OA Expert Group: Metadata, Ontologies and Interoperability

Where to go with interop challenges?

Problems, solutions and next steps for interoperability in EOSC as identified at the 2025 EOSC Winter School

Horizon Europe (HE) Technology Group for INFRAEOSC projects

12 March 2025 at 11:00–12:00

Online

Presented remotely by Wolmar Nyberg Åkerström on behalf of the EOSC OA Expert Group: Metadata, Ontologies and Interoperability

https://doi.org/10.5281/zenodo.XXX

Main Goals in Opportunity Area Expert Group 2 (OA2):

Metadata, Ontologies & Interoperability

EOSC Technical and Semantic Interoperability Task Force

Health Data Task Force

Semantic artefacts, mappings, crosswalks…

Integrate and advance developments around metadata and ontologies to enable data and service level interoperability

Not covered in-depth by most projects

Technical implementation concerns that should translate to the wider EOSC are—with some exceptions—not covered in-depth by the HE-INFRAEOSC projects.

“EOSC approach” to metadata and ontologies

A shared point of departure and frame of reference for current and future EOSC projects to support productive discussions, effective integrations and sustainable results across project timelines.

Macro-Roadmap 2023-Q3–2024-Q2

Q3	Q4 Q1 Q2
Pathogens Portal	Cross-Domain Interoperability Framework
Guidelines for AI for EOSC Interoperability Framework	Core metadata schema for legal interoperability
	OJS plugin for the EOSC Interoperability Framework on Research Product Publishing
FAIRsharing BY-COVID Collection of Data Sources	Metadata and Ontologies for Publishing Platforms
Guidelines for recommended metadata standard for research software within EOSC	Provenance Tracking System for Artificial Intelligence (AI)

BY-COVID · AI4 EOSC · BY-COVID · FAIR-IMPACT · WorldFAIR · FAIR-IMPACT · CRAFT-OA · EOSC · CRAFT-OA · EOSC · AI4 EOSC

394 experts
28 Co-chairs

27 deliverables published

Wide dissemination of results

Semantic interoperability

DOI 10.5281/zenodo.10843882

Developing and implementing the semantic interoperability recommendations of the EOSC Interoperability Framework

March 27, 2024

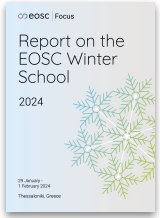
Key Contributions to the EOSC Landscape:

Opportunities to engage in OA2

How to move towards an “EOSC approach” to metadata, ontologies and interoperability?

EOSC Technical and Semantic Interoperability Task Force

Health Data Task Force

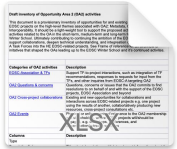


Hands-on community of implementers

Track implementation concerns and leverage experts from across the EOSC projects to find answers and to discover and improve on existing solutions.

Integration of project and task force outputs

Find and pave paths to how recommendations, tools and solutions from EOSC (and beyond) can be integrated, reused and aligned across project and timelines.

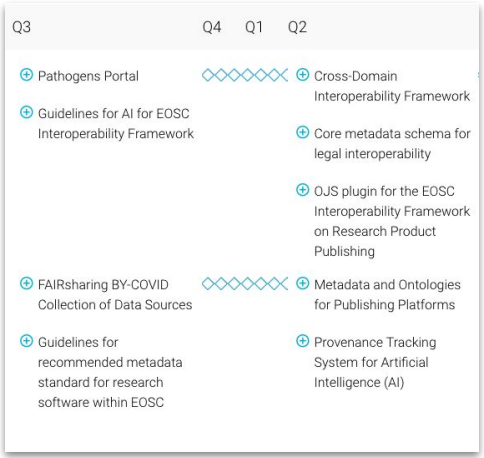


Draft inventory of Opportunity Area 2 activities.xlsx

Channel for collaborations and events

Advertise and discover opportunities to collaborate, respond to requests for input, and take part in physical or online events.

