M4M Workshops for the ZonMw COVID 19 community

October 7, 2021

FAIRification STEP4 – domain-specific metadata webinar

EOSC NORDIC

METADATA 4 MACHINES

ZonMw

CEDAR

health RI research infrastructure

FAIR Data Collective

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Involved experts

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GO FAIR Foundation

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UTwente

Process facilitation in the creation of community vocabularies and templates

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Department of Wind Energy
DTU Orbit

Design of metadata templates and provision of FAIRification tools

Community: COVID-19 research community

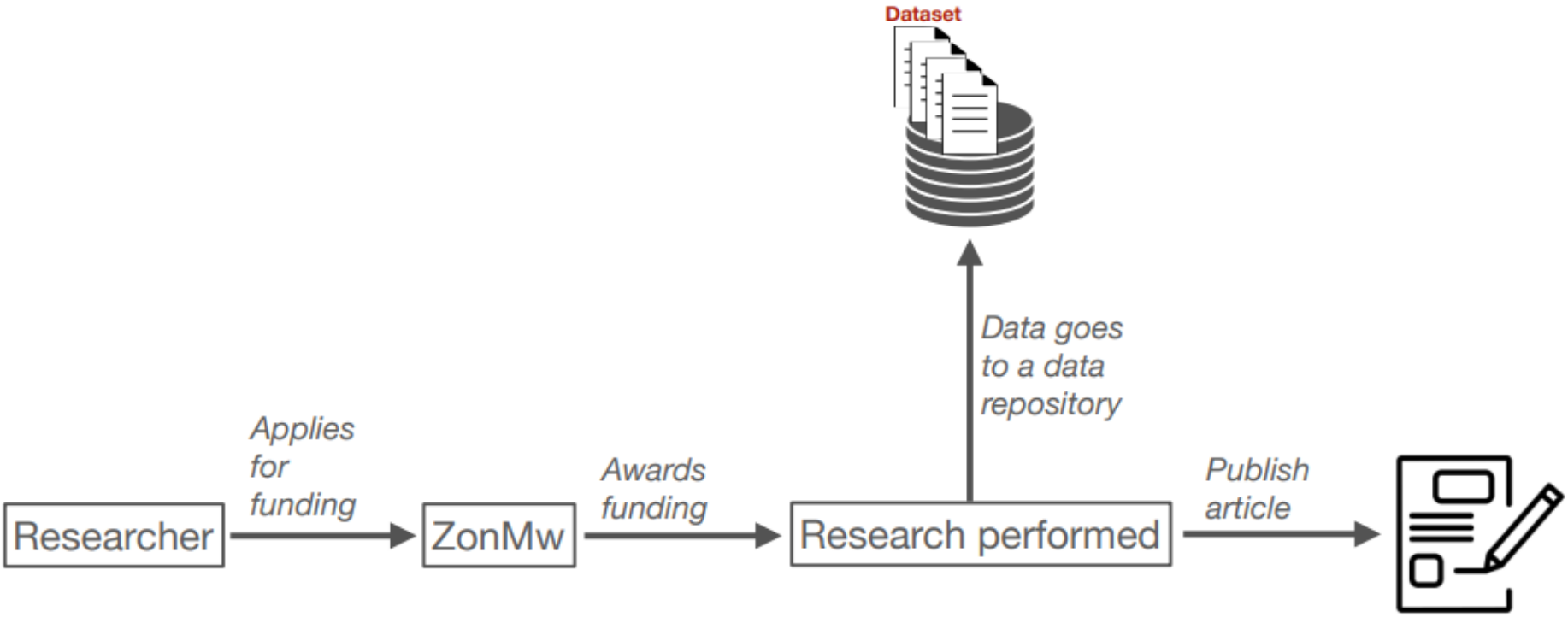
ZonMw: Dutch funder of health research and innovation projects.

-> **COVID-19 research programme** includes a series of training events for involved project data stewards in applying FAIRification approaches to improve interoperability of (meta)data in collaboration with GO FAIR, DTL and

