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Core Components Supporting a FAIR EOSC

FAIRCORE4EOSC

Developing EOSC-Core components to enable a FAIR EOSC ecosystem

Presentation title: FAIRCORE4EOSC - Extending the EOSC Platform to support FAIR

22 | 11 | 2023 Tommi Suominen, FAIRCORE4EOSC Coordinator at CSC – IT Center for Science

Slides by Tommi Suominen, Joonas Kesäniemi & Rumana Quazi

Funded by the European Union

faircore4eosc.eu
Twitter: @FAIRCORE4EOSC
LinkedIn: company/faircore4eosc
Youtube: FAIRCORE4EOSC

FAIRCORE4EOSC in a nutshell

- today at month 17/36

Full name: Developing EOSC-Core components to enable a FAIR EOSC ecosystem

Research and Innovation Action

Budget: 10 million EUR

Duration: June 2022 – May 2025

Consortium: 22 partners, coordinated by CSC – IT Center for Science

Coordinator Tommi Suominen (CSC), **Project Manager** Anu Märkälä (CSC) and **Technical Coordinator** Mark van de Sanden (SURF)

Website: faircore4eosc.eu

Key results: In response to the gaps identified in the SRIA, the project will develop nine new EOSC-Core components aimed to improve the discoverability and interoperability of an increased amount of research outputs.

Amsterdam, Netherlands – Kick-off meeting, June 2022

Context

Enhancing FAIRness in the EOSC ecosystem

The European Open Science Cloud (EOSC) is an ecosystem of research data and related services that will enable and enhance seamless access to and reliable re-use of FAIR research objects (including data, publications, software, etc.).

The Strategic Research and Innovation Agenda (SRIA) for EOSC was created in 2021, as a roadmap for future development. Priorities highlighted in the SRIA are the establishment of the Web of FAIR data and a Minimum Viable EOSC (MVE) by 2027, that is the core components and functions to enable EOSC to operate (the EOSC-Core).

2021

Minimum Viable eosc

Web of FAIR Data

Findable Accessible Interoperable Reusable

2027

Implementation Challenges (SRIA) addressed

FAIRCORE4EOSC develops 9 new EOSC CORE components to address gaps identified in the SRIA. Our concrete service development work furthers the realisation of the priorities highlighted in the SRIA, that are the Minimum Viable EOSC (MVE) and web of FAIR data.

- *Identifiers:* Introducing new resource types; machine-actionable persistent identifiers (PIDs); establishing a PID meta-resolver; standardising PID graphs; PID compliance framework to ensure compliance to the EOSC PID policy and to ensure quality of service for PIDs;
- *Metadata and Ontologies:* Provide or embrace/stimulate existing registries of metadata schemas, ontologies and crosswalks, develop services that build on metadata registries and can facilitate the creation and sharing of crosswalks;
- *Interoperability:* Enable discovery of data sources available in different formats, making search tools available; Provide tools for quality validation of metadata records and of digital objects; Implement EOSC PID Policy;
- *Research Software*: metadata description standards for research software, automated deposit of new releases into a scholarly repository and Software Heritage.

Kajaani, Finland– Technical project meeting, April 2023

The 9 FAIRCORE4EOSC components supporting FAIR

RDGraph (F, A)

EOSC Research Discovery Graph

EOSC Research Discovery Graph (RDGraph) is a flexible and federated EOSC search service across EOSC repositories that extends EOSC Research Catalogue.

PIDGraph (F, A)

EOSC PID Graph

Services for providing access to the PID Graph, which is made up of links and records gathered from persistent identifier (PID) authority data sources.

MSCR (I, R)

EOSC Metadata Schema and Crosswalk Registry

Support publishing, discovery and access of metadata schemas and crosswalks and provide functions to operationalise metadata conversion by combining crosswalks.

The 9 FAIRCORE4EOSC components supporting FAIR

DTR (I, R)

EOSC Data Type Registry

Provide user friendly and machine actionable Interfaces for the registration and usage of Data Types and Kernel Information Profiles.

PIDMR (F, A)

EOSC PID Meta Resolver

Provides users with a common interface to resolve different types of PIDs regardless of their originating system. The PIDMR either resolves to a given URI or provides Kernel Information Profiles if available.

CAT (F, I)

EOSC Compliance Assessment Toolkit

The Compliance Assessment Toolkit will support the EOSC PID policy with services to encode, record, and query compliance with the policy.

The 9 FAIRCORE4EOSC components supporting FAIR

RAiD (F, A)

EOSC Research Activity Identifier Service

The EOSC RAiD will mint PIDs for research projects, which will allow authorised EOSC users and services to manage information about project-related participants, services, and outcomes.

RSAC (F)

EOSC Research Software APIs and Connectors

Ensure the long-term preservation of research software in different disciplines. APIs and connectors will be developed to interconnect research outputs infrastructures with the Software Heritage universal source code archive, using the CodeMeta standard, and the Software Heritage intrinsic identifiers (SWHID).

