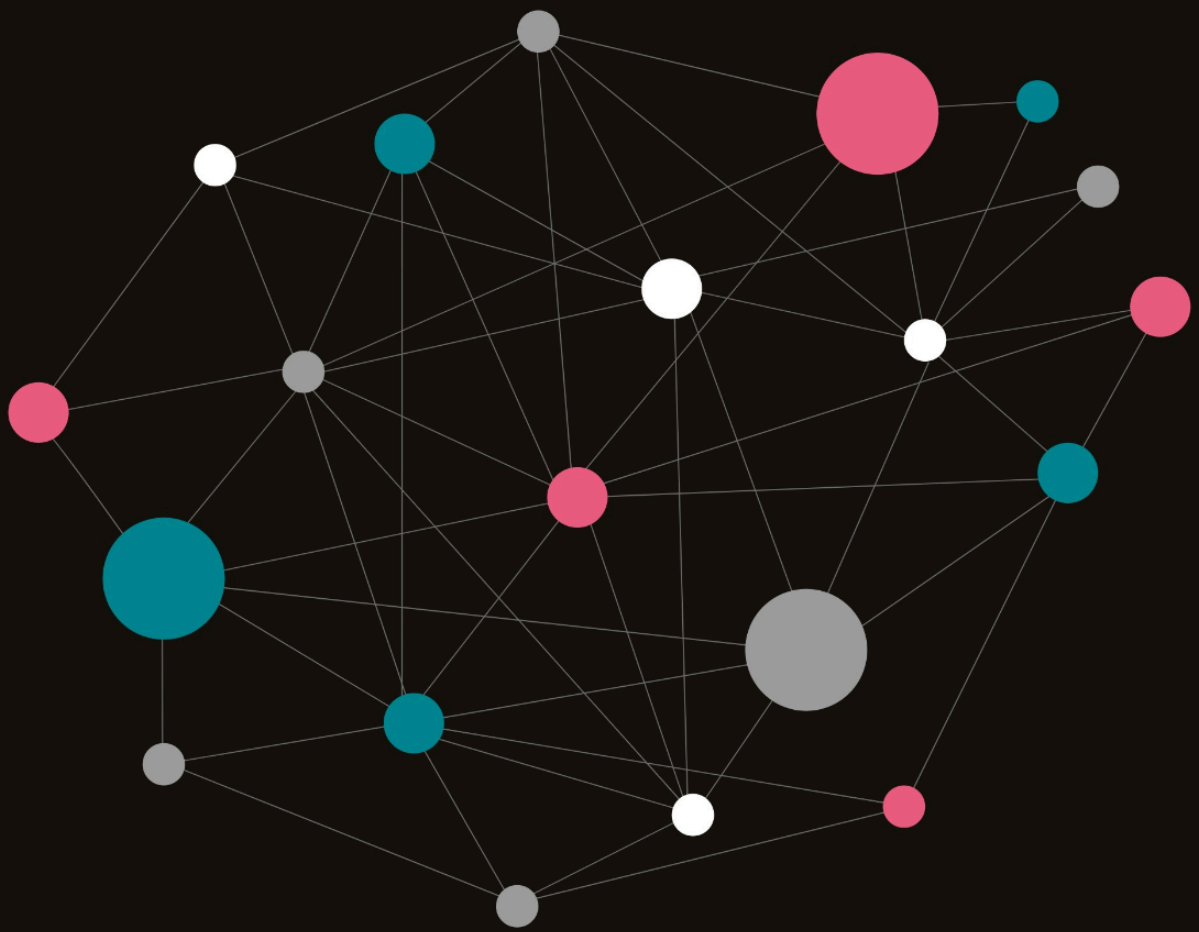
eosc | Tripartite

EOSC Federation Handbook



Version 2.0

EOSC Federation Handbook

Version 2 - FINAL DRAFT

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Abbreviations and Acronyms

AAI	Authentication and Authorization Infrastructure
AARC	Authentication and Authorisation for Research and Collaboration
ADM	Application Deployment Management
AISBL	Association Internationale Sans But Lucratif - International Nonprofit Association
API	Application Programming Interface
AUP	Acceptable Use Policy
AWM	Application Workflow Management
ADM	Application Deployment Management
BYOC	Bring-your-own-compute
CC	Competence Centre
CSIRT	Computer Security Incident Response Team
DG CNECT	Directorates-General for Communications Networks, Content and Technology (European Commission)
DG RTD	Directorates-General for Research and Innovation (European Commission)
DMP	Data Management Plan
EC	European Commission
ELSA	Ethical, Legal, and Social Aspects
ERA	European Research Area
EOSC	European Open Science Cloud
EOSC-A	EOSC Association
EOSC IF	EOSC Interoperability Framework
EOSC IG	EOSC Interoperability Guidelines
ERA	European Research Area
EU	European Union
FAIR data	Findable, Accessible, Interoperable, and Reusable data
FC	Federating Capability
FDO	FAIR Digital Object
FitSM	Federated IT Service Management
GDPR	EU General Data Protection Regulation

