemeta:name>
23 <codemeta:givenName>Andrew</codemeta:givenName>
24 <codemeta:familyName>Tausz</codemeta:familyName>
25 </codemeta:author>
26 <codemeta:name>javaPlex</codemeta:name>
27 <codemeta:description>zbMATH Open Web Interface contents unavailable due to conflicting licenses.</codemeta:description>
28 <codemeta:sameAs>http://appliedtopology.github.io/javaplex/</codemeta:sameAs>

```

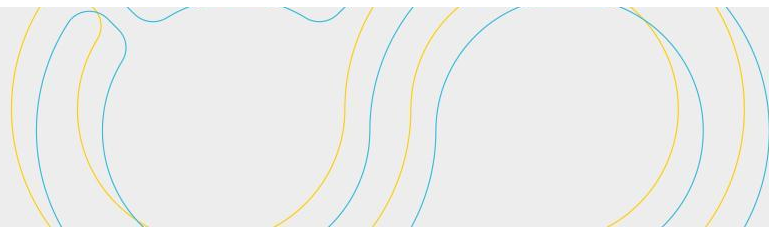


The citation work

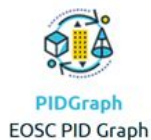
Click to view citation

[Collapse]

```
@software{javaPlex,  
  author      = {Vejdemo-Johansson, Mikael and Adams, Henry and Tausz, Andrew},  
  title       = {javaPlex},  
  url         = {https://zbmath.org/software/8779},  
  year        = {2014},  
  swhid       = {swh:1:dir:ba50b7dc0025cdbc10911381cf1f5b672b086a1a},  
  repository  = {https://github.com/appliedtopology/javaplex}  
}
```



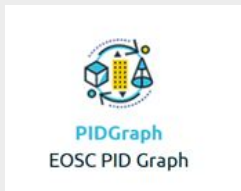
The PIDGraph and RDGraph integration






User story

- A mathematician is using services like the PIDGraph and the RDGraph to collect mathematics articles metadata. He can find the articles metadata referenced by zbMATH and their associated persistent identifiers, like zbMATH authors codes, zbMATH document identifiers and swMATH identifiers, exposed in standard vocabularies like the one of DataCite.





		<p>Matching</p>
<p>zbMATH Open author id</p>	<p>ORCID</p>	<p>35 016</p>
<p>zbMATH Open document id</p>	<p>DOI</p>	<p>2 616 582</p>

	<p>Expected ingestions</p>
<p>zbMATH software id</p>	<p>> 47 K, including 300 K articles citing them</p>
<p>zbMATH Open document id</p>	<p>> 4 millions</p>



The PIDMR integration



User story

- A mathematician is using a research engine service to find mathematical research articles. He finds an article identified with the zbMATH identifier and can check on the PIDMR service that the identifier is valid.



The PIDMR integration

The FC4EOSC Metaresolver resolves individual handles from various providers

swsh:1:dir:1c5dbf8dcc5dcf2150ef759dcc416d5f6742d0d5

Format: swsh - Valid:

resolve: [Landing Page](#) [Metadata](#) [Resource](#)

SageMath

swMATH ID: 825

Software Authors: The Sage Developers; William Stein; David Joyner; David Kohel; John Cremona; Eröcal, Burçin

Description: Sage (SageMath) is free, open-source math software that supports research and teaching in algebra, geometry, number theory, cryptography, numerical computation, and related areas. Both the Sage development model and the technology in Sage itself are distinguished by an extremely strong emphasis on openness, community, cooperation, and collaboration: we are building the car, not reinventing the wheel. The overall goal of Sage is to create a viable, free, open-source alternative to Maple, Mathematica, Magma, and MATLAB, Computer algebra system (CAS).

Homepage: <http://www.sagemath.org>

Source Code: <https://github.com/sagemath/sage>

Keywords: orms, Python, Cython, Sage, Open Source, interfaces

Related Software: Magma; GAP; OEIS; SINGULAR; PARI/GP; GitHub; Sage-Combinat; Macaulay2; Mathematica; Maple; LMFDB; Python; ecdata; nauty; Traces; Maxima; DLMF; Gfan; SciPy; Matlab

Cited in: 2,596 Documents
This software is also referenced in ORMS.

Further Publications: <http://www.sagemath.org/library-publications.html>

Standard Articles

7 Publications describing the Software, including 7 Publications in zbMATH

Computational mathematics with SageMath. Translated from the 2013 French original by the authors. [Zbl 1434.65001](https://doi.org/10.1434/65001) 2019

The FC4EOSC Metaresolver resolves individual handles from various providers

1434.65001

Format: Zbl - Valid:

resolve: [Landing Page](#) [Metadata](#) [Resource](#)

<https://archive.softwareheritage.org/browse/directory/1c5dbf8dcc5dcf2150ef759dcc416d5f6742d0d5/>

Software Heritage

Browse the archive

<https://zbmath.org/1434.65001>

About FAQ Reviewer Service Contact

zbMATH Open

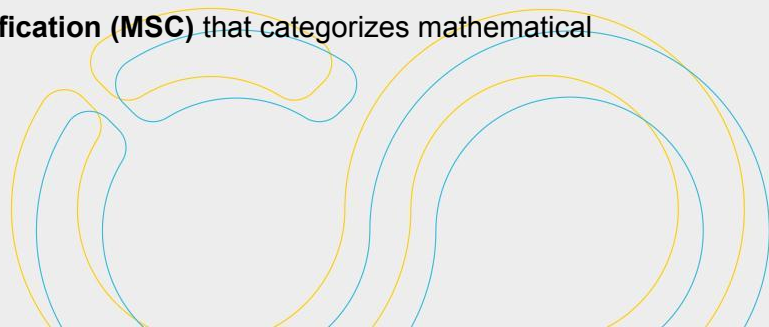
Documents

an:1434.65001



Added value for Mathematicians

- **RSAC (Software and Code Access)**: Access mathematical software and source code seamlessly via **MaRDI** and **Software Heritage (SWH)**.
- **MSCR**: Map **swMATH** and **zbMATH** metadata to **CodeMeta**, **DataCite** and **OpenAire** for better understanding and interoperability.
- **PIDMR**: Validate **swMATH** and **zbMATH** identifiers to ensure metadata accuracy and reliability.
- **PIDGraph & RDGraph**: Discover mathematical articles and software in other aggregator services.
- **DTR**: Access and reference the **Mathematics Subject Classification (MSC)** that categorizes mathematical documents.





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FAIRCORE4EOSC
Core Components Supporting a FAIR EOSC

European Integration of National-level Services

Joonas Nikkanen (CSC)



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the European Union**



Starting points: CRIS'

Current Research Information Systems

UHH Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

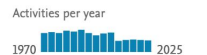
FOR RES

PUBLICATIONS PROJECTS ACTIVITIES RESEARCH DATA MORE DATA ABOUT THE PORTA

PORTAL RESEARCH INFORMATION

UHH -> Research Information -> Projects

PROJECTS



11690

Organisation and participation
in conferences, workshops,
courses, seminars

4528

Peer review of manuscripts

2101

Oral presentation

2016

Public Talks

12586

More

Research.fi Home Search Science and Innovation Policy Science and research news In English

Search target For example, publication, field of science, keyword SEARCH Search help

[← Back to search results](#)

People Diaz Ruiz, Carlos A.

Diaz Ruiz, Carlos A.