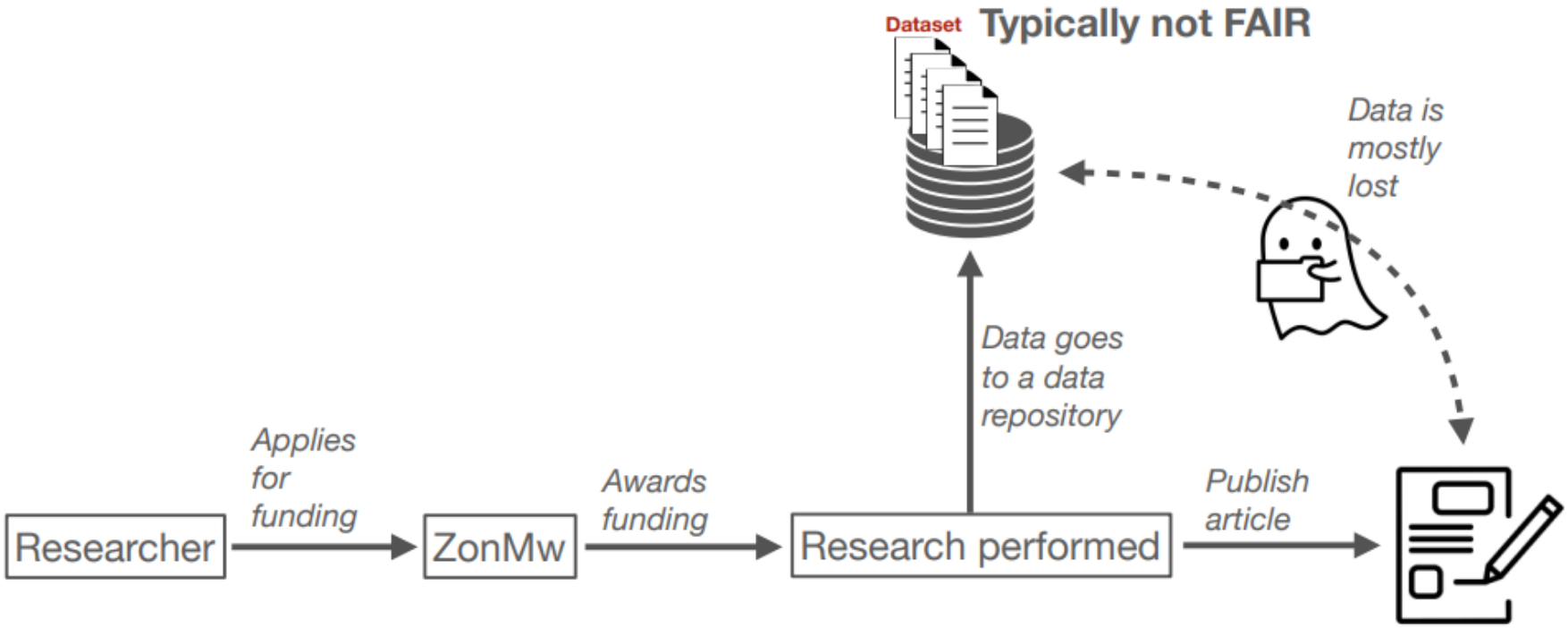
Health-RI: Dutch National Health Research Infrastructure for optimal access to knowledge, data and samples

Objective: Build a national COVID-19 observational and innovation portal with (meta)data from all more than 130 funded projects covering topics from health care to diagnostics, prognosis to immunology and socio-economic studies

Traditional Research Cycle



Traditional Research Cycle



What is needed to make data FAIR

Box 2 | The FAIR Guiding Principles https://www.nature.com/articles/sdata201618

To be Findable:
F1. (meta)data are assigned a globally unique and persistent identifier
F2. data are described with rich metadata (defined by R1 below)
F3. metadata clearly and explicitly include the identifier of the data it describes
F4. (meta)data are registered or indexed in a searchable resource

To be Accessible:
A1. (meta)data are retrievable by their identifier using a standardized communications protocol
A1.1 the protocol is open, free, and universally implementable
A1.2 the protocol allows for an authentication and authorization procedure, where necessary
A2. metadata are accessible, even when the data are no longer available

To be Interoperable:
I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
I2. (meta)data use vocabularies that follow FAIR principles
I3. (meta)data include qualified references to other (meta)data

To be Reusable:
R1. meta(data) are richly described with a plurality of accurate and relevant attributes
R1.1. (meta)data are released with a clear and accessible data usage license
R1.2. (meta)data are associated with detailed provenance
R1.3. (meta)data meet domain-relevant community standards

FAIR is 90% machine-actionable metadata

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Metadata for Machines

machine actionable metadata form

Metadata for Machines

Machine-actionable metadata form

Machine actionable metadata form =
metadata schema represented as linked data and JSON-LD

- **LINKED DATA** builds upon standard Web technologies extending them to share information in a way that can be read automatically by machines. This enables data from different sources to be connected and queried.
- **JSON-LD** is a lightweight Linked Data format. It is easy for humans to read and write. It is based on the already successful JSON format and provides a way to help JSON data interoperate at Web-scale. **JSON-LD is an ideal data format for programming environments**, REST Web services, and unstructured databases such as Apache CouchDB and MongoDB.

Metadata for Machines

FAIR metadata

Metadata schema + Vocabulary = FAIR Metadata

CEDAR Workbench

FAIR Data Collective

Metadata for Machines

FAIR metadata

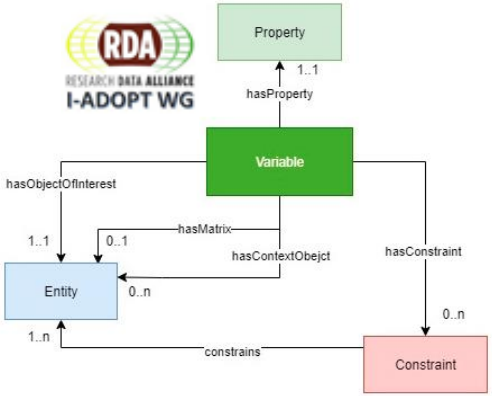
FAIR metadata =
metadata using controlled vocabulary based on W3C specs

- **RDF** (Resource Data Framework) is a standard model for information (e.g. vocabularies) interchange on the Web
- **Turtle** is a common, human-readable and very compact data format for storing RDF data
- **SKOS** (Simple Knowledge Organization System) is a W3C recommendation designed for representation of thesauri, classification schemes, taxonomies, subject-heading systems, or **any other type of structured controlled vocabulary**.