SWHM (F, A)

EOSC Software Heritage Mirror

Equip EOSC with a mirror of the Software Heritage universal source code archive. In order to prevent information loss, a mirror of Software Heritage will be established by GRNET to serve the EOSC community and will be updated regularly to follow the growth of the universal source code archive.

Case Studies

CLARIN

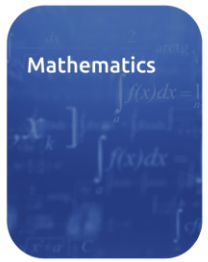
This case-study will focus on improving the discoverability of CLARIN data through the integration of the Digital Object Gateway (DOG), a crucial component for the interoperability of the CLARIN infrastructure, Language Resource Switchboard and Virtual Collection Registry tools.

Adopted components DTR, MSCR, PIDGraph, PIDMR, RDGraph

DKRZ
DEUTSCHES KLIMARECHENZENTRUM

ENES supports climate modellers in their work, in particular in the area of data management. In this case study we demonstrate how the developed EOSC-Core components can improve the discoverability and re-use of research results from the ENES community.

Adopted components DTR, MSCR, PIDGraph, RAiD, RDGraph



FIZ Karlsruhe
Leibniz Institute for Information Infrastructure

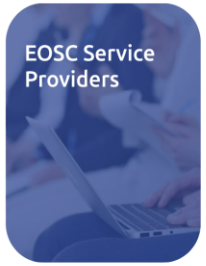
zbMATH Open & swMATH projects aggregate significant scientific advances in mathematics and related disciplines supporting researchers in finding relevant publications and data. The case study will increase the discoverability of the zbMATH Open and swMATH data and services in the mathematical and EOSC community.

Adopted components MSCR, PIDGraph, PIDMR, RDGraph, RSAC

CSC

The case study will showcase how the developed components can enrich the content of the national research information systems displaying international connections to research objects and improve their interoperability.