Macro-Roadmap 2023-Q3–2024-Q2



BY-COVID

AI4 | eosc

BY-COVID

FAIR-IMPACT

WorldFAIR

FAIR-IMPACT

CRAFT-OA | eosc

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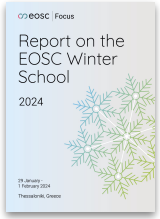

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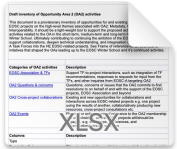

Draft inventory of Opportunity Area 2 activities.xlsx

Channel for collaborations and events

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	A	B	C
1	**Draft inventory of Opportunity Area 2 (OA2) activities** This document is a provisionary inventory of opportunities for and existing collaborations across EOSC projects on the high-level themes associated with OA2: Metadata, Ontologies & Interoperability. It should be a light-weight tool to support the proposed actions and shared activities related to the OA in the short-term, medium-term and long-term following the EOSC Winter School. Ultimately contributing to continuing the ambition of the EOSC Winter School to support collaborations, deepen technical understanding, and integreation of deliverables of EOSC-A Task Forces into the HE EOSC-related projects. See Frame of reference for an overview of initatives that shaped the OAs leading up to the EOSC Winter School and it's continued activites.		
2			
3	**Categories of OA2 activities**	**Description**	
4	EOSC-Association & TFs	Support TF-to-project interactions, such as integration of TF recommendations, responses to requests for input from the TFs, and other inquiries from EOSC-A targeting OA2	
5	OA2 Questions & concerns	Questions, concerns or issues that the OA2 commits to find resolutions to on behalf of and with the support of the EOSC projects, EOSC Association and beyond	
6	OA2 Cross-project collaborations	Existing and new opportunities for collaborations and interactions across EOSC-related projects e.g. one project using the results of another, collabortatively producing new resources, cross-project consultations etc.	
7	OA2 Events	Physical or online events of relevance to the OA2 membership and stakeholders, where EOSC projects will/should be engaged, e.g. workshops, conferences, and dissemination/outreach webinars	
8			
9	**Columns**	**Description**	
10	Type		
11	Description/links	Title, short description and link to relevant information about the activity	
12	Contact(s)	Name and contact information to the person who is coordinating for OA2, proposed the activitiy for OA2, or responsible for the activity externally	
13	Status	If relevant, curret status (ongoing, blocked, closed)	
14	Start (date)	When the activity/consultation is expected to open and when projects should be prepared to provide feedback	
15	Finish (date)	When the activity/consultation is expected to close, e.g. final date for providing feedback	
	[Project short name] (from Project and contacts)	Some version of a responsibility assignment (RACI) matrix **From Wikipedia:** *R – Responsible (also recommender):* Those who are responsible for the correct completion of the task. There is at least one role with a participation type of responsible, although	