Metadata for Machines

semantically enhanced variable descriptions

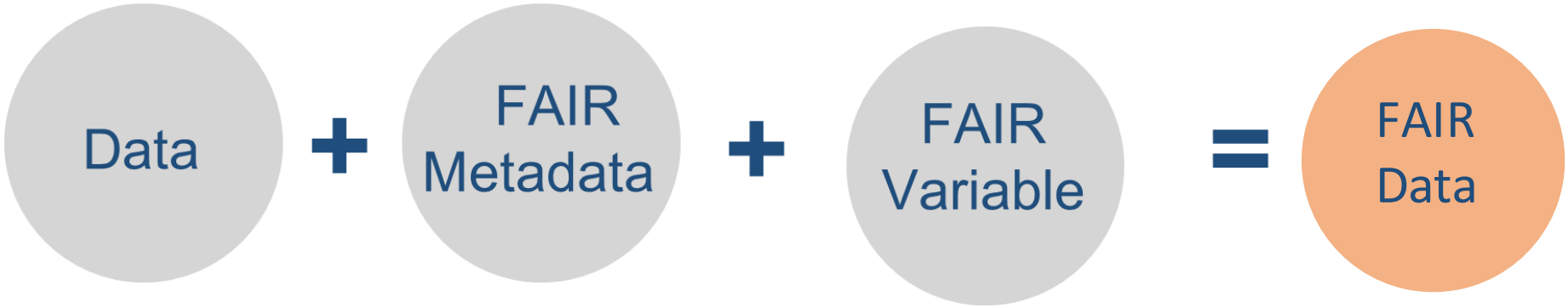
Variable + Vocabulary = FAIR Variable



FAIR Data Collective

Metadata for Machines

metadata plus vocabulary plus tooling

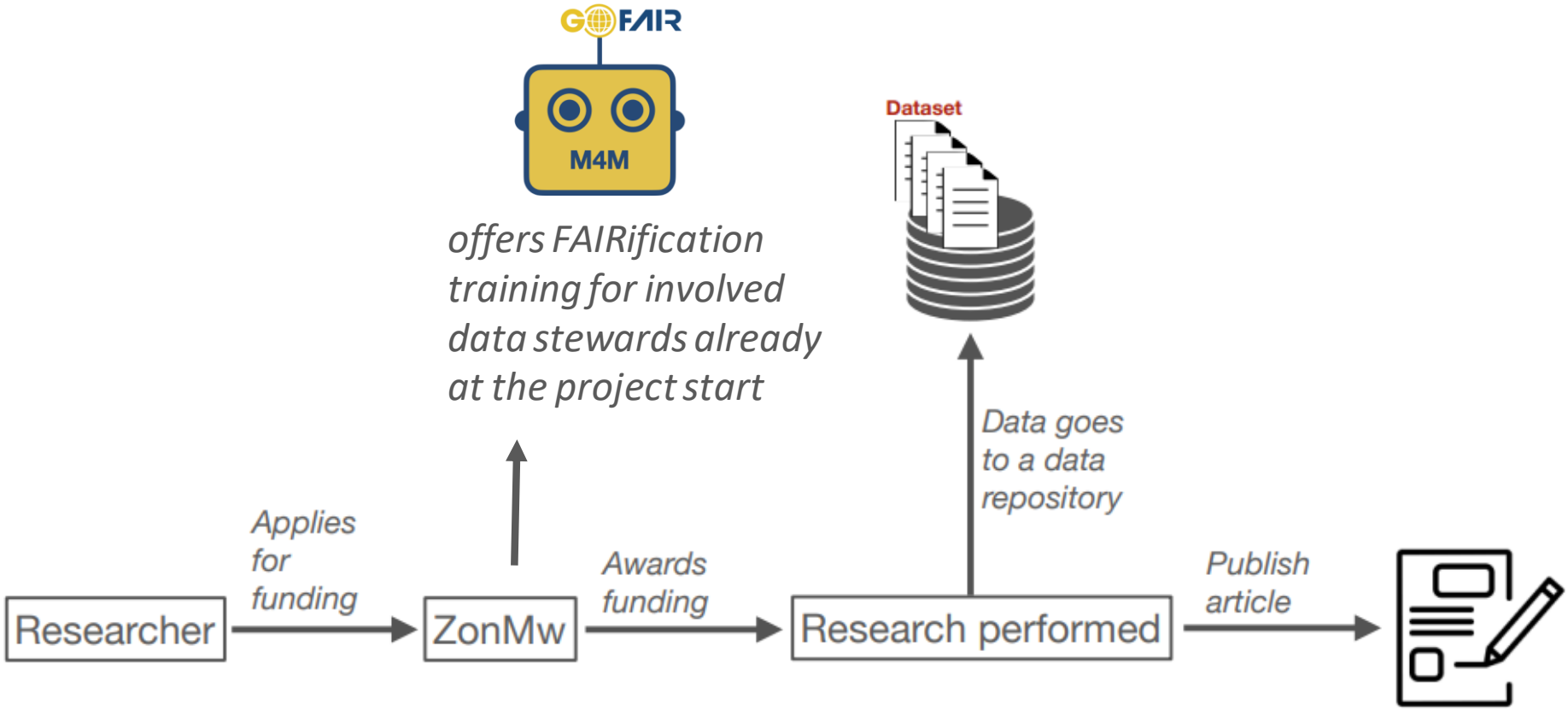


CEDAR Workbench