Adopted components DTR, MSCR, PIDGraph, RAiD, RDGraph, RSAC, SWHM

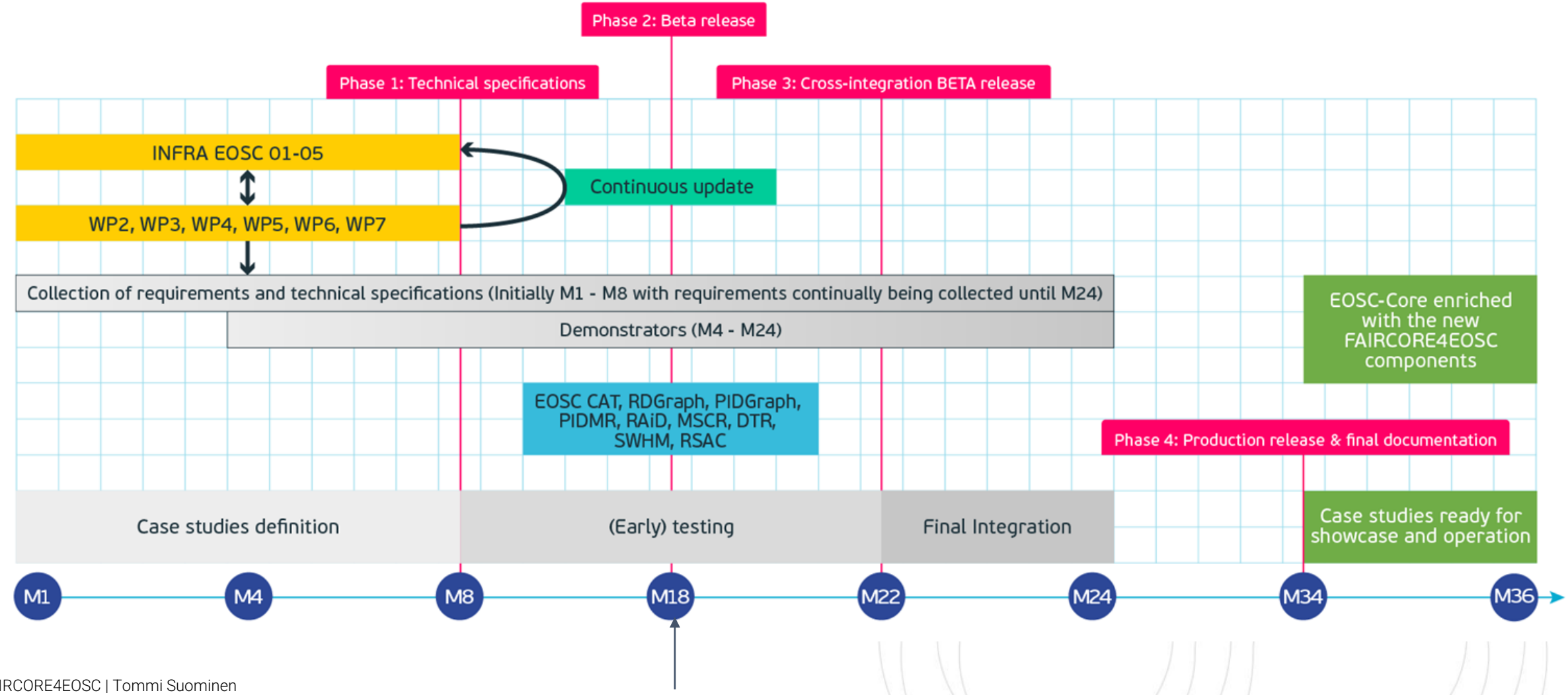


Collaborative EUDAT Data Infrastructure
Data shared and preserved across borders and disciplines

The case study aims to meet domain-specific requirements of research communities for common data services that improve discovery, access and reusability of research data. Leveraging the EUDAT services, the case study will act as a rule model for other service providers to increase the adoption of the developed components.

Adopted components CAT, DTR, MSCR, PIDGraph, RAiD, RDGraph

FC4E Implementation timeline



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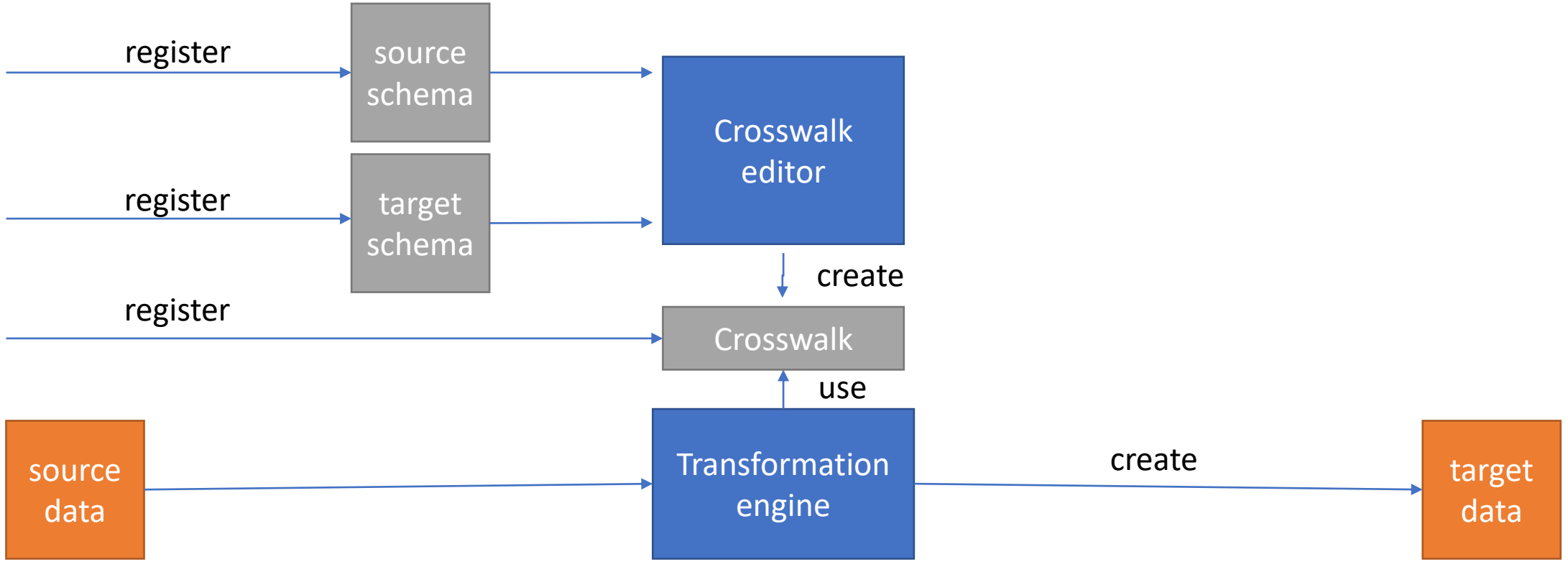
Metadata schema and crosswalk registry in integration with the data type registry