<https://orcid.org/0000-0002-1724-8665>

Description of research

Business academic specializing in consumer insights and market shaping. Currently, Dr. Diaz Ruiz is a Tenure-Track Assistant Professor of Marketing at Hanken School of Economics, Finland. Before, he was part of the marketing faculty in internationally leading business schools, such as KEDGE business school in France and the University of Auckland in New Zealand. Dr. Diaz Ruiz worked with consumer insights in a market research agency. His academic publications have been featured in leading journals such as Marketing Theory, the European Journal of Marketing, the Journal of Business Research, and Industrial Marketing Management.

Contact information

Show email address

scholar.google.co.nz/citations?user=...

www.linkedin.com/in/agonran/

harrisportal.hanken.fi/en/persons/ee6...

carlosdiazruiz.com



Home People Organizations Research Events Capability Map Search for an Expert. Search

Prof. Dr. Auer, Sören

Positions

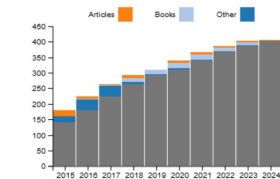
Director, Technische Informationsbibliothek (TIB) Leibniz-Informationszentrum Technik und Naturwissenschaften und Universitätsbibliothek 2017 - More...

research areas

- Digital humanities (LCSH)
- Knowledge representation (Information theory) (LCSH)
- Linked data (LCSH)
- Semantic Web (LCSH)
- Software engineering (LCSH)

tion Publications Research Teaching Service Contact Identity

Publications in VIVO

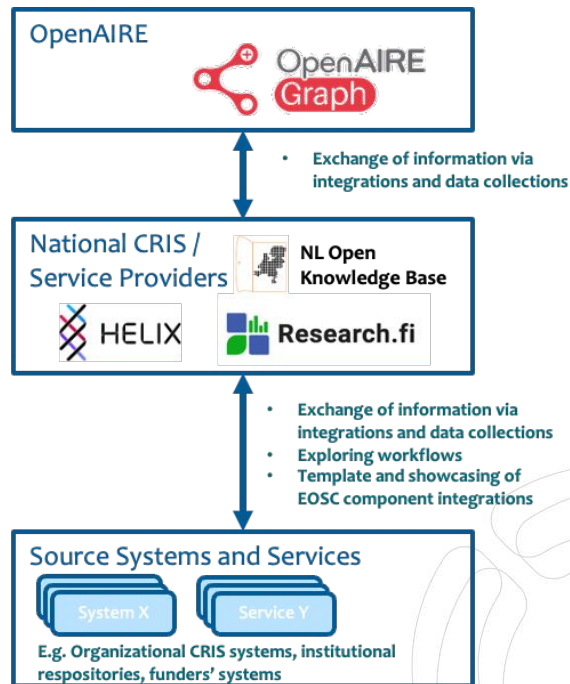


at the universities of Dresden, Ekaterinburg, Leipzig, Pennsylvania, Bonn and the Fraunhofer Society, and Professor of Data Science and Digital Libraries at Leibniz Universität Hannover and Director of VIVO. Prof. Dr. Auer has made important contributions to semantic technologies, knowledge engineering and data science. He is the author (resp. co-author) of over 100 peer-reviewed scientific publications. His awards include an ERC Consolidator Grant from the European Research Council, a SWSA ten-year Best Paper Award, and the OpenCourseware Innovation Award. He has led several large-scale research projects.

*National built systems for
CRIS-like information would
be invaluable sources of
data for research
assessment, science
policy-making or to
highlight EOSC-related
contributions if
interoperability and
extensive data exchange
could be achieved*

What are we trying to tackle?

...highlighting a few...





- Explore workflows for RAiDs
- Assign RAiDs for activities and projects



What's in it for us?

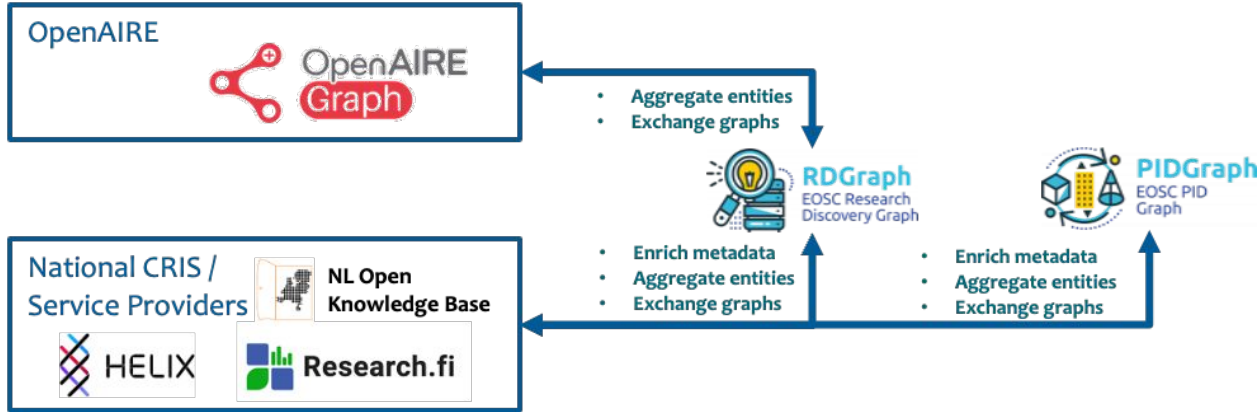
Ability to mint RAiDs and update/retrieve metadata via European RAiD registry + ideas for RAiD governance

What's in it for researchers?

Makes it easier to follow and show project's outputs and use them in e.g. reporting

Research project might include information on: people, publications, funding, activities etc. -> collection of different research entities and roles within projects

How to handle all this interlinking entities in a meaningful way and track the impact and outputs of projects?



What's in it for us?

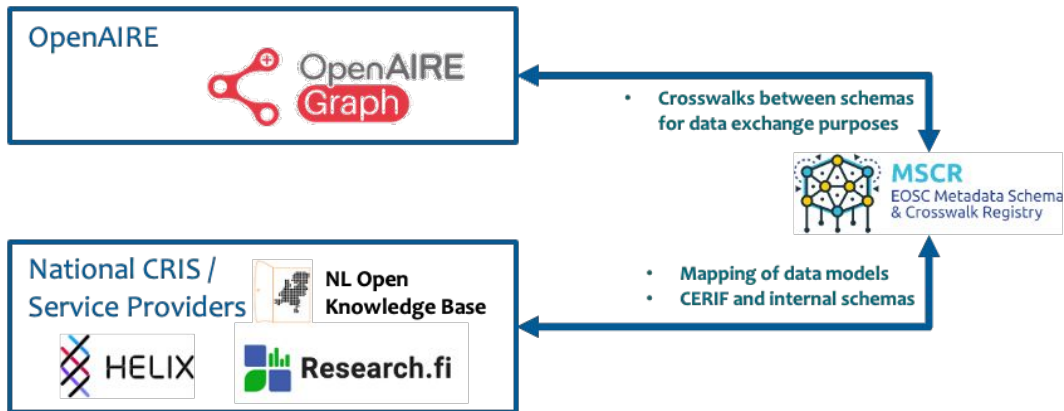
Enrichment of metadata records for nodes and links via APIs and data dumps

What's in it for researchers?

Makes your collaboration and datasets more visible in various systems

PIDs can provide unambiguous linking between persistent identifiers of the same type, e.g. journal articles citing other articles or linking a researcher and the datasets they produced

Datacite PID Graph tool to provide these links between research entities, but also to utilize them e.g. claiming of links between entities and following the usage metrics



What's in it for you?

New CERIF data model as crosswalkable schema + support for data exchanges between CRIS systems

What's in it for researchers?

Makes your contributions to local CRIS system matter as same information is available in other systems as well

How to exchange information between CRIS systems and aggregate information in a sustainable way while taking care of data quality and keeping up with inevitable updates to data models?