FAIR Data Collective

RDA RESEARCH DATA ALLIANCE I-ADOPT WG

FAIR Research Cycle



ZonMw

COVID-19 Program aims to make data FAIR

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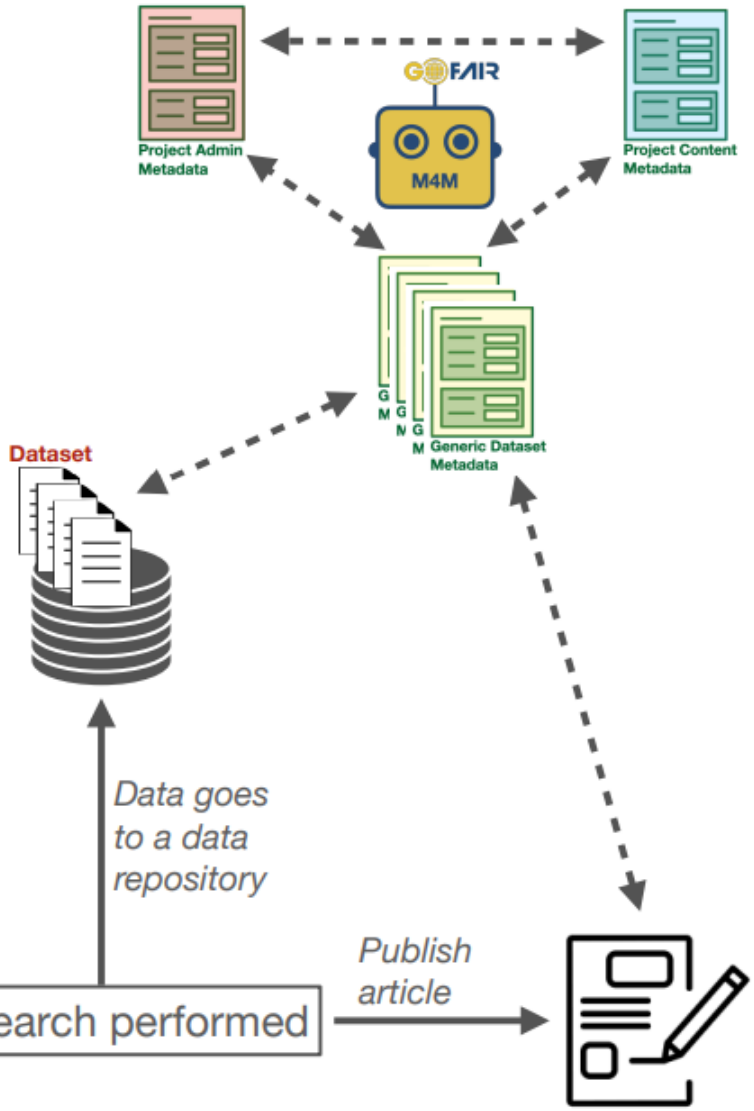
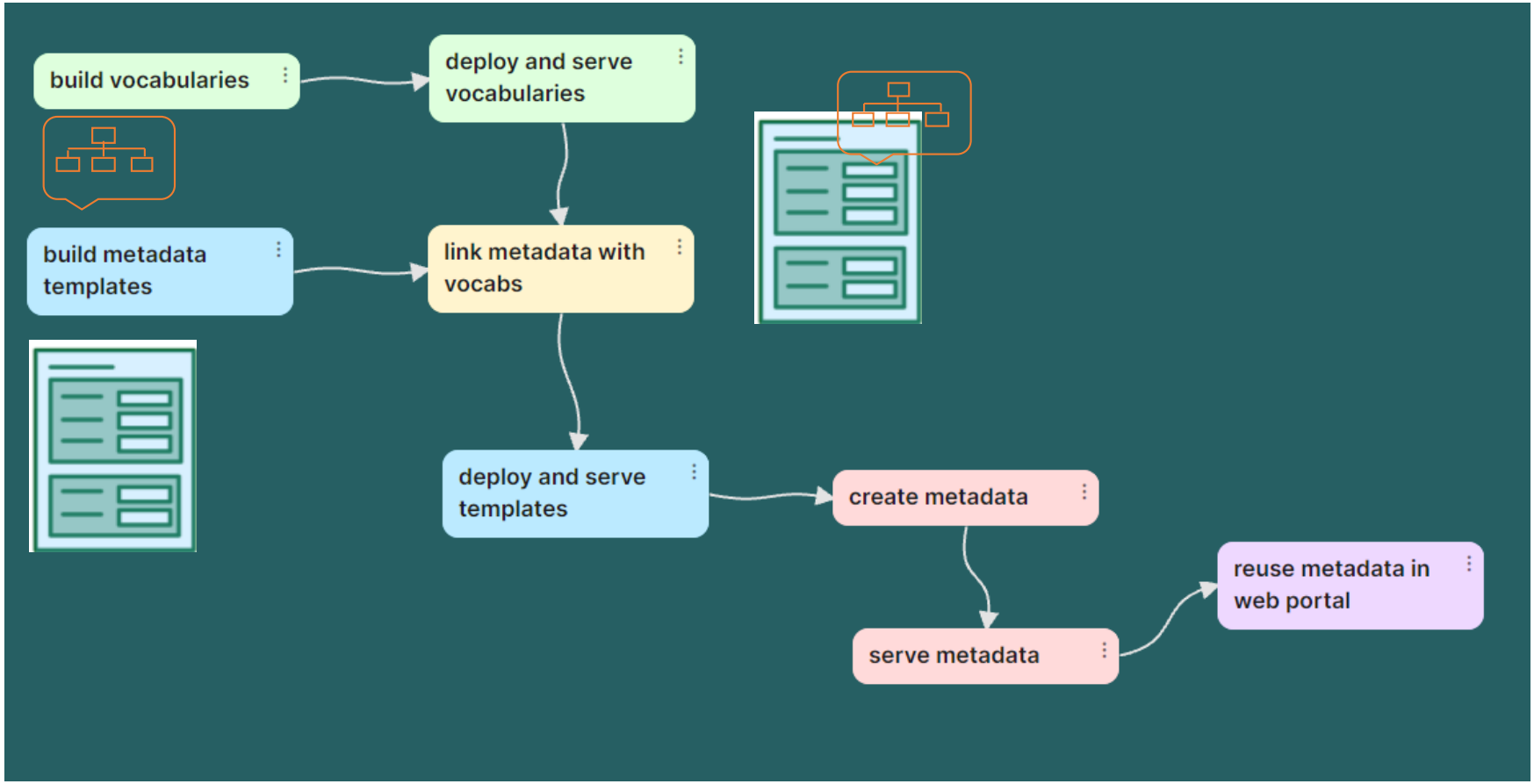
CEDAR Workbench → **Templates**