Draft inventory of Opportunity Area 2 activities.xlsx

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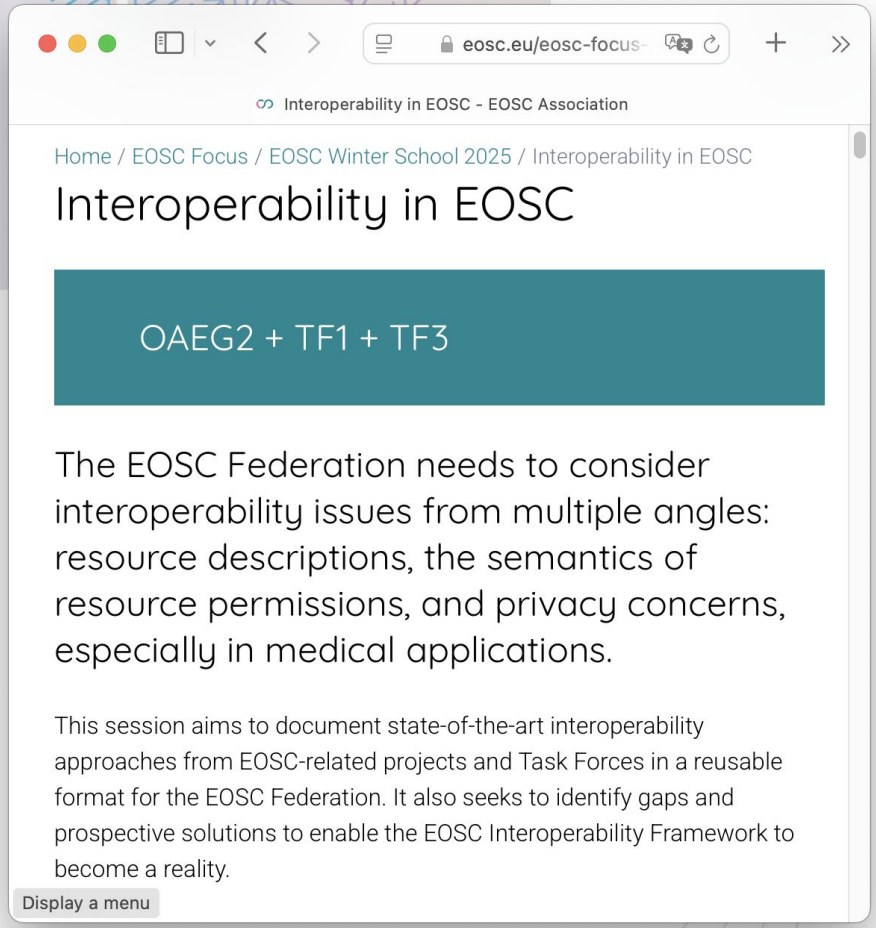
Winter School 2025

20 - 23 January 2025 / Seville, Spain

eosc.eu | #eoscwinterschool2025

Convergence towards the EOSC Federation:

Encouraging collaborative efforts among stakeholders



Interoperability in EOSC

Discussions at EOSC Winter School 2025

EOSC Interoperability:

Past, present & future direction for scalable data integration

AI-ready data and services

How can we use FAIR in the EOSC Federation to make data more usable by AI solutions?

EOSC, European Data Spaces and beyond

Tracking emerging interfaces, core entities and connectors

EOSC Federation:

Towards a model for integrating thematic and cross-cutting resources in research projects

Leveraging AI to enable interoperability

How can AI be used in the EOSC Federation to increase interoperability?

Translating governance and operational aspects

to metadata, ontologies and interoperability challenges

https://eosc.eu/eosc-focus-project/winter-school-2025/interoperability-in-eosc/

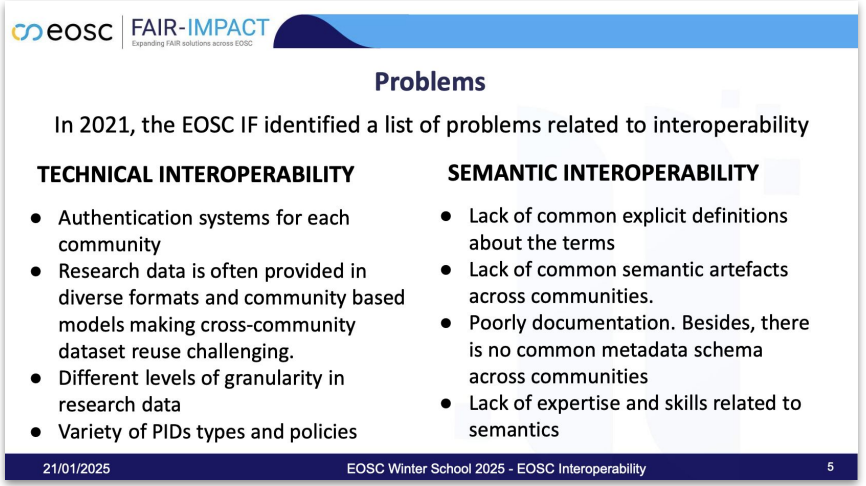
Source: EOSC Winter School 2025, Interoperability in EOSC session