Refactored CERIF data model as common for doing data exchange of national CRIS systems & OpenAIRE RDGraph aggregator of CRIS information

FAIRCORE4EOSC

Core Components Supporting a FAIR EOSC



faircore4eosc.eu



[@FAIRCORE4EOSC](https://twitter.com/FAIRCORE4EOSC)



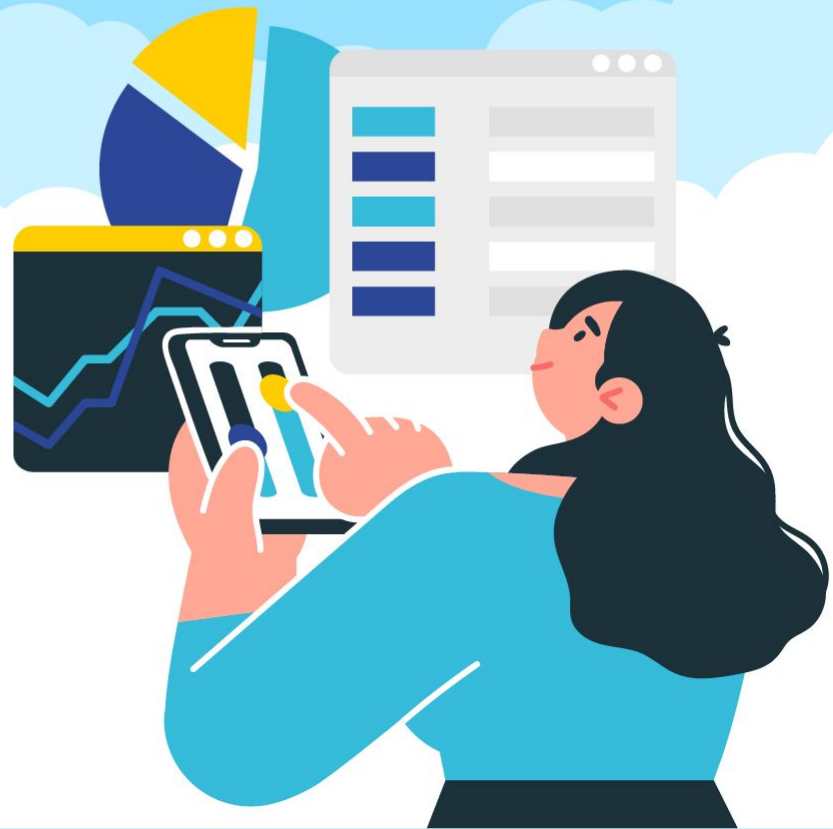
[company/faircore4eosc](https://www.linkedin.com/company/faircore4eosc)



[FAIRCORE4EOSC](https://www.youtube.com/FAIRCORE4EOSC)



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Case studies

How do the components benefit communities?

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- **Service Providers and Research Data Management Communities (EUDAT)**
- Social Sciences and Humanities (CLARIN)

The Service Providers and Research Data Management (SPRDM) Communities Story (EUDAT CDI B2SHARE)

FAIRfest, February 20th – 21st 2025

Once upon a time ...



There was a research scientist, data manager and a scientific community manager.

- How can I store, share & publish my research data and make it available to other researchers easier?
- How can I make an extensive and clear description of the data for better understanding of the research?
- I have a scientific community which want to have a set of rules (metadata schemas) for publishing our research data, can you make it easier to do?
- How can I find research data relevant and / or related to my research data?
- What about related projects and their relationships?

FAIRCORE4EOSC components and services to the rescue

Metadata Schema and Crosswalk Registry (MSCR)

Provide a location where you can easily access rules (Metadata schemas) of publishing your research data

Data Type Registry (DTR)

Add typing for your research data.

Research Activity Identifier Service (RAiD)

Show you the research projects and the relationships to others.

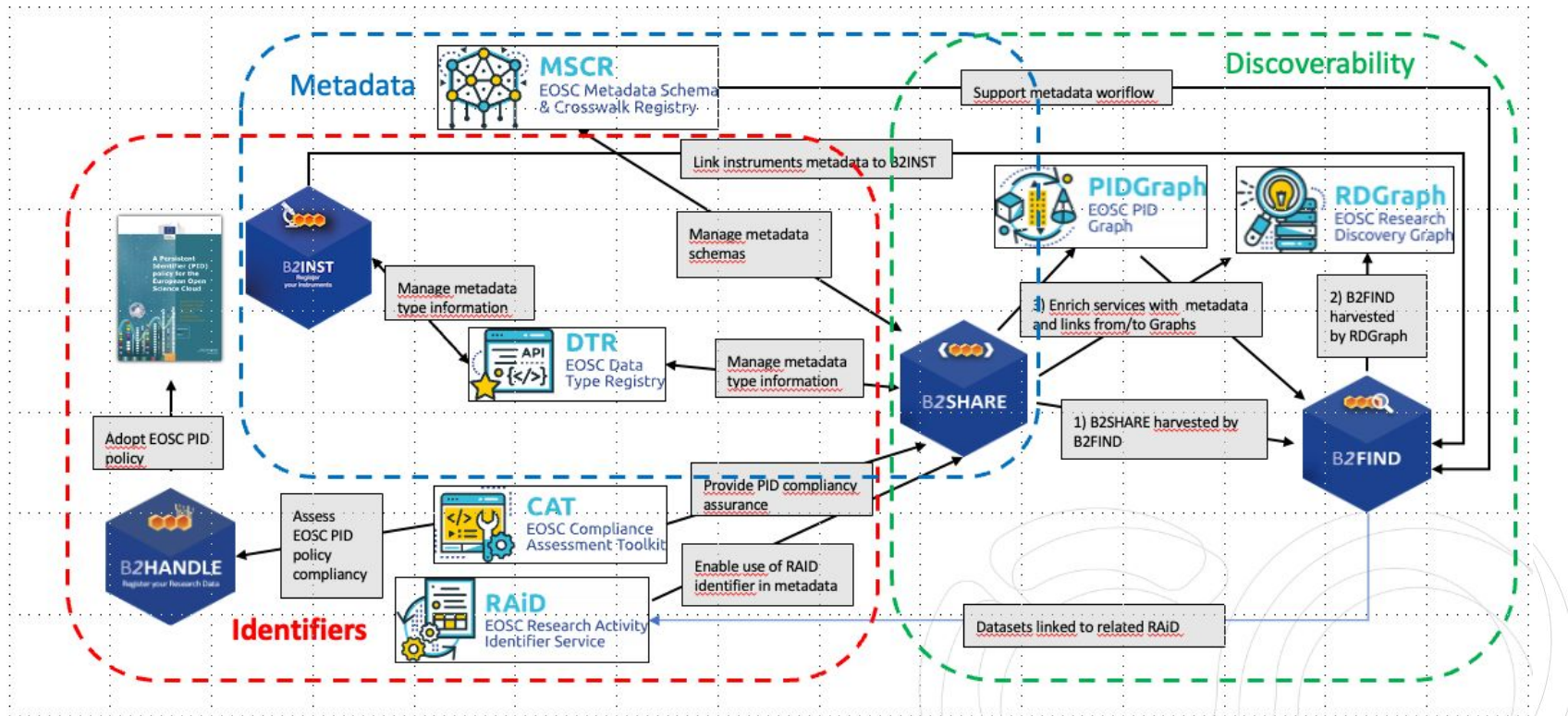
Research Discovery Graph (RDGraph) and PID Graph (PIDGraph)

Visualise the relationships of different research data

Compliance Assessment Toolkit (CAT)

Just a moment

The connections



The Service Providers and Research Data Management (SPRDM) Community.