BioPortal → **Vocabulary**



FAIRification process and tools



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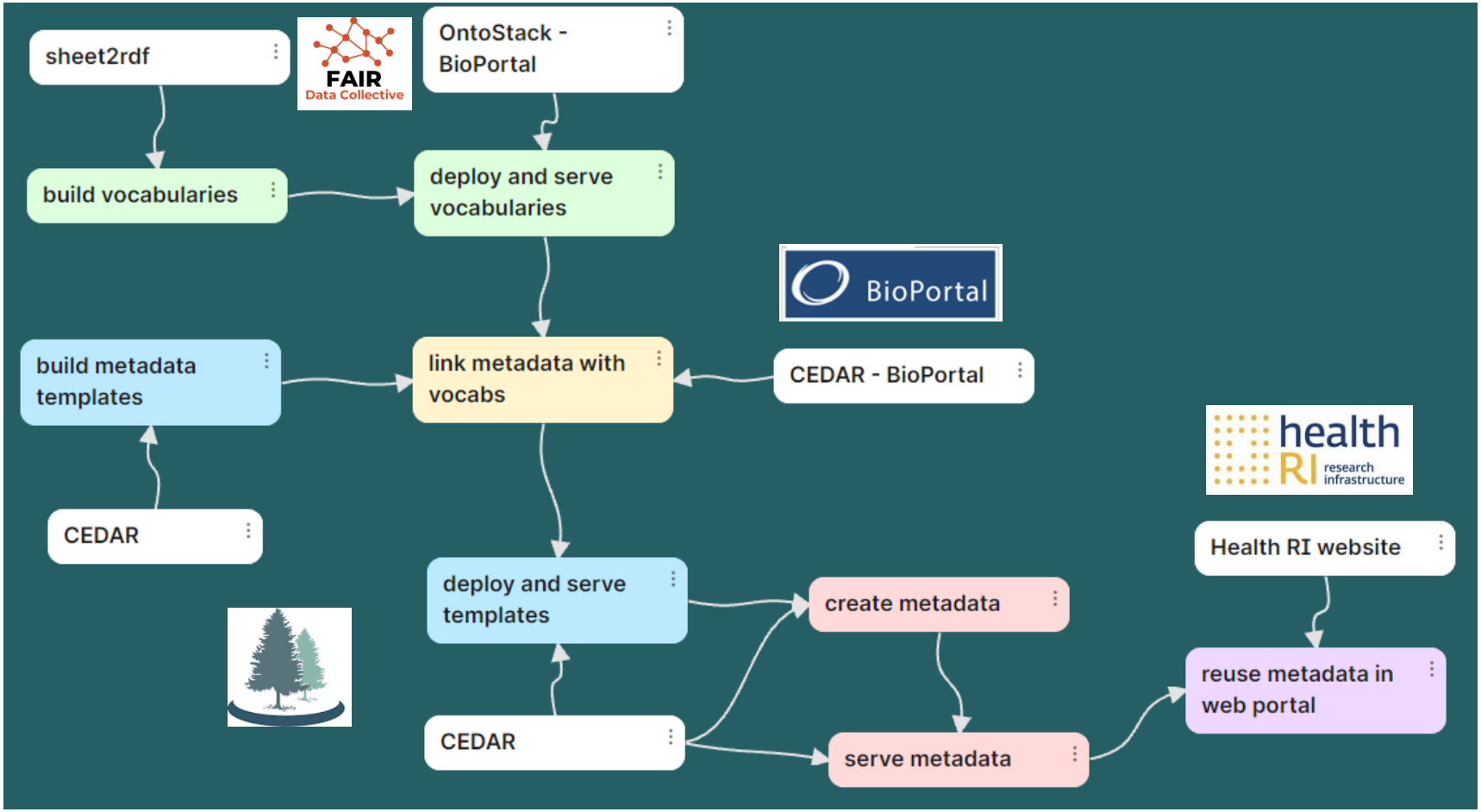
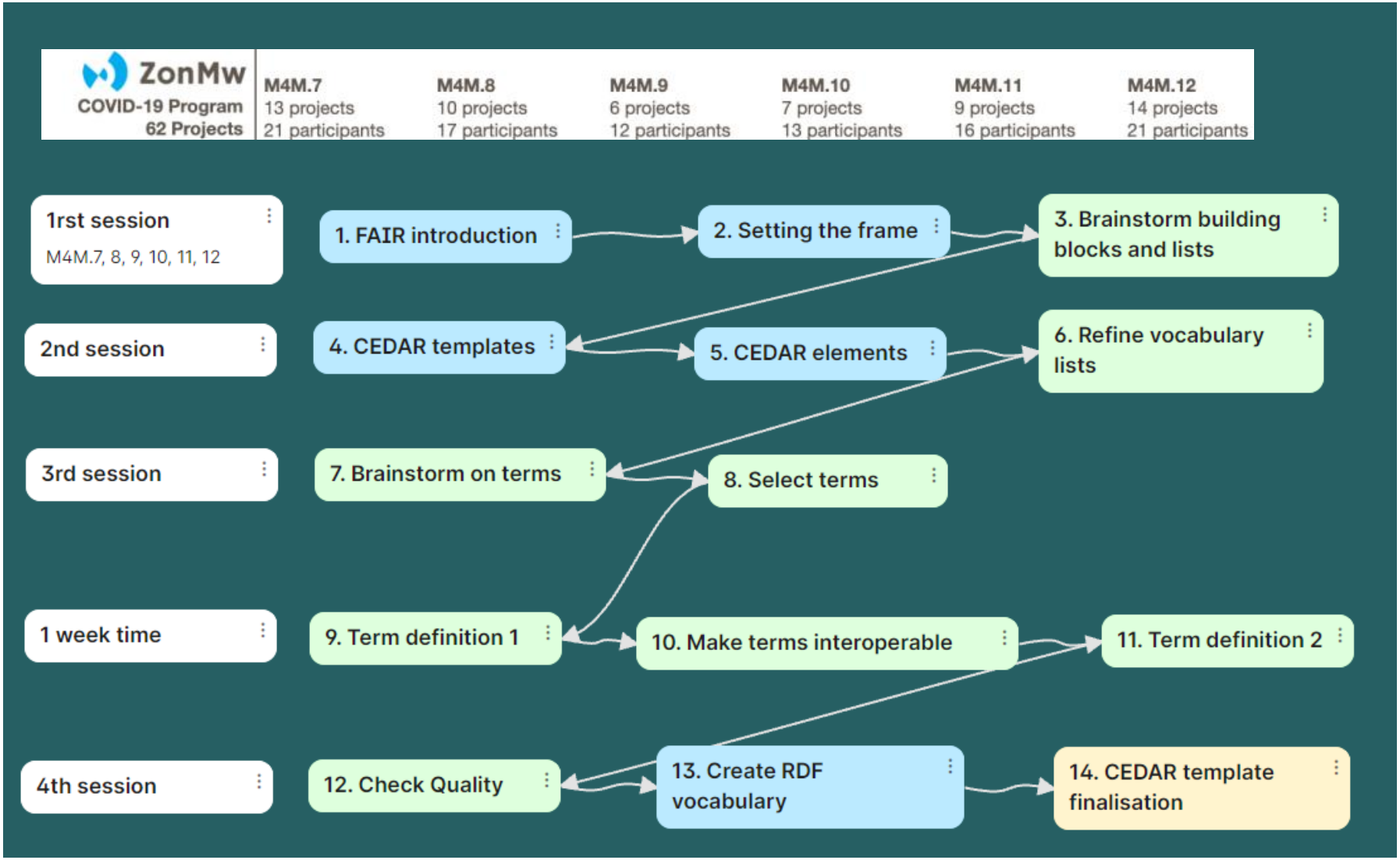


