

EOSC Interoperability Framework

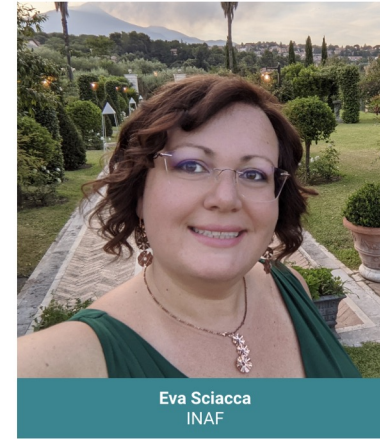
Outcomes of the EOSC-Association Task Force for Technical Interoperability of Data and Services

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EOSC Future co-Technical Coordinator

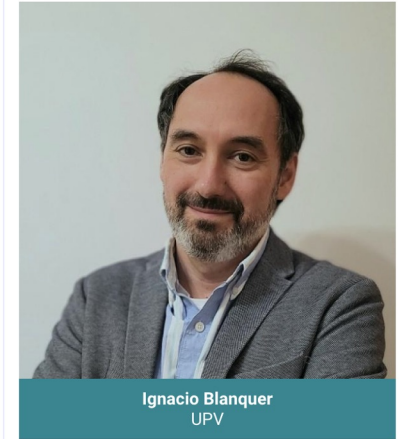




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Task force

Technical Interoperability of Data and Services

Web page:

<https://www.eosc.eu/advisory-groups/technical-interoperability-data-and-services>



Technical Interoperability of
Data and Services Task Force

Design Considerations for Technical Interoperability in EOSC

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Technical Interoperability of
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A landscape overview of the EOSC Interoperability Framework Capabilities and Gaps

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In publication

Short url : <https://bit.ly/3a7vPEW>

European Open Science Cloud data space

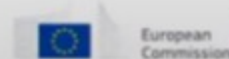
European node
e.g. central EOSC EU node enabling the federation with common AUP, AAI, search and access engine, APIs etc.

National nodes
e.g. national repository platforms, national research information systems



Thematic community nodes
e.g. ESFRI thematic research infrastructures / ERICs

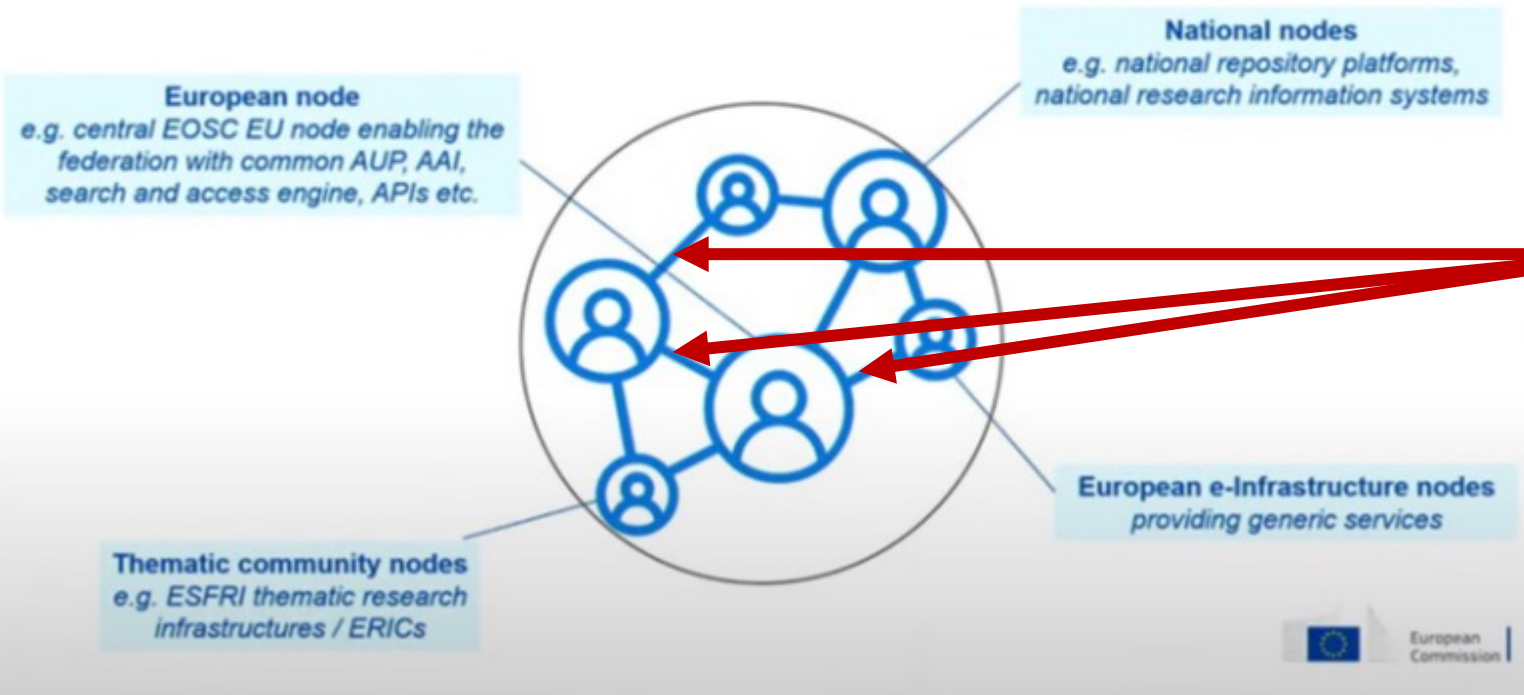
European e-Infrastructure nodes
providing generic services