- We have made available metadata schemas in MSCR & DTR so it is easier for you to register, store, publish and share you research data.
- We have incorporated into B2SHARE necessary metadata handles to make the presentation of your research data better to visualize and to see the relationships to other research data and projects for RAiD, RDGRAPH, & PIDGRAPH.
- And while at it, even succeeded to show the use of CAT for EOSC PID Compliance Policy assessment.

EUDAT Core metadata schema has been made available in MSCR

Metadata & files | Schema | Version history

Schema details

Name:	EUDAT Core Metadata Schema	Description:
Namespace:	http://test.com	
Version label:	1.1	
Contact:		
Owner:	Anna-Lena Flügel	
PID:	21.T13999/EOSC-202410000281220	
Source URL	https://schema.eudat.eu/schemas/v1.1/eudat-core.xsd	
Format:	XSD	
Created:	24/10/2024, 14.37	
Modified:	24/10/2024, 14.37	
State:	PUBLISHED	
Visibility:	PUBLIC	

EUDAT B2SHARE provides information to PIDGraph, RAiD & RDGRAPH

Alternate identifier :: alternate_identifiers

The alternative identifiers for this resource such as a URN, URI or an ISBN number.

```
alternate_identifier (required) string

Type ::
alternate_identifier_type (required)
enum [ARK, arXiv, bibcode, DOI, EAN13, EISSN, Handle, ISBN, ISSN, ISTE, LISSN, LSID, ORCID, PMID, PURL, UPC, URL, URN, w3id, RAiD]

The type of the identifier.
```

Related identifiers :: related_identifiers

The identifiers of other resources related to the resource such as a URN, URI or an ISBN number.

```
related_identifier (required) string

Resource type ::
resource_type_general
enum [Audiovisual, Book, BookChapter, Collection, ComputationalNotebook, ConferencePaper, ConferenceProceeding, DataPaper, Dataset, Dissertation, Event, Image, InteractiveResource, Journal, JournalArticle, Model, OutputManagementPlan, PeerReview, PhysicalObject, Preprint, Report, Service, Software, Sound, Standard, Text, Workflow, Other]

The type of the resource.

Type :: related_identifier_type (required)
enum [ARK, arXiv, bibcode, DOI, EAN13, EISSN, Handle, ISBN, ISSN, ISTE, LISSN, LSID, ORCID, PMID, PURL, UPC, URL, URN, w3id, RAiD]

The type of the identifier.

Relation :: relation_type (required)