FAIRification process for COVID-19 Community

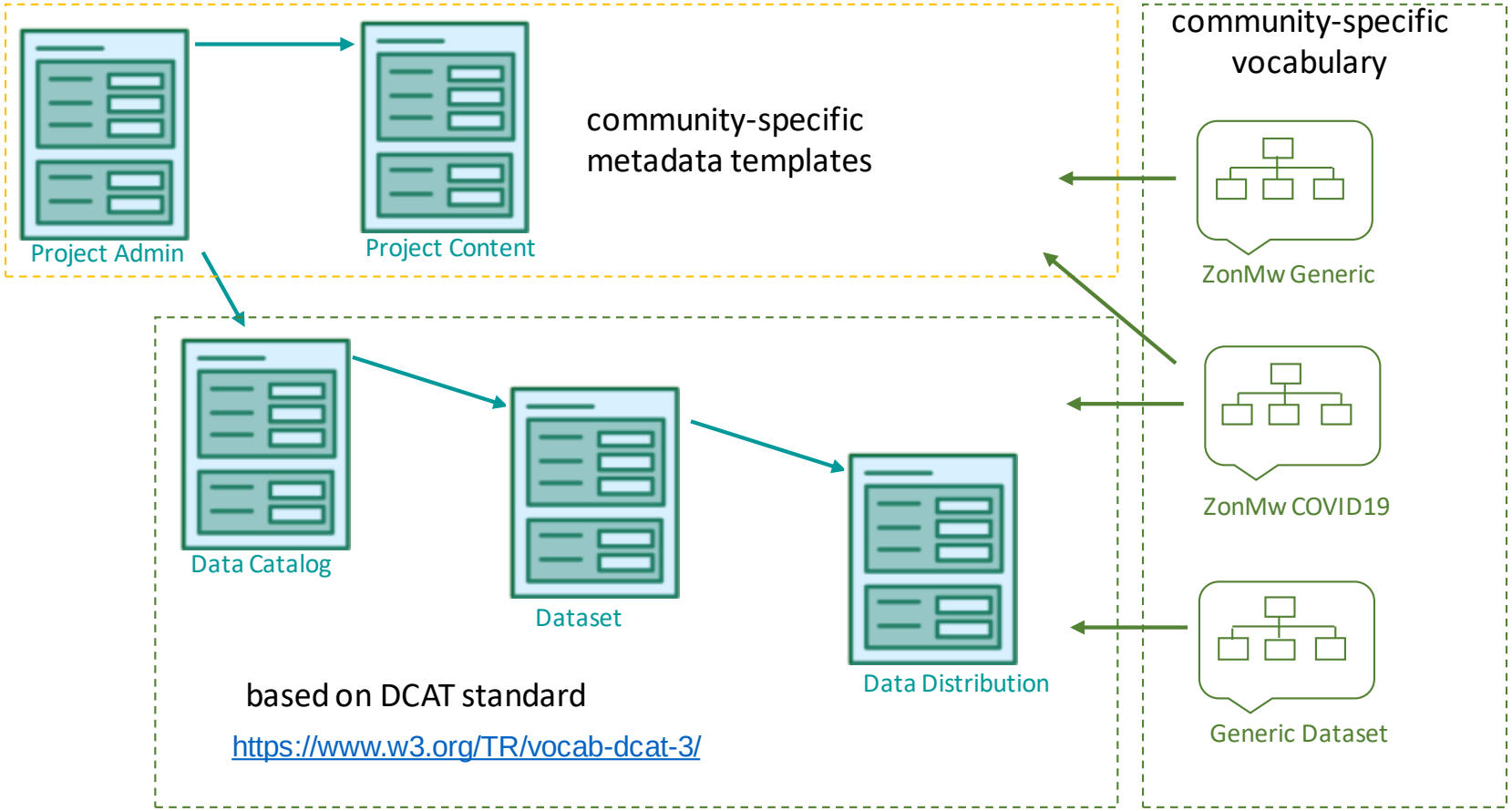
M4M workshops overview

Workshop	Date	Community	Topic	Sponsor
M4M.1	October 2019	Inaugural	Setting up the concept	GO FAIR
M4M.2	January 2020	Funders	ZonMw + HRB	GO FAIR
M4M.3	January 2020	PreClinicalTrails	pre-registration form	GO FAIR
M4M.4	April-Sept 2020	VODAN Africa	Metadata for the FDP	Phillips Foundation
M4M.5	Summer 2020	AnnaEE	Climate data	DeiC
M4M.6	Summer 2020	DTU and others	Wind Energy	DeiC
M4M.7	November 2020	COVID-19 Program	Care (Treatment) / Prevention	ZonMw
M4M.8	November 2020	COVID-19 Program	Diagnostic / Testing	ZonMw
M4M.9	November 2020	COVID-19 Program	Prognosis / Risk assessments	ZonMw