OA Expert Group: Metadata, Ontologies and Interoperability

Catalogue of interoperability solutions

Contribute solutions from your projects

- Problems solved
- Description
- Status (Ready/In development)
- Limitations
- Type
- Associated scenario
- Link to documentation (URL)
- EOSC project/initiative



eosc | OA Expert Group: Metadata, Ontologies and Interoperability

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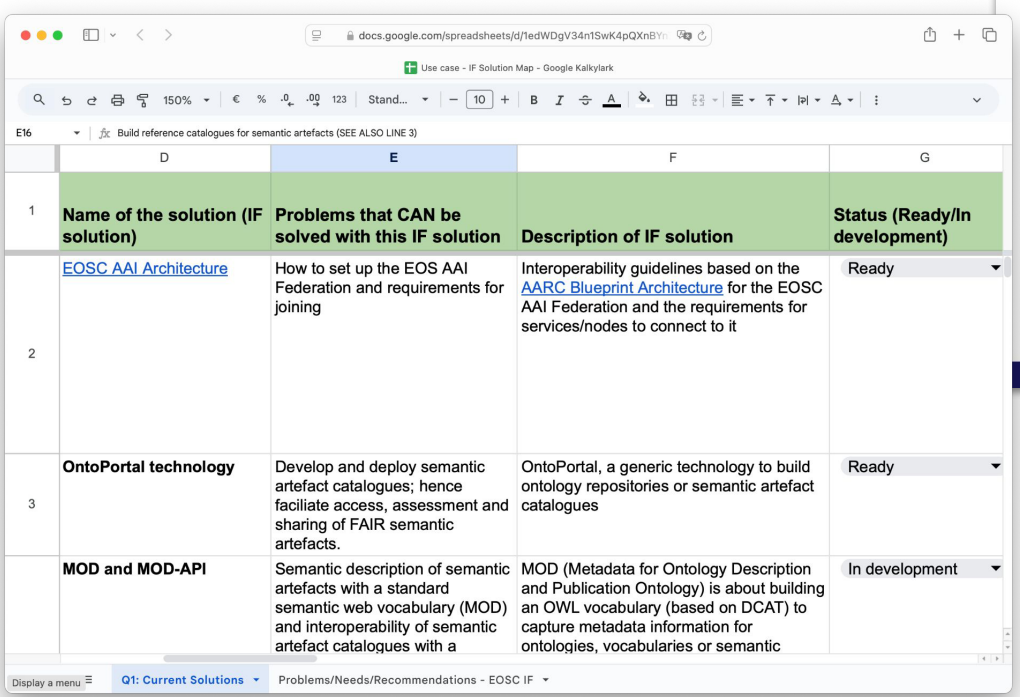


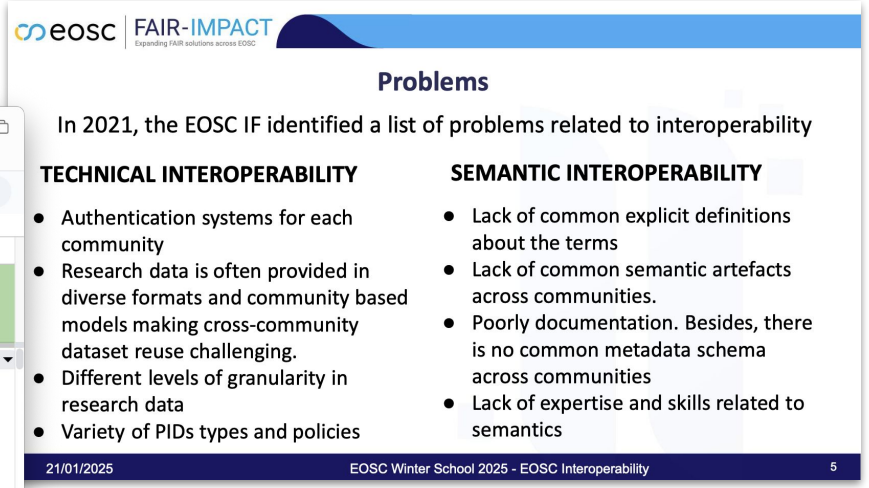
docs.google.com/spreadsheets/d/1edWDgV34n1SwK4pQXnBYn