enum [IsCitedBy, Cites, IsSupplementTo, IsPublishedIn, IsSupplementedBy, IsContinuedBy, Continues, HasMetadata, IsMetadata, IsNewVersionOf, IsPreviousVersionOf, IsPartOf, HasPart, IsReferencedBy, References, IsDocumentedBy, Documents, IsCompiledBy, Compiles, IsVariantFormOf, IsOriginalFormOf, IsIdenticalTo, IsReviewedBy, Reviews, IsDerivedFrom, IsSourceOf, Describes, IsDescribedBy, HasVersion, IsVersionOf, Requires, IsRequiredBy, ObscuredBy, IsObscuredBy, IsObsoletedBy]

The relation type of the described reference.
```

```
Scheme :: scheme
The scheme used for the identifier.
```

```
Scheme URI :: scheme_uri
The URI pointing to the scheme.
```

Type :: related_identifier_type (required)

The type of the identifier.

enum [ARK, arXiv, bibcode, DOI, EAN13, EISSN, PURL, UPC, URL, URN, w3id, RAiD]

Thank you

EOSC PID Compliance Policy

FAIRCORE4EOSC
Compliance Assessment Toolkit

B2SHARE
Compliance Policy: EOSC PID Policy

Statistics

Principles: **8**
Criteria: **13**

- Mandatory: **9/9**
- Optional: **4/4**



Assessment Results

Compliance:
pass

Details

fields.actor: PID Manager (Role)

Organisation: National Infrastructures for Research
and Technology - GRNET S.A

Subject:

b2share / service

Latest Update:2024-11-15



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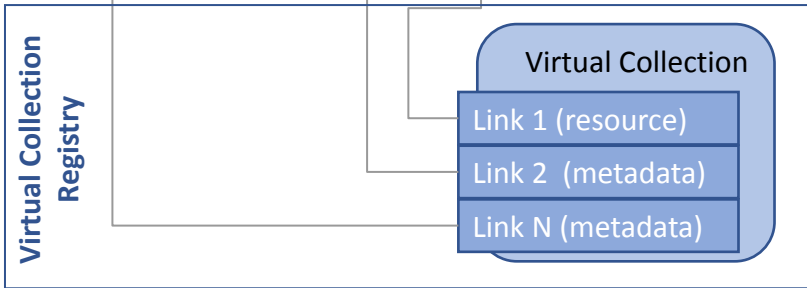
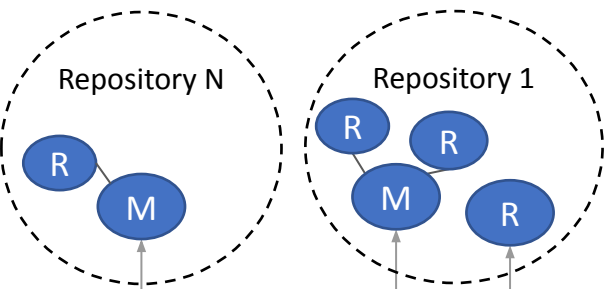
SSH Case Study

Willem Elbers (CLARIN ERIC)
FairFest, The Hague
February 20 2025

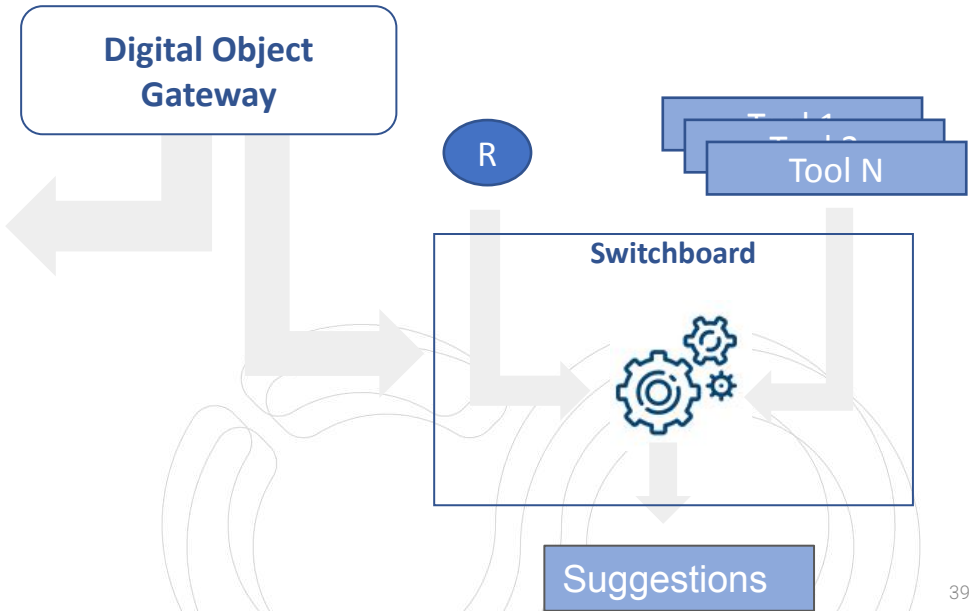


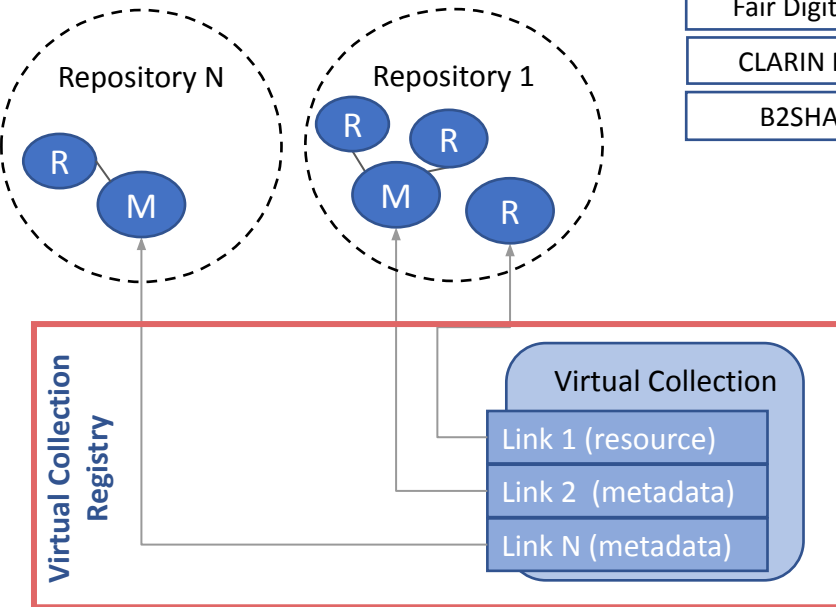
Funded by
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Zenodo PID	Handle
Humanum PID	DOI
Fair Digital Object	
CLARIN Repo PID	
B2SHARE PID	

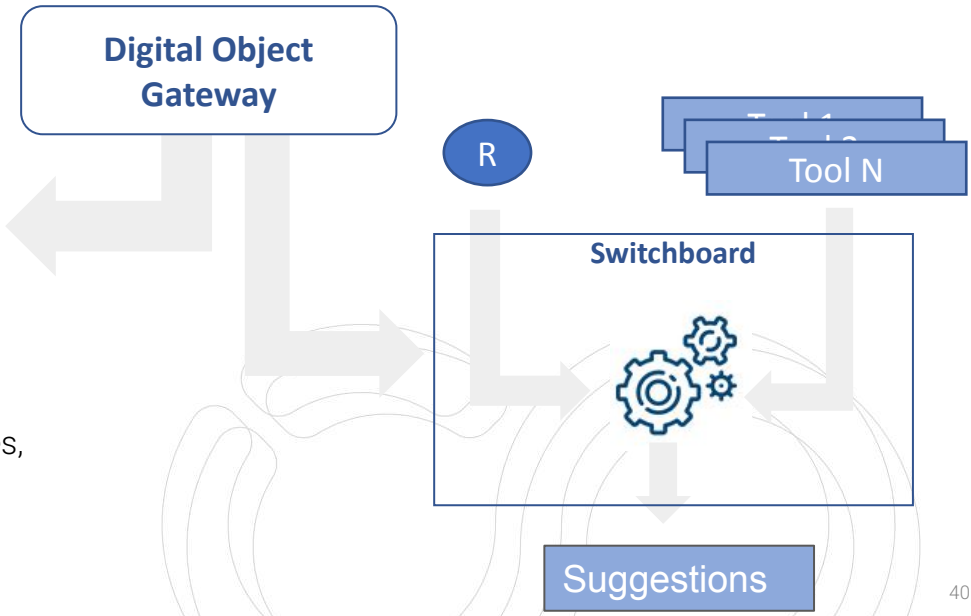


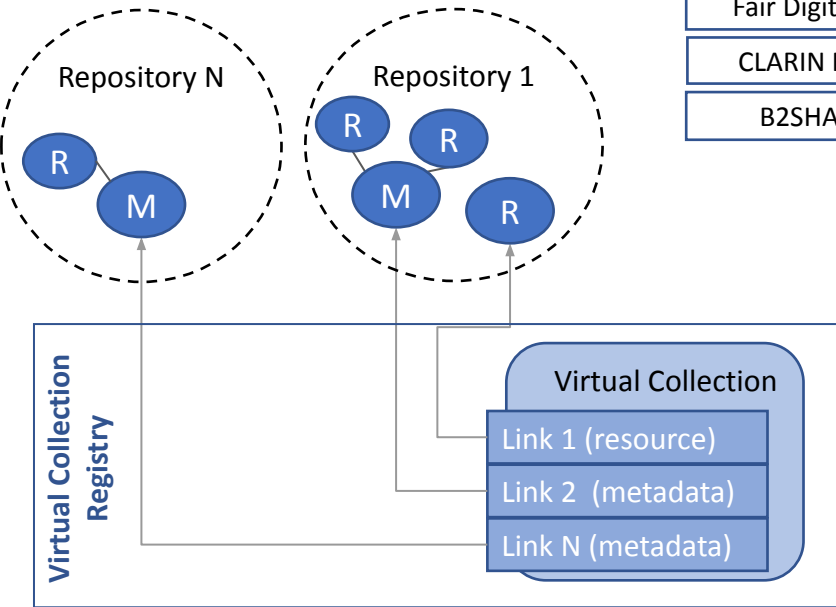


The Virtual Collection Registry allows a user to create collections of links pointing to resources, such as landing pages, metadata files or bit streams.

This provides easy citation, sharing and processability of resources spread across various repositories.

Zenodo PID	Handle
Humanum PID	DOI
Fair Digital Object	
CLARIN Repo PID	
B2SHARE PID	





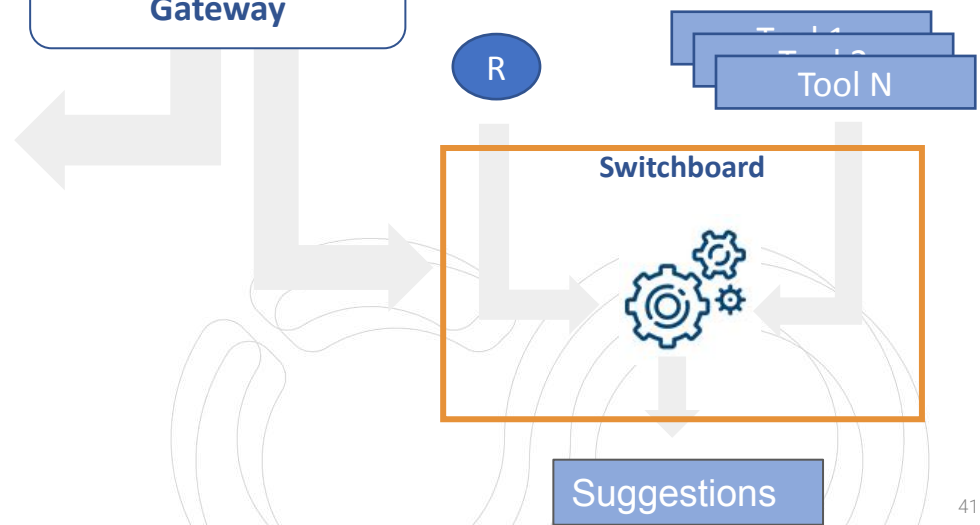
Zenodo PID	Handle
Humanum PID	DOI
Fair Digital Object	
CLARIN Repo PID	
B2SHARE PID	

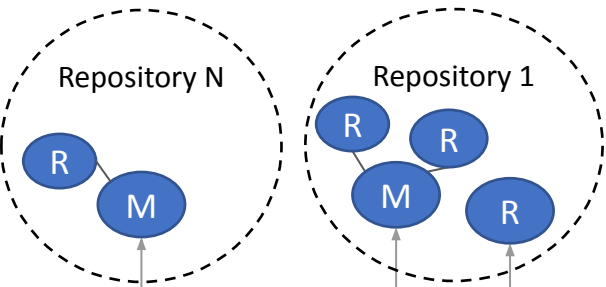


The Switchboard is a broker between resources and processing tools.