M4M.10	November 2020	COVID-19 Program	Virus / Immunology / Molecular	ZonMw
M4M.11	November 2020	COVID-19 Program	Organisational / Process related	ZonMw
M4M.12	November 2020	COVID-19 Program	Socio-economic / Behavioral	ZonMw
M4M.13	February 2021	COVID-19 Program	Vocab	ZonMw
M4M.14	February 2021	COVID-19 Program	Vocab	ZonMw
M4M.15	June 2021	COVID-19 Program	Rapid M4M for datasets	ZonMw
M4M.16	June 2021	COVID-19 Program	I-ADOPT M4M for variables	ZonMw
M4M.17	June 2021	ID & AMR	R4R, COVID—>ID&AMR	ZonMw
M4M.18	Sept 2021	INCENTIVE	Influenca vaccine	EU/Horizon2020

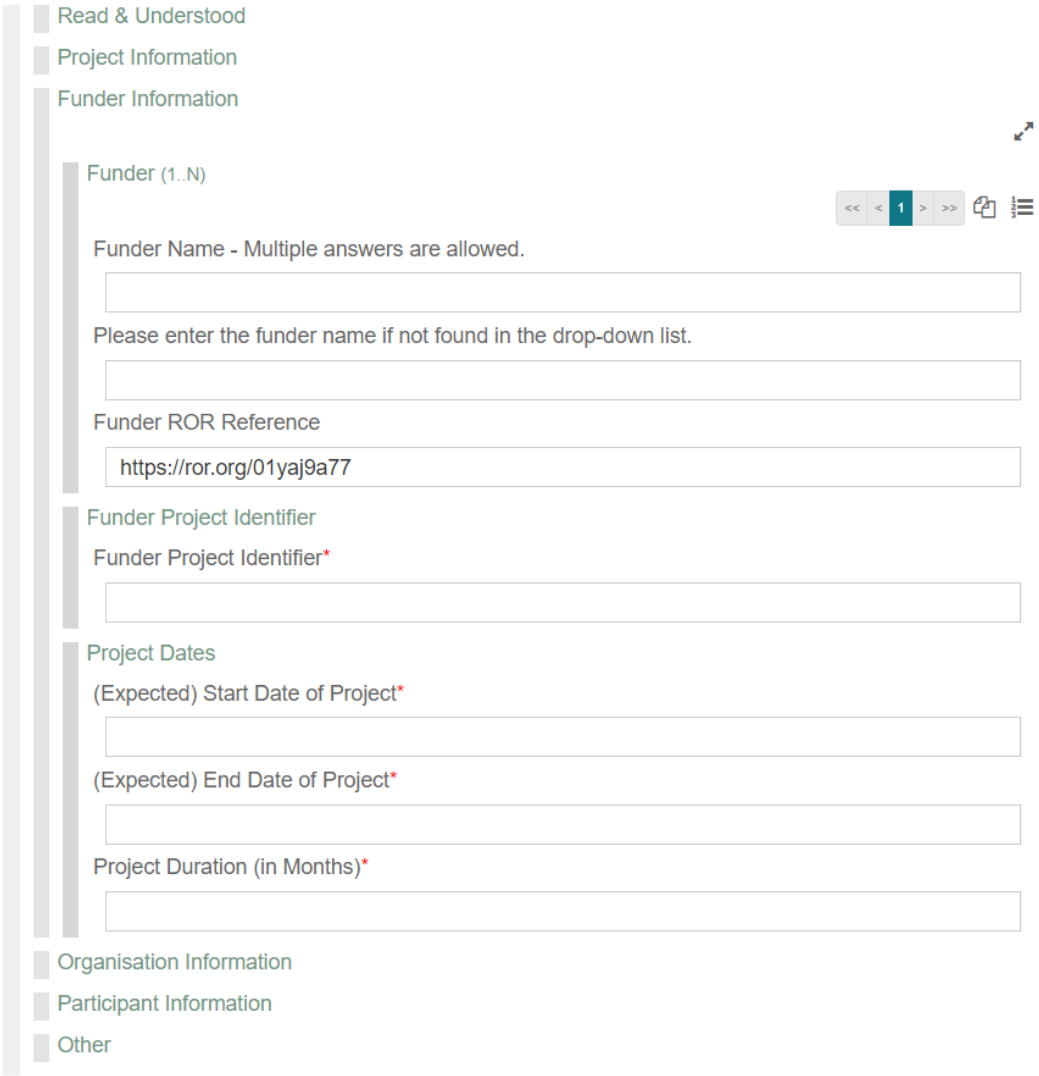
Building templates and vocabulary for metadata