Use case - IF Solution Map - Google Kalkylark

E16 | Build reference catalogues for semantic artefacts (SEE ALSO LINE 3)

	D	E	F	G
1	**Name of the solution (IF solution)**	**Problems that CAN be solved with this IF solution**	**Description of IF solution**	**Status (Ready/In development)**
2	EOSC AAI Architecture	How to set up the EOS AAI Federation and requirements for joining	Interoperability guidelines based on the AARC Blueprint Architecture for the EOSC AAI Federation and the requirements for services/nodes to connect to it	Ready
3	**OntoPortal technology**	Develop and deploy semantic artefact catalogues; hence faciliate access, assessment and sharing of FAIR semantic artefacts.	OntoPortal, a generic technology to build ontology repositories or semantic artefact catalogues	Ready
	MOD and MOD-API	Semantic description of semantic artefacts with a standard semantic web vocabulary (MOD) and interoperability of semantic artefact catalogues with a	MOD (Metadata for Ontology Description and Publication Ontology) is about building an OWL vocabulary (based on DCAT) to capture metadata information for ontologies, vocabularies or semantic	In development

Display a menu | Q1: Current Solutions | Problems/Needs/Recommendations - EOSC IF



eosc | FAIR-IMPACT
Expanding FAIR solutions across EOSC

Problems

In 2021, the EOSC IF identified a list of problems related to interoperability

TECHNICAL INTEROPERABILITY

- Authentication systems for each community
- Research data is often provided in diverse formats and community based models making cross-community dataset reuse challenging.
- Different levels of granularity in research data
- Variety of PIDs types and policies

SEMANTIC INTEROPERABILITY

- Lack of common explicit definitions about the terms
- Lack of common semantic artefacts across communities.
- Poorly documentation. Besides, there is no common metadata schema across communities
- Lack of expertise and skills related to semantics

21/01/2025 EOSC Winter School 2025 - EOSC Interoperability 5

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Library of interoperability scenarios

Contribute use cases from your projects

- Description
- User type(s)
- Interoperability goal(s)
- Other user goals
- Scientific domain(s)
- Scientific communities / infrastructures / initiatives
- Links to relevant documentation
- Contact point

Example approach (illustration)

1. Identify users types and create a profile for each one
2. Select a user and define their goals
3. Describe the steps taken through the system to reach that goal
4. Consider every alternate course of events and extend use case
5. Identify all commonalities in user journeys to create a common course use case
6. Repeat steps 2-5 for all user types

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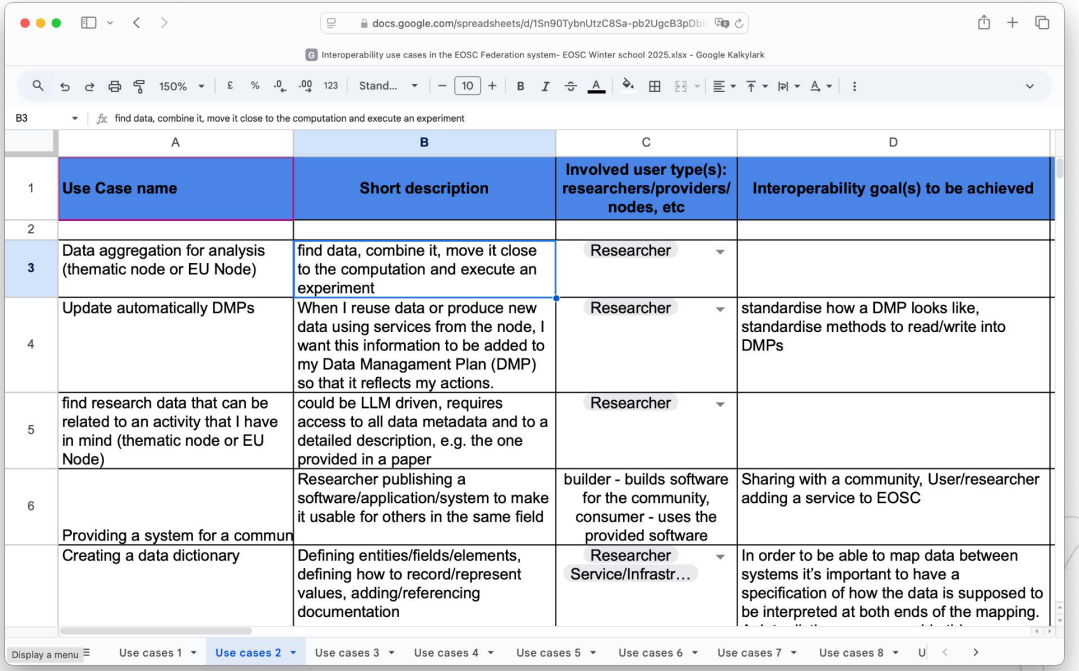