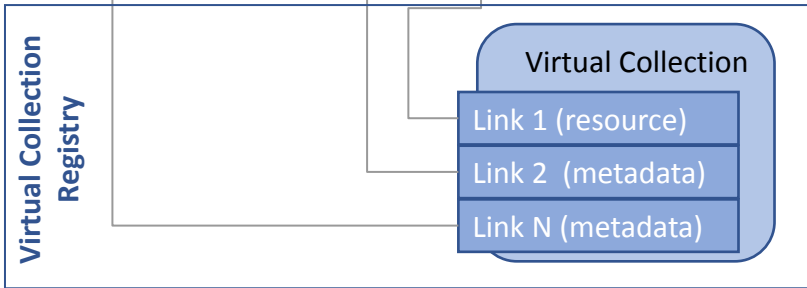
A user presents a (link to a) resource and the Switchboard returns a list of tools that can process the given resource.

This allows the user to explore what tools are available for his/her data in our domain.

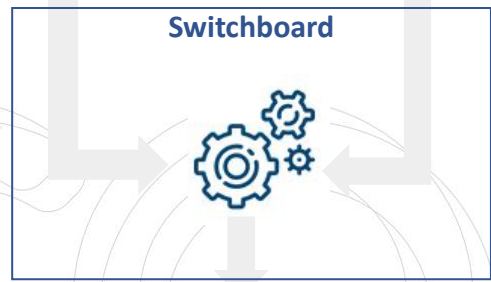




Zenodo PID	Handle
Humanum PID	DOI
Fair Digital Object	
CLARIN Repo PID	
B2SHARE PID	



The Digital Object Gateway provides a uniform API used within our infrastructure to interface with the outside world.



Use case

A typical workflow for a user, a teacher in this example, in our domain is:

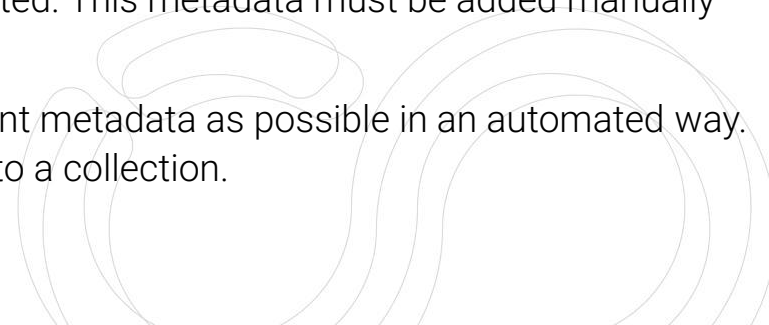
1. Create a virtual collection of links pointing to various resources used in a lecture.

E.g. Create a collection to bundle works by and secondary sources about Henrik Ibsen (<http://hdl.handle.net/11372/VC-1002>).

2. Use this collection to send it to the switchboard to get suggestions on available tools to process the resources linked in this collection.

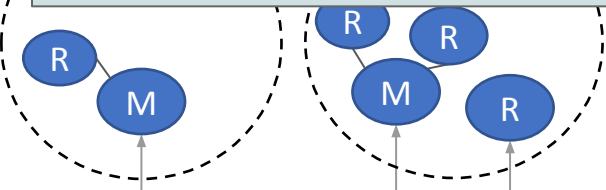
When creating a collection some basic metadata is collected. This metadata must be added manually for each link added to the collection.

This workflow can be improved by getting as much relevant metadata as possible in an automated way. This will reduce the amount of work required to add links to a collection.

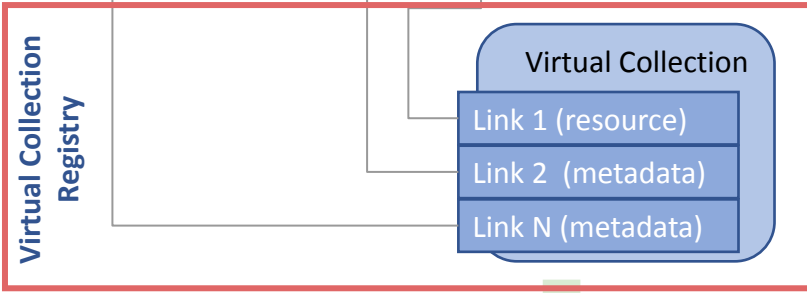


The integration with the PID Meta Resolvers allows us to support other PID systems such as ark and urn:nbn.

The user can add a link using one of these PID systems and resolve the PID to the underlying resource.



B2SHARE PID



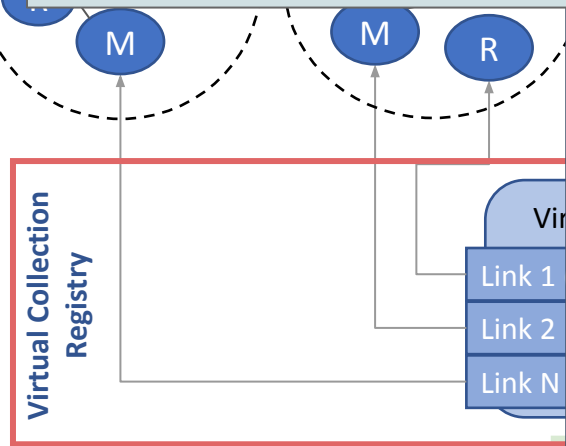
Identifier System	DOG	PIDMR
HDL (with registered CLARIN repository)	L,M,R'	
HDL, EPIC (21.*)		M, L
HDL, EPIC (old)		M, L
ARK		M, L
URN-NBN-DE		M, L
URN-NBN-CH		M, L, R
arXiv		M, L, R
Zenodo (10.5281/zenodo)	L,M,R'	M, L, R
DOI	L,M,R'	M, L, R
ark		M, L
B2SHARE	L,M,R'	





Using extended data types defined in the DTR we can store additional information with the type to improve processability and discoverability of tools.

Based on the resource media type we can query for an extended mimeType that is storing schema and crosswalk information.



Reference 1

Reference Name

RFC

Reference URL

<https://datatracker.ietf.org/doc/html/rfc6129>

Reference 2

Reference Name

SCHEMA

Reference URL

https://tei-c.org/release/xml/tei/custom/schema/xsd/tei_lite_xml.xsd

Reference 3

Reference Name

CROSSWALK

Reference URL

<https://mscr-test.2.rahtiapp.fi/datamodel-api/v2/crosswalk/21.T13999/EOSC-202411000283922>



PID Graph



Research Discovery Graph



Finally we use the schema information to query the MSCR for a crosswalk.

If a crosswalk exists, we can download the associated XSLT and use this XSLT to transform the resource metadata into a schema we understand.

This schema is used to extract the relevant information we require as metadata for links in a collection and this information is prefilled into the user interface.



PID Meta Resolver



Data Type Registry

Metadata Schema and Crosswalk Registry



Virtual Collection Registry

Virtual Collection

Link 1 (resource)

Link 2 (metadata)

Link N (metadata)



PID Graph



Research Discovery Graph

R

Tool N

Switchboard



Suggestions



https://lids.ling-phil.ox.ac.uk/lids/xmlui/bitstream/handle/20.500.14106/A39119/A39119.xml

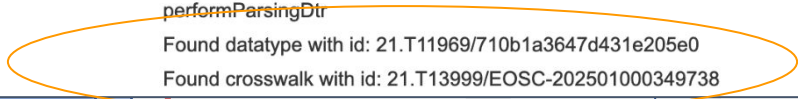
A39119.xml

Suggested value

A vindication of the letter out of the north concerning Bishop Lake's declaration of his dying in the belief of the doctrine of passive obedience, &c. : in answer to a late pamphlet, called, The defence of the profession, &c. of the said Bishop : as far as it concerns the person of quality.