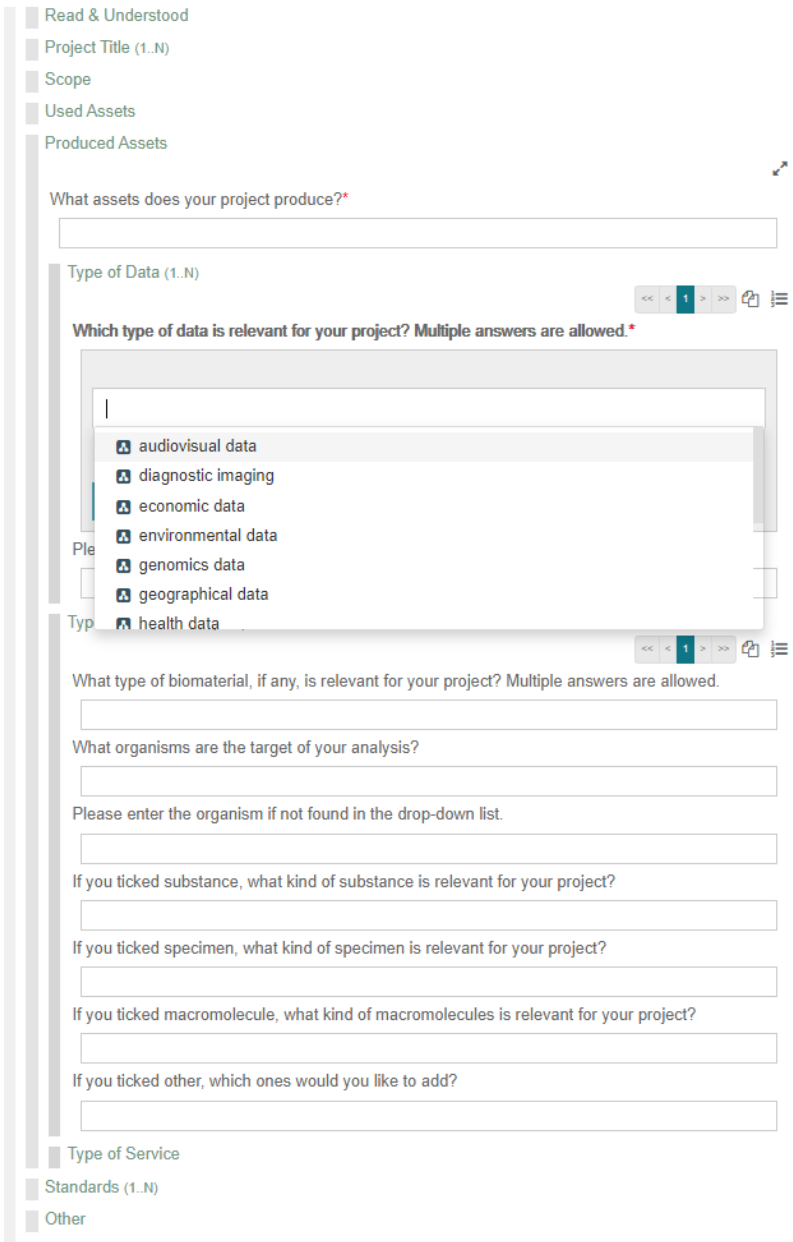
Metadata templates and vocabulary for projects and datasets



Project Admin Form (... funder information)



Project Content Form (... produced assets: data)



Products of M4Ms

Guidelines for completing CEDAR forms

Link to the guidelines document

CEDAR forms – to be filled out

Project Admin form [CEDAR account required]

Project Content form [CEDAR account required]

Data Catalogue form [CEDAR account required]

Dataset form [CEDAR account required]

Data Distribution form [CEDAR account required]

CEDAR forms in OpenView – easy way to view/share forms

Project Admin form in OpenView [no CEDAR account required]

Project Content form in OpenView [no CEDAR account required]

Data Catalogue form in OpenView [no CEDAR account required]

Dataset form in OpenView [no CEDAR account required]

Data Distribution form in OpenView [no CEDAR account required]

BioPortal vocabularies

ZonMw Generic Terms

Ontology for Generic Dataset Metadata Template

ZonMw COVID-19 Vocabulary

→ used as resources in the Health RI Website

Health RI Portal with semantic faceted search using the provided metadata