The Potential of Research Data: How Research Infrastructures Provide New Opportunities and Benefits for Society, Lund, Sweden, 20 June 2023, **Michael Arentoft, Head of Unit for Open Science and Research Infrastructure, DG RTD**

EOSC Node Concept & the EOSC Interoperability Framework

European Open Science Cloud data space



The EOSC IF defines the interfaces that allow nodes to communicate


The Potential of Research Data: How Research Infrastructures Provide New Opportunities and Benefits for Society, Lund, Sweden, 20 June 2023, **Michael Arentoft, Head of Unit for Open Science and Research Infrastructure, DG RTD**

- EOSC IF Provides a **flexible framework of interoperability guidelines** (IGs) to support the interoperability and composability of resources (services, datasets and other research products) in the EOSC Core and EOSC Exchange
- EOSC IF empowers the **EOSC Federation Model**:
 - provide Interfaces (APIs/Protocols) to connect nodes/services/datasets and other resources in EOSC



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Data and Services Task Force

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TF Deliverable in publication



**9 Recommendations to
establish, implement
the EOSC IF enabling
service and data
composability**

Establishment of the EOSC IF

1. Establish the EOSC IF adopting a **bottom-up approach** aiming to put together, in a **unique framework**, the results of the most relevant initiatives that are working on Interoperability in the ERA
 - General purpose e-infrastructures (EGI, EUDAT, GEANT, OpenAIRE), RIs, Thematic Clusters, RDA, etc
2. The EOSC IF should embed a library of **Interoperability Guidelines (EOSC IGs)** to promote the branding and adoption of standards and common best practices in EOSC
 - The EOSC Interoperability Guidelines should specify the APIs, the metadata format of the exchanged data (the **EOSC Profiles**) and all the processes required to really make two resources interoperable
 - The EOSC IF should include IGs for EOSC Core and EOSC Exchange (horizontal and thematic) services.

Implementation of the EOSC IF

3. The EOSC Interoperability Guidelines should be recorded in a curated **EOSC IF registry/repository**
 - A common metadata structure should be adopted to describe Igs
 - Technical governance

4. The **EOSC Resource Catalogue** should gather information about IGs from the EOSC IF Registry and annotate resource descriptions with the guidelines they comply with
 - Enables an interoperability-driven overlay of EOSC resources across different disciplines
 - Enables the discovery of resources based on interoperability features



Enabling Machine Composability

- 5. Machine composability** requires that IGs are annotated with configuration templates, structured metadata profiles through which providers can describe the actual access parameters of their services for a given guideline
 - A provider can declare the actual parameters to access a given interface of its service together with the compatibility with a certain IG

Enabling Data Interoperability

- 6. IGs for Data interoperability** should ensure that datasets can be exchanged between systems such that datasets can be understood, combined, processed and analysed by various EOSC services
 - Data should be machine-readable and available in suitable forms with enough contextual information to be interpretable and meaningfully composed with other data.

Interoperability with Data Spaces

7. Coordinate with the **Data Space Support Centre (DSSC)**, and through the DSSC with other Data Spaces
 - Ensure that such interoperation is possible through the technical, governance, access and use, and semantic interoperability mechanisms that EOSC will implement
8. EOSC initiatives should collaborate with the **SIMPL open-source community**
 - co-design approach to ensure compatibility and interoperability

Interoperability with EuroHPC

9. Develop gateways to ensure the **interconnection between world-class supercomputing systems** and EOSC
 - serve research communities leveraging both EOSC and EuroHPC infrastructures

8. Recommendations

This section summarises the main recommendations provided by this document.

Area	Recommendations
Establishment of the EOSC Interoperability Framework	The EOSC Interoperability Framework has to be established adopting a bottom-up approach aiming to put together, in a unique framework, the results of the most relevant initiatives that are working on interoperability in the ERA, such as general-purpose e-Infrastructures (EGI, EUDAT, GEANT, OpenAIRE), thematic cluster communities, as well as through global and cross-domain initiatives like the Research Data Alliance, AARC/AEGIS, GO-FAIR and CODATA
Establishment of the EOSC Interoperability Framework	The EOSC IF should embed a library of Interoperability Guidelines (EOSC IGs) to promote the branding and adoption of standards and common best practices in EOSC. The EOSC Interoperability Guidelines should specify the APIs, the metadata format of the exchanged data (the EOSC Profiles ⁵²) and all the processes required to really make two resources interoperable. The EOSC IF should include IGs for EOSC Core and EOSC Exchange (horizontal and thematic) services.
Implementation of the EOSC Interoperability Framework	The EOSC Interoperability Guidelines should be recorded in a curated EOSC IF registry/repository . A common metadata structure should be adopted to describe IGs, this will make information on interoperability best practices available in a homogeneous way facilitating the discovery, sharing and reuse.
Implementation of the EOSC Interoperability Framework	The EOSC Resource Catalogue should gather information about IGs from the EOSC IF Registry and annotate resource descriptions with the guidelines they comply with. This mechanism enables an interoperability-driven overlay of EOSC resources across different disciplines and the discovery of resources based on interoperability features.