Suggested value

2025-02-48 10:12:04	PARSER_HTTP KEY_HTTP_RESPONSE_MEDIA_TYPE	text/xml
2025-02-48 10:12:04	PARSER_HTTP HTTP_RESPONSE_CODE	200
2025-02-48 10:12:04	PARSER_HTTP NAME	A39119.xml
2025-02-48 10:12:05	PARSER_CMDI STATE	OK
2025-02-48 10:12:05	PARSER_MSCR STATE	OK
2025-02-48 10:12:05	PARSER_MSCR NAME	Eyre, William, 1612 or 13-1670.
2025-02-48 10:12:05	PARSER_MSCR DESCRIPTION	A vindication of the letter out of the north concerning Bishop Lake's declaration of his dying in the belief of the doctrine of passive obedience, &c. : in answer to a late pamphlet, called, The defence of the profession, &c. of the said Bishop : as far as it concerns the person of quality.
2025-02-48 10:12:05	PARSER_MSCR PROCESS_0	perform ParsingDir
2025-02-48 10:12:05	PARSER_MSCR PROCESS_1	Found datatype with id: 21.T11969/710b1a3647d431e205e0
2025-02-48 10:12:05	PARSER_MSCR PROCESS_2	Found crosswalk with id: 21.T13999/EOSC-202501000349738



Link N (metadata)

Virtual Collection



PID Graph



Research Discovery Graph



Suggestions

Use case

A workflow for a “technical” researcher in our domain is the processing of a set of resources referenced by PIDs in order to find tools that can operate on the data.

1. Write a script to iterate over a collection or set of resources
2. Utilize the DOG to resolve the PIDs and query relevant metadata for each resource
3. Utilize the switchboard to find relevant tools to process each resource

This workflow can be improved by supporting more PID systems and improving the returned metadata by e.g. including taxonomy information. This allows for the selection of more generic tools that might be able to process the data as well.



The integration with the PID Meta Resolvers allows us to support other PID systems such as ark and urn:nbn.

The user can add a link using one of these PID systems and resolve the PID to the underlying resource.

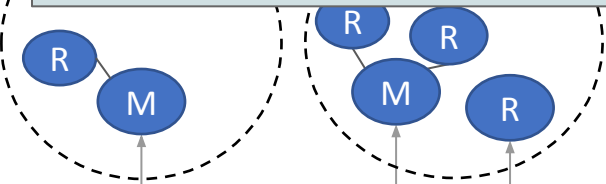


PID Meta Resolver



Data Type Registry

Metadata Schema and Crosswalk Registry



B2SHARE PID


Virtual Collection Registry

Virtual Collection


- Link 1 (resource)
- Link 2 (metadata)
- Link N (metadata)

Digital Object Gateway

Tool N



Switchboard



Suggestions



PID Graph




Research Discovery Graph

Using extended data types defined in the DTR we can store additional information with the type to improve processability and discoverability of tools.

Based on the resource media type we can query for an extended mimeType that is storing taxonomy information.

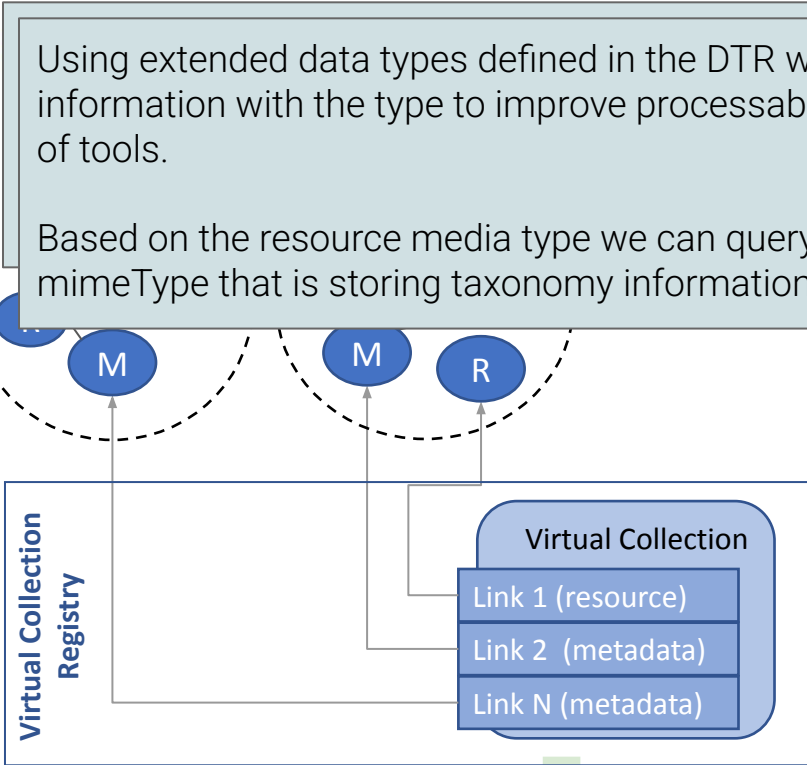


PID Meta Resolver

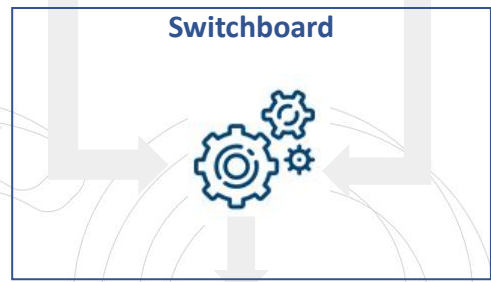


Data Type Registry

Metadata Schema and Crosswalk Registry 



Digital Object Gateway



Suggestions



PID Graph



Research Discovery Graph

Using extended data types defined in the DTD we can store additional

Taxonomies

Taxonomy nodes that this type should be assigned to.

Taxonomy 1 *

21.T11969/fe61e4792b37f2bbb26e

Type Name: application/tei+xml



Crosswalk Registry

Digital Object

Virtual Collection

Identifier

21.T11969/fe61e4792b37f2bbb26e

Type Name *

application/tei+xml

please use printable ascii characters without blank

Parent Nodes

Parent Node 1 *

21.T11969/f33c32fa8246e2ca6d5c

Type Name: text/xml



Added value

PIDMR, DTR and MSCR

- Improvements in the virtual collection creation workflow by collecting as much of the required metadata automatically.