Funded by
the European Union

Main features



Registering Existing Schema

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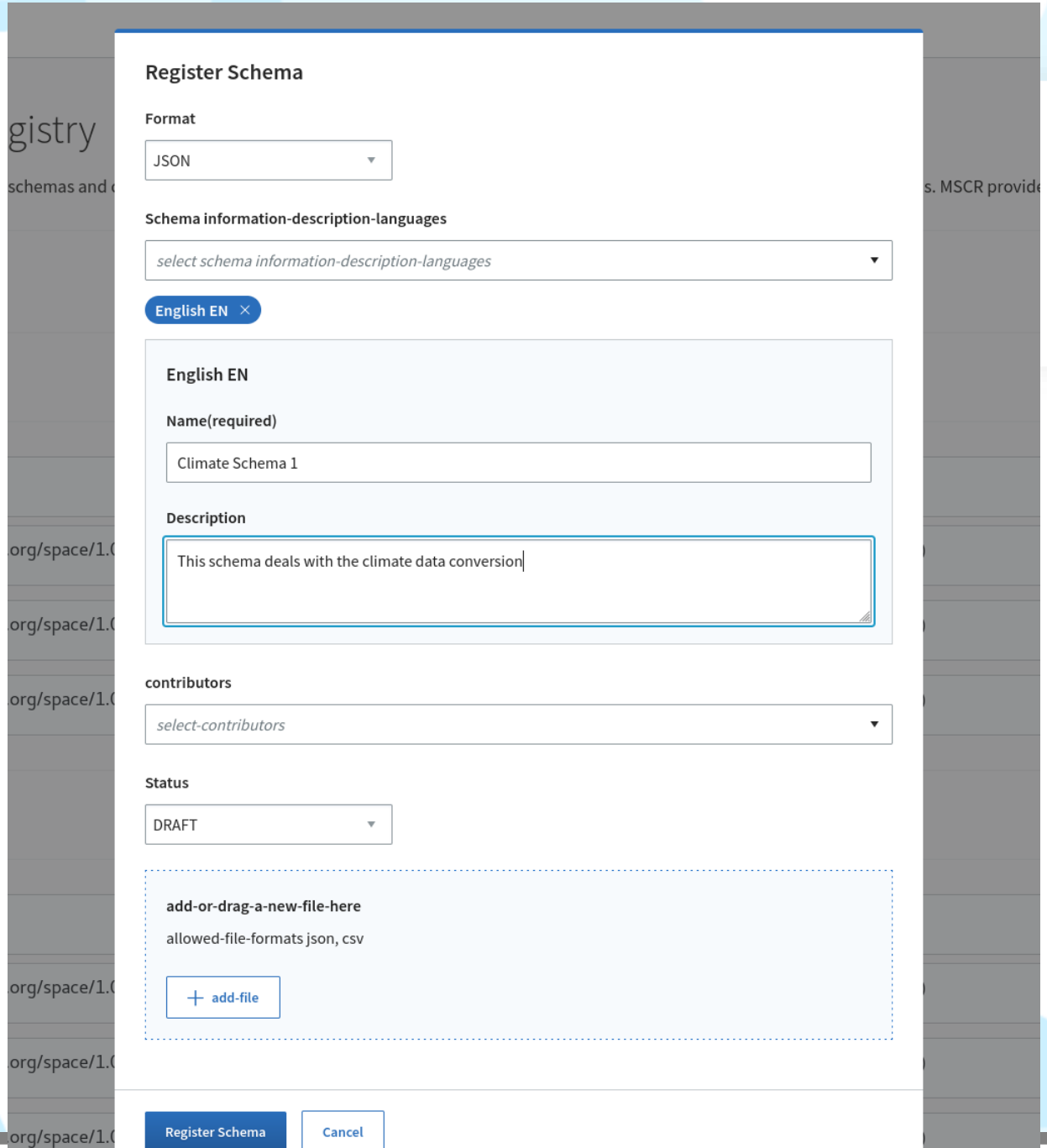

MSCR Content

Schema description formats

- CSV, JSON Schema, XML Schema
- SKOS
- OWL
- SHACL
- Any file (e.g. PDF) – cannot be part of the a crosswalk

Crosswalk

- Any file (e.g. XSLT) or reference to implementation
- Created with the Crosswalk editor (native format)
- Imported SSSOM (converted into internal format)

Hosted or referenced

- Hosted content is maintained with the MSCR (repository)
- Referenced content is maintained somewhere else (e.g. Github)

Versioned

MSCR Home Page

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In English (EN)

Admin User
LOGOUT

This is the personal content page for user Admin

Personal workspace
- Workspace content
- Workspace settings

Group workspaces
- Test org
  - Group content
  - Group settings

Metadata Schema and Crosswalk Registry

MSCR allows registered users and communities to create, register and version schemas and crosswalks with PIDs. The published content can be searched, browsed and downloaded without restrictions. MSCR provides an API to facilitate the transformation of data from one schema to another via registered crosswalks.

+ Register Schema | + Register Crosswalk | + Create new crosswalk

Schemas

Name	Namespace	Status	Revision	PID	
MARC to MODS 1	http/example.org/space/1.0	DRAFT	1.1(+5 other)	1	Remove
DTC to EML	http/example.org/space/1.0	DRAFT	1.1(+5 other)	2	Remove
Datacite to Dublin Core	http/example.org/space/1.0	INCOMPLETE	1.1(+5 other)	3	Remove

Crosswalks

Name	Namespace	Status	Revision	PID	
MARC to MODS 1	http/example.org/space/1.0	DRAFT	1.1(+5 other)	1	Remove
DTC to EML	http/example.org/space/1.0	DRAFT	1.1(+5 other)	2	Remove
Datacite to Dublin Core	http/example.org/space/1.0	INCOMPLETE	1.1(+5 other)	3	Remove