docs.google.com/spreadsheets/d/1Sn90TybnUtzC8Sa-pb2UgcB3pDbi

Interoperability use cases in the EOSC Federation system- EOSC Winter school 2025.xlsx - Google Kalkylark

B3: find data, combine it, move it close to the computation and execute an experiment

	A	B	C	D
1	**Use Case name**	**Short description**	**Involved user type(s): researchers/providers/ nodes, etc**	**Interoperability goal(s) to be achieved**
2				
3	Data aggregation for analysis (thematic node or EU Node)	find data, combine it, move it close to the computation and execute an experiment	Researcher	
4	Update automatically DMPs	When I reuse data or produce new data using services from the node, I want this information to be added to my Data Managament Plan (DMP) so that it reflects my actions.	Researcher	standardise how a DMP looks like, standardise methods to read/write into DMPs
5	find research data that can be related to an activity that I have in mind (thematic node or EU Node)	could be LLM driven, requires access to all data metadata and to a detailed description, e.g. the one provided in a paper	Researcher	
6	Providing a system for a commun	Researcher publishing a software/application/system to make it usable for others in the same field	builder - builds software for the community, consumer - uses the provided software	Sharing with a community, User/researcher adding a service to EOSC
	Creating a data dictionary	Defining entities/fields/elements, defining how to record/represent values, adding/referencing documentation	Researcher Service/Infrastr…	In order to be able to map data between systems it's important to have a specification of how the data is supposed to be interpreted at both ends of the mapping.

Display a menu | Use cases 1 | Use cases 2 | Use cases 3 | Use cases 4 | Use cases 5 | Use cases 6 | Use cases 7 | Use cases 8