 - Extended supported PID systems
 - Utilizes extended mimeType DTR type
 - Utilizes crosswalks to convert metadata into
- Extended the Digital Object Gateway to:
 - Support the resolution of PIDs in more than 10 new PID systems
 - Query DTR type information, including extendedMimeTypes and taxonomy information

PIDGraph and RDGraph

- Improved discoverability of collections published with DOIs



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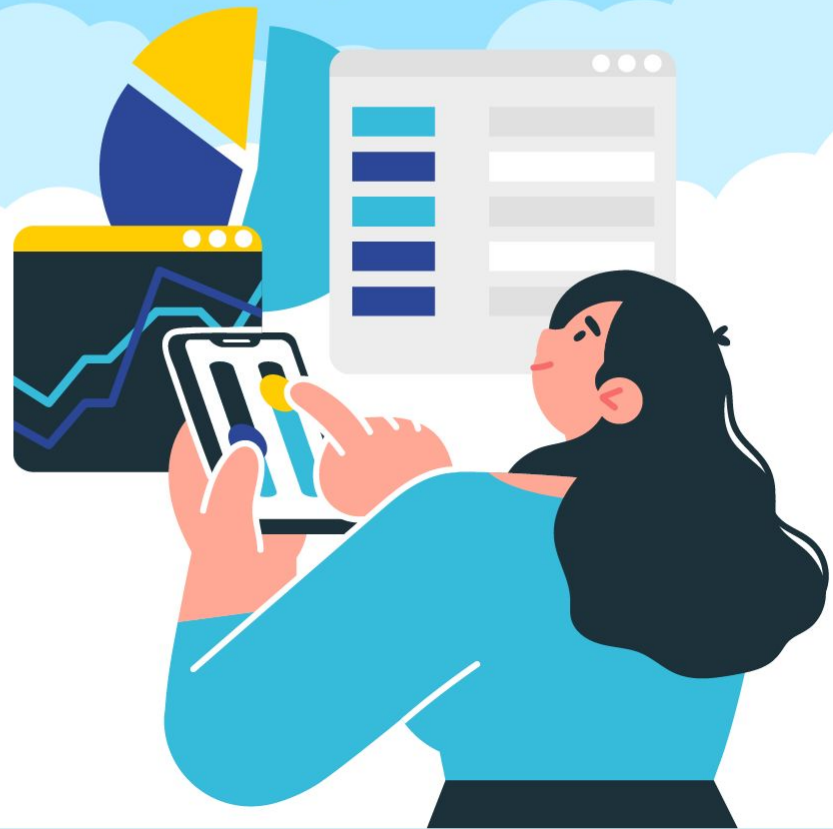
[company/faircore4eosc](https://www.linkedin.com/company/faircore4eosc)



[FAIRCORE4EOSC](https://www.youtube.com/FAIRCORE4EOSC)



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the European Union





Case studies

How do the components benefit communities?

Components are co-developed and tested within domain-specific communities:

- **Climate Change (DKRZ)**
- European Integration of National-level Services (CSC)
- Mathematics (FIZ)
- Service Providers and Research Data Management Communities (EUDAT)
- Social Sciences and Humanities (CLARIN)

Climate Change Case Study

User Story

The Hague, 20th of February 2025

Beate Kruess, German Climate Computing Center



Funded by
the European Union



Why this case study?

FAIRCORE4EOSC has promised to enhance the discoverability and interoperability of research outputs.

Case studies should guide the development and testing of these enhancements.

The Climate Change Case Study was born



How to improve Earth System Science infrastructure?

IS-ENES (Infrastructure for the European Network for Earth System Modeling)

- widely used
- national and international projects
- different funding streams
- user portal
- provenance plug-in

How to make ENES more FAIR?



User Story: How can a downstream data product be generated?

I want to analyze the windstorm risk in specific areas of Europe.



I need to **find** relevant climate data on windstorms, ideally from various sources.

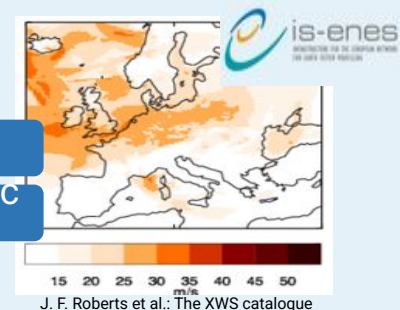
I require **access** to this data, considering permissions, availability, and other restrictions.

The data should be **interoperable** across different platforms and systems.

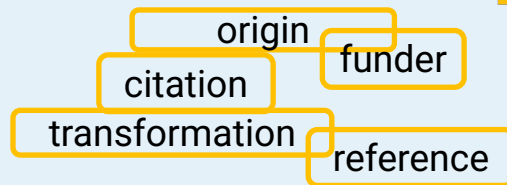
I am looking for **reusable** data that also includes pre-defined data processing steps.



data
provenance



missing ...



How to add missing provenance information?



Use new FC4E services!

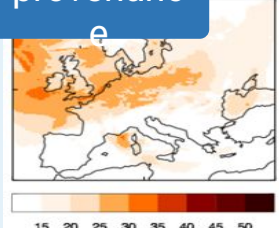


Services on **climate dataset**
Data & Metadata

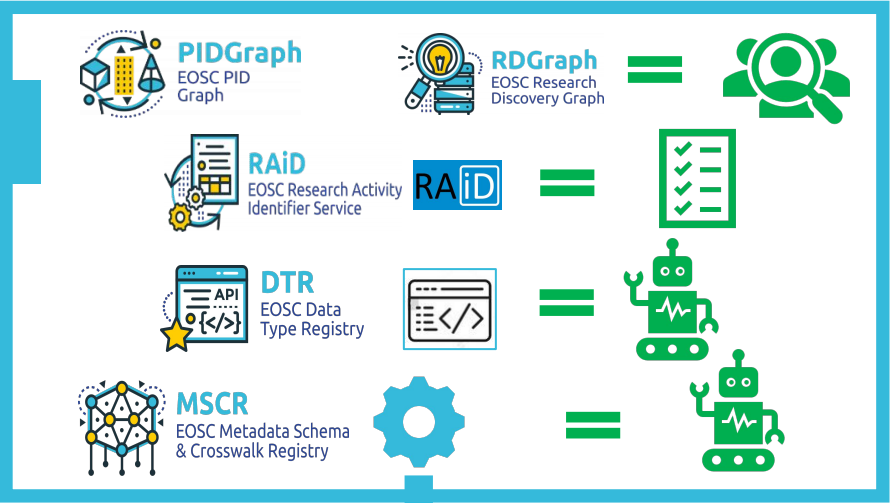


PID

data
provenanc



J. F. Roberts et al.: The XWS catalogue



User Story: How can a downstream data product be generated?

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I require **access** to this data, considering permissions, availability, and other restrictions. **A**

The data should be **interoperable** across different platforms and systems. **I**

I am looking for **reusable** data that also includes pre-defined data processing steps. **R**



PIDGraph
EOSC PID Graph



RDGraph
EOSC Research Discovery Graph



DTR
EOSC Data Type Registry



RAiD
EOSC Research Activity Identifier Service



DTR
EOSC Data Type Registry



DTR
EOSC Data Type Registry



MSCR
EOSC Metadata Schema & Crosswalk Registry



DTR
EOSC Data Type Registry



MSCR
EOSC Metadata Schema & Crosswalk Registry



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Thank you!



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Case studies

How do the components benefit communities?



RDGraph

improves findability and re-use of research outputs and softwares.



DTR

allows machine actionable standardisation of metadata helpful to:

- analyse, compare and validate large data volumes
- define and register extended Mime-Types, taxonomies and subject classifications
- improve visibility and selection of data types



MSCR

provides machine-actionable metadata transformation jobs and findability of metadata schemas and crosswalks.



RAiDs

improves visibility and allows connectivity of research project data & related entities.



PIDGraph

offers discoverability of data collections and makes research objects connections visible.



PIDMR

resolves a large amount of PID types.



RSAC

component enhances research software discoverability and long-term preservation.

<https://app.sli.do/event/grfSDixNPS6GB6XhrLA3SV>



Meet our team to deliver a short video statement on your interest in using the components ! (1 sentence is enough!)

You'll get a present as thank you for your time.





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