"MSCR UI Screenshots" selected (containing 0 items)

Content governance

Authorized user can login and create a personal account

- For the potentially messy content

Groups are be managed by system level admins

- Process for requesting a new group required
- Roles
  - Group admin
  - Group member
- Can be used for more authorative content

API keys can be generated for programmatic use

This is the personal content page for user Admin

Metadata Schema and Crosswalk Registry

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+ Register Schema | + Register Crosswalk | + Create new crosswalk

Schemas

Name	Namespace
MARC to MODS 1	http/example.org/space/1.0
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Crosswalks

Name	Namespace
MARC to MODS 1	http/example.org/space/1.0
DTC to EML	http/example.org/space/1.0
Datacite to Dublin Core	http/example.org/space/1.0

Add New Crosswalk

Add New Crosswalk Description

Select source schema

Default schema 1

Select a schema to see properties.

Select target schema

Test schema 2

Select a schema to see properties.

Name

Datacite to Dublin Core

Description

This crosswalk will create suitable mapping

Format

XSLT

add-or-drag-a-new-file-here

allowed-file-formats csv, json

+ add-file

Information description languages

Select information description languages in which the content of the data model is described.

Select languages for information description

English EN

Create Crosswalk | Cancel

Crosswalk Editor

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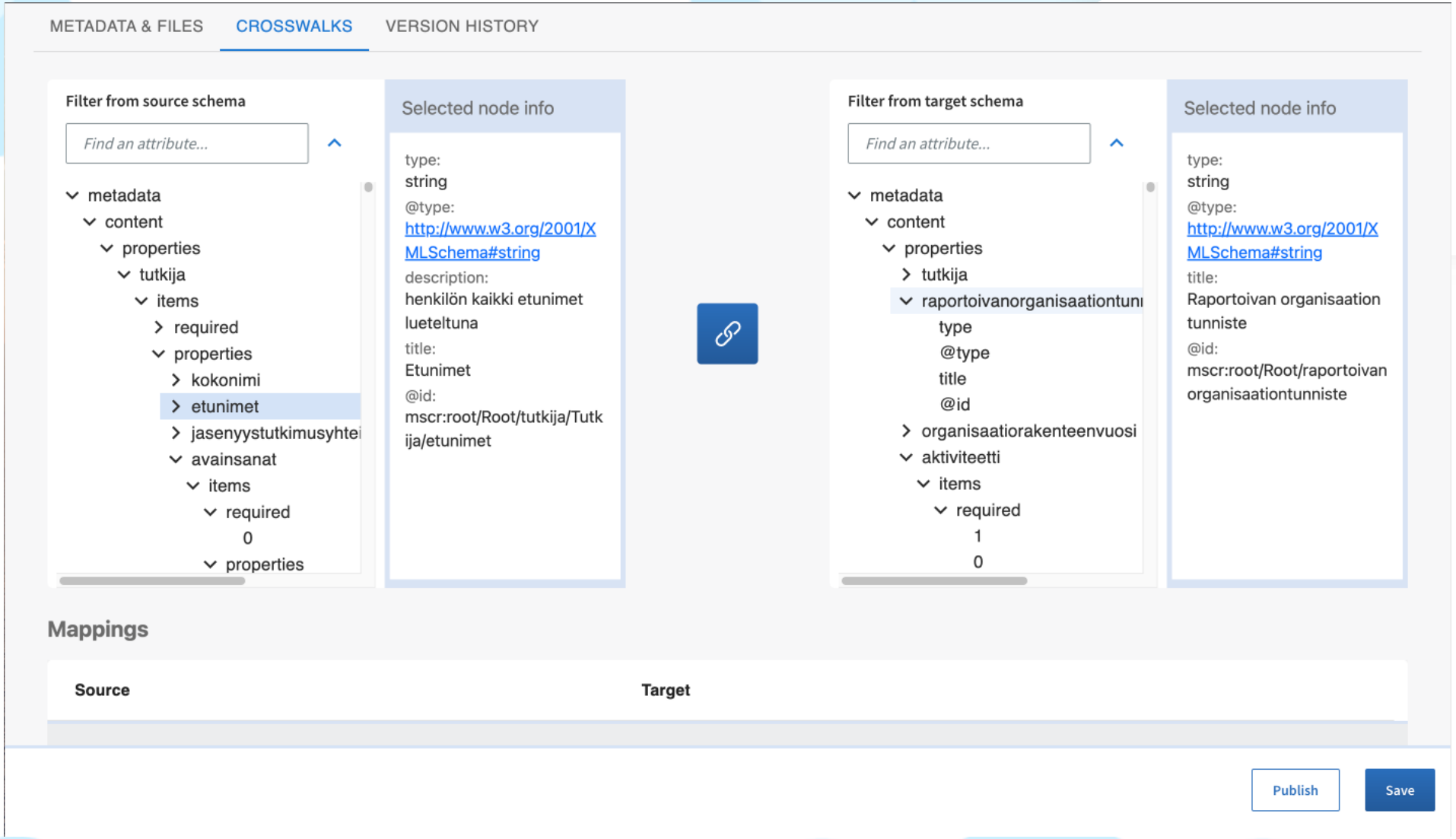