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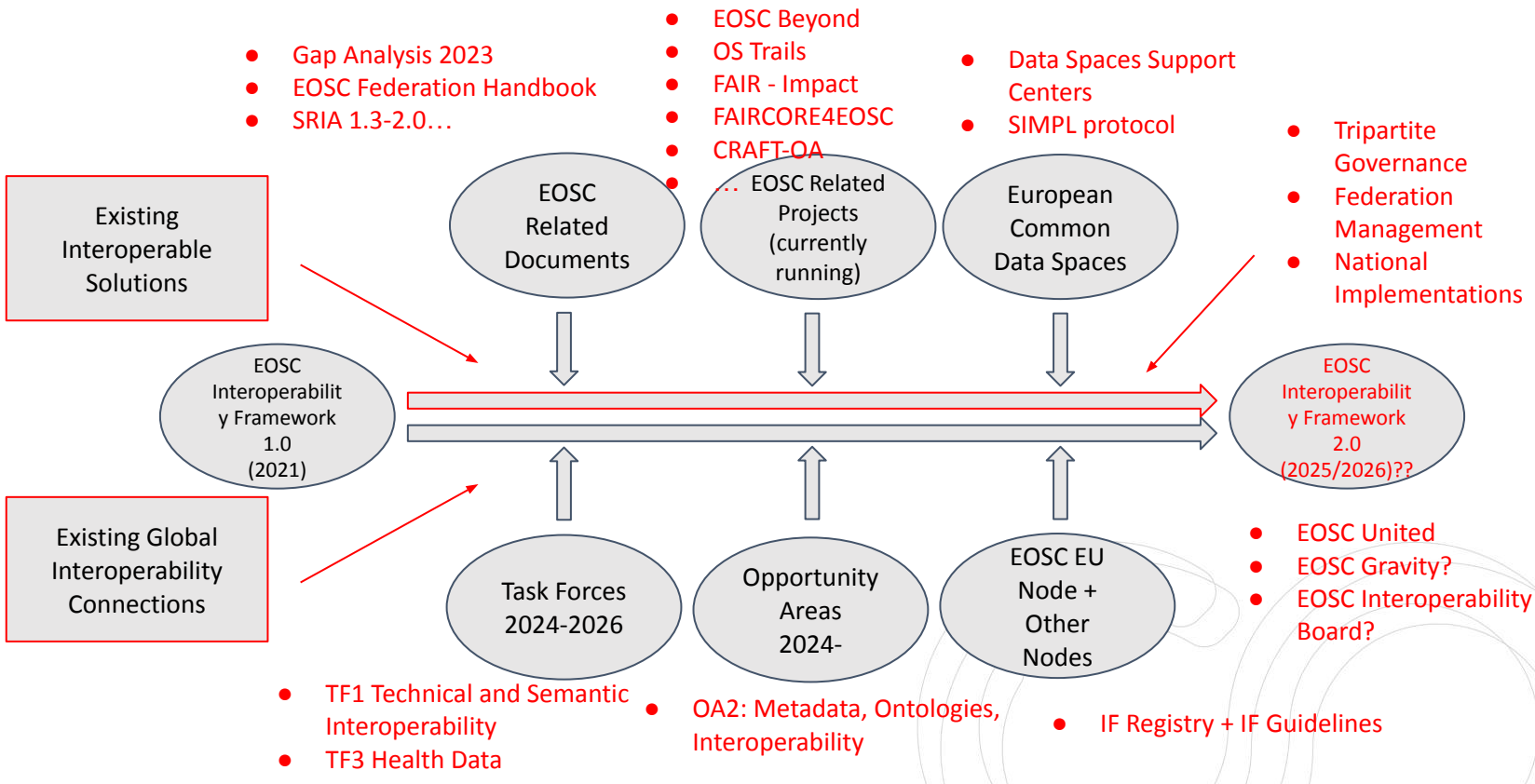
Source: EOSC Winter School 2025, Interoperability in EOSC session

Towards EOSC Interoperability Framework v 2.0



May 2025

Home / Collaborations / Horizon Europe Projects

Horizon Europe Projects n = 25

Home / The Association / Task Forces

EOSC-A Task Forces n = 4 (+ 13)

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"This Expert Group aims to integrate and advance developments around **metadata** and **ontologies** to enable **data and service level interoperability** "

https://eosc.eu/eosc-opportunity-area-expert-groups/

eosc | FAIR Metrics and Digital Objects Task Force

eosc | Health Data Task Force

OA Expert Group: Metadata, Ontologies and Interoperability

OA2: Metadata, Ontologies and Interoperability

This Expert Group aims to integrate and advance developments around metadata and ontologies to enable data and service level interoperability.

In response to the gaps identified in the SRIA discussions, the group will establish and support collaboration between projects and Task Forces to define the EOSC approach to interoperability, metadata, and ontologies. To accomplish this, the group will build a hands-on community of implementers from across the EOSC ecosystem to find answers and to discover and improve on existing solutions. This coordinated EOSC-wide approach will create a common ground for effective integration, productive discussions, and sustainable results across the projects.

OA2 Expert Group website:
https://eosc.eu/opportunity-area-exp/oa2-metadata-ontologies-and-interoperability/

Expression of interest to join:
https://eosc.eu/eosc-opportunity-area-expert-groups/