Area	Recommendations
Enabling machine composability via the EOSC Interoperability Framework	Machine composability requires that IGs are annotated with configuration templates, structured metadata profiles through which providers can describe the actual access parameters of their services for a given guideline. In such a way, a provider can declare the actual parameters to access a given interface of its service together with the compatibility with a certain IG.
Enabling data interoperability via the EOSC Interoperability Framework	The EOSC IF will also include IGs for Data interoperability . These IGs should ensure that datasets can be exchanged between systems such that datasets can be understood, combined, processed and analysed by various EOSC services. This requires data to be machine-readable and available in suitable forms with enough contextual information to be interpretable and meaningfully composed with other data.
Interoperability with Data Spaces	EOSC initiatives (EOSC-A, EOSC related projects, etc.) have to coordinate with the Data Space Support Centre (DSSC) , and through the DSSC with other Data Spaces, to ensure that such interoperation is possible through the technical, governance, access and use, and semantic interoperability mechanisms that EOSC will implement.
Interoperability with Data Spaces	EOSC initiatives should join the SIMPL open source community to work with the SIMPL project through a co-design approach to ensure compatibility and interoperability.
Interoperability with EuroHPC	It may be necessary to develop gateways to ensure the interconnection between world-class supercomputing systems from EuroHPC and EOSC services to serve research communities leveraging both infrastructures.



- **EOSC IF Governance:** technical governance to oversee the process of proposing, accepting, publishing and promoting EOSC Interoperability Guidelines (IGs)
- **EOSC Core Tools supporting the EOSC IF:** IF registry and links to EOSC Resource Catalogue & Marketplace
- **Populating the EOSC IF with Interoperability Guidelines:** IGs for Core services and Exchange services (horizontal and thematic)

The EOSC Interoperability Framework

The EOSC Interoperability Framework is a set of policies and guidelines that enable interoperability of resources and services, and will facilitate service composability.

The guidelines could be documents, procedures, workflows, scripts, code, datasets, formats, and guidelines used in science.



About the EOSC Interoperability Framework (EOSC-IF)

Enabling interoperability across resources and services is essential for building a European Open Science Cloud that is federated and fit for purpose. In turn, interoperability guidelines are necessary to facilitate the cross-discipline collaboration of researchers, providers and research communities.

[Learn more](#)

Body	Responsibility	During EOSC Future
EOSC Interoperability Advisory Board (EIAB)	Oversees the EOSC IF as a whole (plus tools, procedures); accepting proposed guidelines, based on the recommendations of the EIAC	EOSC Future Technical Coordination Board
EOSC Interoperability Area Chairs (EIAC)	Performs the initial assessment of the proposed guidelines; to make recommendations for inclusion/exclusion to the EIAB	EOSC Future WP3 task leads, calling in experts to help with the review as needed.
EOSC Interoperability Core Guideline Owners	Contributes Interoperability Guidelines for EOSC-Core Services, reviews Interoperability Guidelines proposed for the EOSC.	Service owners for core components



EOSC Core IGs	
EOSC Profiles	
Resource Catalogue	
Helpdesk	
Monitoring	
Research Product Accounting	
Service Accounting	
Order Management	
Messaging	
AAI	
PIDs	

EOSC Horizontal IGs	
Data Transfer	
Data Publishing and Open Data	
Compute Continuum	
Machine Learning	

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EOSC Security Operational Baseline 2022

Interoperability Guideline

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To fulfil its mission, it is necessary for the European Open Science Cloud (EOSC) to be protected from damage, disruption, and unauthorised use. This Security Baseline supports these goals by defining minimum expectations and requirements of the behavior... [Show more](#)

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Next steps

EOSC Technical Architecture and IF

- Preparatory work for the final TF deliverable **EOSC Technical Architecture and Interoperability Framework** (ongoing)
 - Presentations of the main technical outputs of the current EOSC Projects
 - Discussions on how to integrate all the contributions in the EOSC Technical Architecture
 - **GAPS** in the current EOSC Architecture and EOSC Core (what does researchers need ? what is missing in the current EOSC Core ?)
- Final TF deliverable “EOSC Technical Architecture and Interoperability Framework” (in preparation)
 - Writing: ongoing
 - Consultation: Nov 2023
 - Finalization: Dec 2023