Metadata Schema and Crosswalk Registry

Search for... | in your workspace

Personal workspace

- Crosswalks
- Schemas
- Workspace settings

Group workspaces

- Diligent professionals
- Another group name

Sign out

Personal workspace > Crosswalks > AmazingCrosswalk_1

Description of the crosswalk here. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Proin congue magna vel odio tempus, quis finibus velit sollicitudin. Ut non lectus at lectus vestibulum gravida tempus fringilla tellus

Metadata & files | **Crosswalk** | Version history

Source schema
DataCite

- 1 Identifier
  - 1.a identifierType
- 2 Creator
  - 2.1 creatorName
    - 2.1.a nameType
  - 2.2 givenName
  - 2.3 familyName
  - 2.4 nameIdentifier
    - 2.4.a nameIdentifierScheme
    - 2.4.b schemeURI
  - 2.5 Affiliation
    - 2.5.a affiliationIdentifier
    - 2.5.b affiliationIdentifierScheme

Selected node info

Selected node:
AffiliationIndentifier

Node description:
Example value: xx-yy-xx-yyxx

is linked to
dcterms:indentifier

Data type: String

Name:
Description:
DTR reference:
Unit:

Target schema
Dublin Core

- dcterms:alternative
- dcterms:available
- dcterms:contributor
- dcterms:creator
- dcterms:date
- dcterms:dateAccepted
- dcterms:dateCopyrighted
- dcterms:Submitted
- dcterms:identifier
- dcterms:issued
- dcterms:language
- dcterms:modified
- dcterms:publisher

Selected node info

Selected node:
dcterms:indentifier

Node description:
Example value: xxyyxxyyxx

is linked to
AffiliationIndentifier

Data type: Int

Name:
Description:
DTR reference:
Unit:

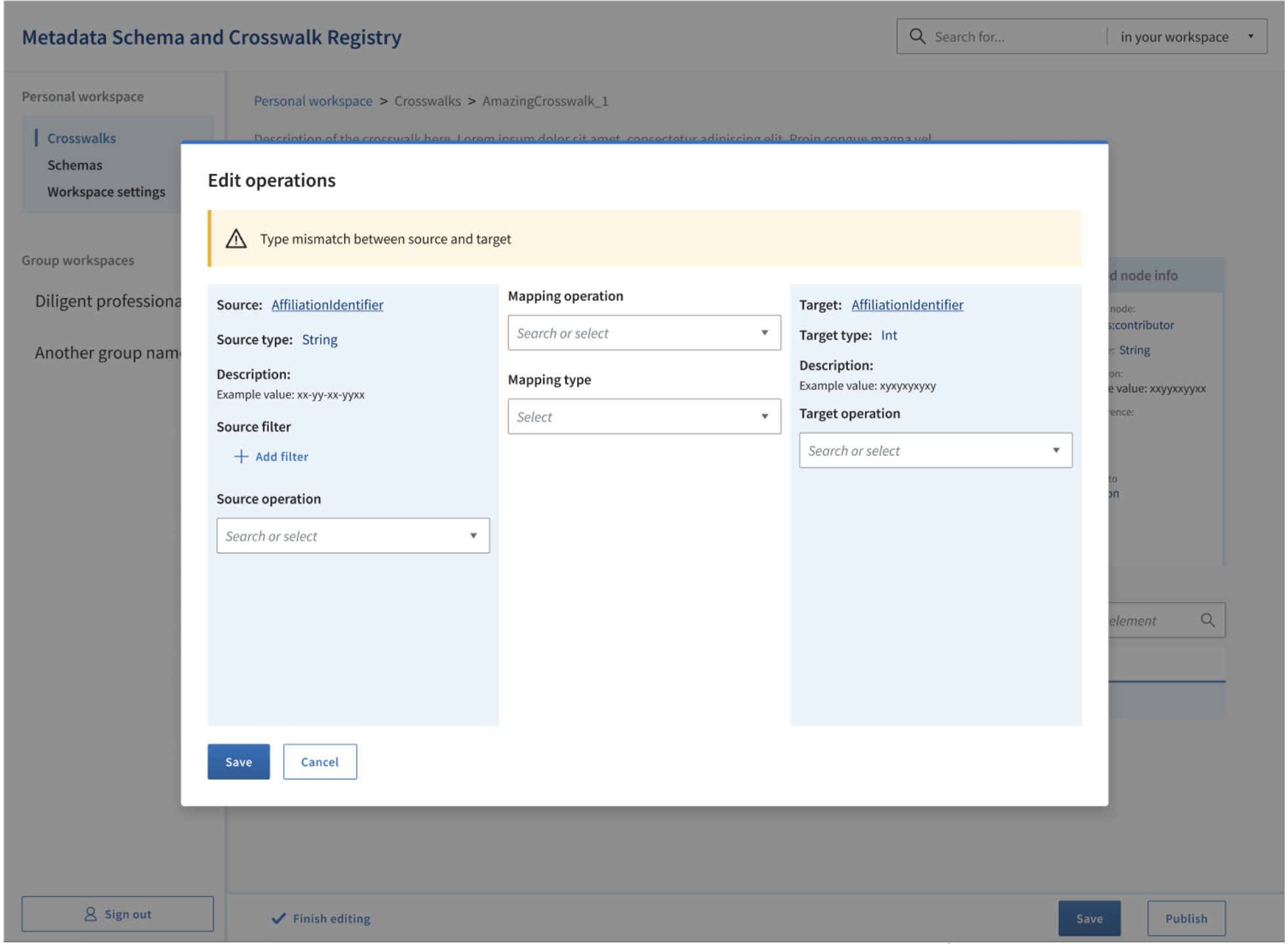
Mappings

Find element

Source	Target
You haven't mapped any elements. Mappings will appear in this table	

Finish editing

Save | Publish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Search for...
in your workspace
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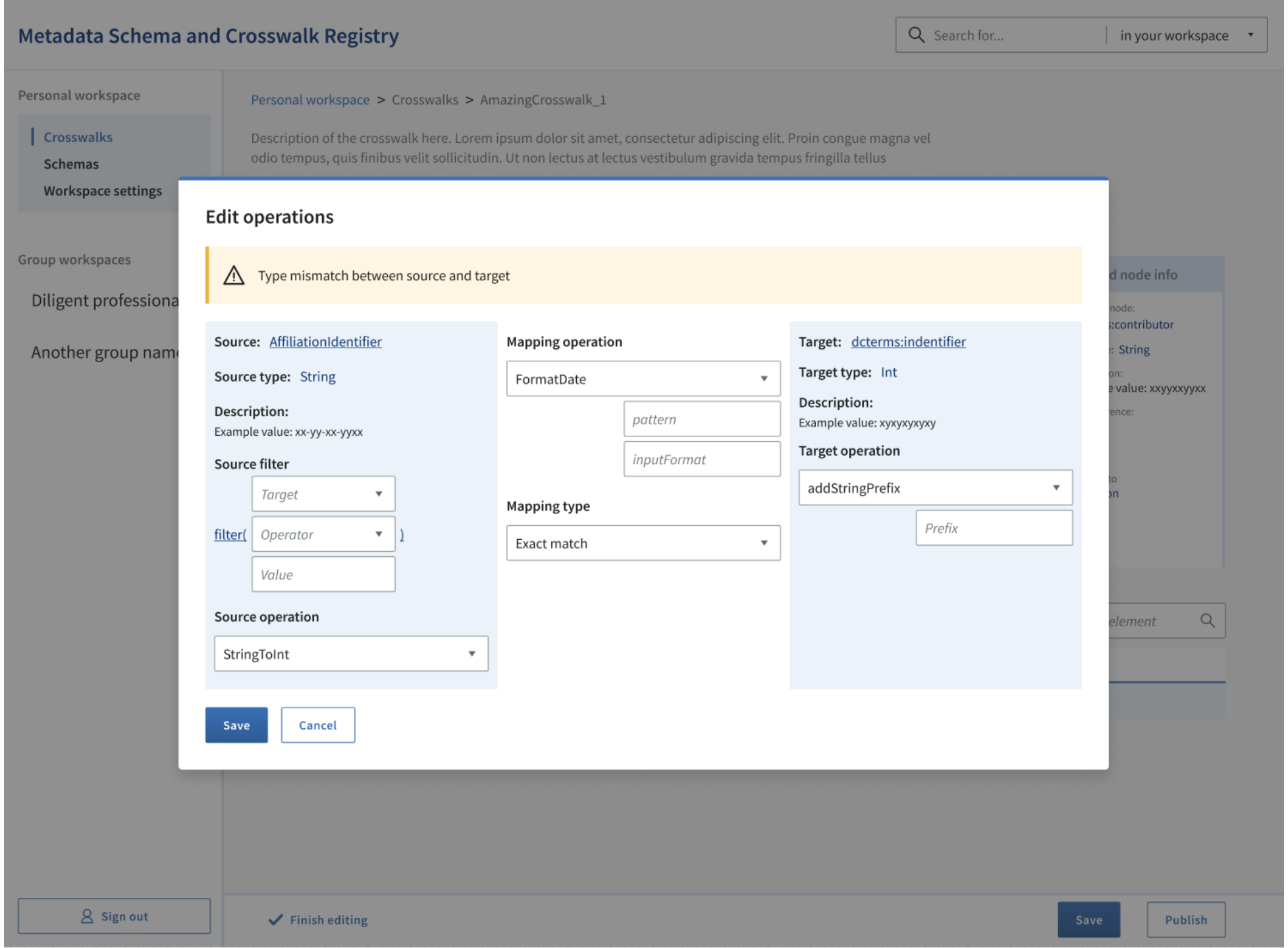
Another group nam
Personal workspace > Crosswalks > AmazingCrosswalk_1
Edit operations
Type mismatch between source and target
Source: AffiliationIdentifier
Source type: String
Description:
Example value: xx-yy-xx-yyxx
Source filter
Add filter
Source operation
Search or select
Mapping operation
Search or select
Mapping type
Select
Target: AffiliationIdentifier
Target type: Int
Description:
Example value: xyxyxyxyxy
Target operation
Search or select
Save
Cancel
Sign out
Finish editing
Save
Publish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Edit operations
Type mismatch between source and target
Source: AffiliationIdentifier
Source type: String
Description:
Example value: xx-yy-xx-yyxx
Source filter
Target
filter(
Operator
)
Value
Source operation
StringToInt
Mapping operation
FormatDate
pattern
inputFormat
Mapping type
Exact match
Target: dcterms:indentifier
Target type: Int
Description:
Example value: xyxyxyxyxy
Target operation
addStringPrefix
Prefix
Save
Cancel
d node info
:contributor
String
value: xxyyxxyyxx
element
Sign out
Finish editing
Save
Publish

Metadata Schema and Crosswalk Registry

Search for... | in your workspace

Personal workspace

- Crosswalks
- Schemas
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Group workspaces

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Sign out

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Metadata & files | **Crosswalk** | Version history

Source schema
DataCite

- 1 Identifier
  - 1.a identifierType
- 2 Creator
  - 2.1 creatorName
    - 2.1.a nameType
  - 2.2 givenName
  - 2.3 familyName
  - 2.4 nameIdentifier
    - 2.4.a nameIdentifierScheme
    - 2.4.b schemeURI
  - 2.5 Affiliation
    - 2.5.a affiliationIdentifier
    - 2.5.b affiliationIdentifierScheme

Selected node info

Selected node:
AffiliationIndentifier

Node description:
Example value: xx-yy-xx-yyxx

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Dublin Core

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- dcterms:available
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- dcterms:creator
- dcterms:date
- dcterms:dateAccepted
- dcterms:dateCopyrighted
- dcterms:Submitted
- dcterms:identifier
- dcterms:issued
- dcterms:language
- dcterms:modified
- dcterms:publisher

Selected node info

Selected node:
dcterms:indentifier

Node description:
Example value: xxyyxxyyxx

is linked to
AffiliationIndentifier

Data type: Int

Name:
Description:
DTR reference:
Unit:

Mappings

Find element

Source	Target	Actions
affiliationIdentifier	dcterms:identifier	⋮

Finish editing | Save | Publish

Mappings in MSCR

- Semantic mappings
  - Social security number → exact match → Personal identification number
  - Description → broader -→ Short description
  - <temperature> → is about → <http://vocabs/measures/temperature>
- Structural mappings
  - <coordinate>12.232,29.323</coordinate> →(exact match) → <coordinates><coordinate><lat>12.232</lat><long>29.323</long></coordinates>
- Value mappings
  - “DRAFT” → “Not_ready_yet”
  - “DRAFT → <http://standards.org/status/draft>
  - Kesäniemi, Joonas→ Joonas Kesäniemi
  - 20C→ 36.8F

Why FAIR?

Findable

- Registered content is assigned a PID (Handle) as needed
  - pre-existing PIDs for referenced content are preserved and promoted
- mappings utilize part identifiers by default
  - considered highly contextual, still reusable for example for semantic mappings
- Support for harvesting
  - microformats?

Accessible

- Resolvable PIDs (ERIC handles)
- Published content is persistent by default
  - Each version has its own PID
- All metadata is publicly accessible
  - visibility/searchability of draft content can be toggled

Why FAIR?

Interoperable

- Final metadata schema of crosswalks schemas is still under development
- Support for DTR defined data types
- Crosswalk import/export format
  - SSSOM import and export for crosswalks/mappings that fit to spefication
  - Default format will be custom format (JSON)
  - RML export for CSV/JSON/XML to RDF crosswalks(?)
- Registered schemas can always be downloaded in their original format
  - Internal format (SHACL) is also available

Reusable

- Licensing is part of the content's metadata schema
- Published content cannot be changed
  - Metadata can always be modified
- Provenance information on a version level
- Schemas in common standards
  - XSD, JSON schema, OWL, SHACL, SKOS

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Hands-on tutorials for adopting the FC4E services

Are planned to be organized as a workshop at the **CRIS2024 Conference**, which takes place 15-17 May, 2024 at the Technical University of Vienna (TU Wien)

The idea is to show interested adopters how to get started with using these services.

We are FAIRCORE4EOSC