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HEI	Higher Education Institute
ISO	International Organization for Standardization
ITIL	Information Technology Infrastructure Library
ITSM	Information Technology Service Management
ITSRM	IT Security Risk Management Methodology of the European Commission
KPIs	Key Performance Indicators
MoU	Memorandum of Understanding
PIDs	Persistent Identifiers
R&I	Research and Innovation
RI	Research Infrastructure
RSMD	Research Software Metadata Guidelines
SLA	Service Level Agreement
SMS	Service Management System
SoS	System of Systems
SRIA	EOSC Strategic Research and Innovation Agenda
SSO	Single-Sign-On
VRE	Virtual Research Environment
WG	Working Group

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Executive Summary

The EOSC Federation Handbook serves as the reference document for implementing the European Open Science Cloud (EOSC) Federation. It is intended as a practical guide for stakeholders - specifically facility managers, resource providers, and technical staff - involved in establishing and operating the EOSC Federation Nodes during the build-up of the EOSC Federation (2025-2027).

The EOSC Federation is not a single, centralised cloud, but a **system of systems**, built as a distributed network to enable Open Science[1] across disciplinary and national borders.

The EOSC Federation federates EOSC Nodes. An EOSC Node is a collection of services and data sources operated as a platform by a national, regional, thematic, or European organisation (or consortium) that provides European researchers with seamless, trustworthy, and secure access to digital resources - FAIR[2] data, software, and services - for conducting research.

The Handbook is designed to be a guide for joining and contributing to the Federation. It details the current governance structure, and the EOSC Node architecture, technical requirements, and services. This document will guide stakeholders through the process of making their organisation's digital research resources available to researchers across Europe as part of the EOSC Federation according to the FAIR Guiding Principles (Findable, Accessible, Interoperable, and Reusable). It categorises the types of scientific resources that are expected to be made available by an EOSC Node. The Handbook furthermore describes the steps on how to form a Node for organisations wanting to join the EOSC Federation.

The EOSC Federation is expected to deliver multiple benefits, ensuring better returns on public investment in research infrastructure through a seamless and comprehensive access to an array of high-quality digital resources. The interim phase (2025-2027) is an ongoing process, and the operational and legal frameworks are still maturing. The latest version (v2) of the Handbook reflects the feedback from the first wave of EOSC Nodes during the build-up phase in 2025 including input from the Task Forces, Opportunity Area Expert Groups and EOSC projects. The new version of the EOSC Federation Handbook is intended to inform and guide the second wave of EOSC Nodes who are preparing to enrol in the Federation.

[1] Open Science is defined as the practice of making science more accessible. Inclusive and equitable for all (https://www.unesco.org/en/open-science) (last accessed 22/12/2025)
[2] Wilkinson, M., Dumontier, M., Aalbersberg, I. *et al.* The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* 3, 160018 (2016). https://doi.org/10.1038/sdata.2016.18 (last accessed 21/12/2025)

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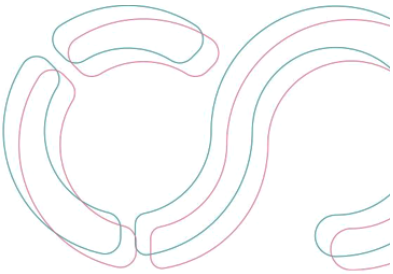

Introduction

The EOSC Federation Handbook provides an overview of the organisational and operational structure and technical characteristics of the EOSC Federation.

The Handbook aims to serve as a practical guide for organisations that are interested in making their resources available within and across the EOSC Federation. Such organisations can achieve this objective by creating and operating an **EOSC Node**, and **enrolling** it as part of the EOSC Federation, alternatively they can **onboard** their resources in one or more EOSC Nodes operated by other organisations.

The intended users of the Handbook include primarily facility managers, policy makers and technical staff of research performing and funding organisations, research infrastructures, providers of scientific services and other resources, and e-infrastructures.

The end-users of the resources accessible through the EOSC Federation, i.e. the researchers, are not the primary audience of the Handbook, however they will still find useful information about the scope and organisation of the EOSC Federation. The Handbook documents how the EOSC Federation is being built in an open and transparent manner so that the research community can provide feedback on how it can serve them best.

Chapter 1 lays the foundations on which the rest of the Handbook is built. It includes descriptions of the purpose of the EOSC Federation, its primary users, its main advantages and expected outcomes.

Chapter 2 concerns the governance framework and legal structure. It describes the current governance structure, communication and relations with other initiatives, and how to manage possible risks. Chapter 2 identifies the governance roles for the EOSC Federation as well as for EOSC Nodes.

Chapter 3 defines and describes the operational structure of the EOSC Federation. The requirements to become an EOSC Node, technical or otherwise, are outlined here.

Chapter 4 details the EOSC Node architecture, how services can be set up and interlinked, and specifically the requirements for federated capabilities and relationships with the EOSC EU Node.

Chapter 5 contains a description of the different categories of FAIR data and scientific resources that will be made available through the EOSC Federation.

Chapter 6 describes the process of applying to become an EOSC Node to join the EOSC Federation and creating a node.

Building the EOSC Federation out of EOSC Nodes will structure data and services in Europe into a coherent set of research services for researchers. The Handbook is a guide of how to

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build the EOSC Federation in order to move from individual siloed services and data to a web of federated data and services (as depicted in the diagram below).

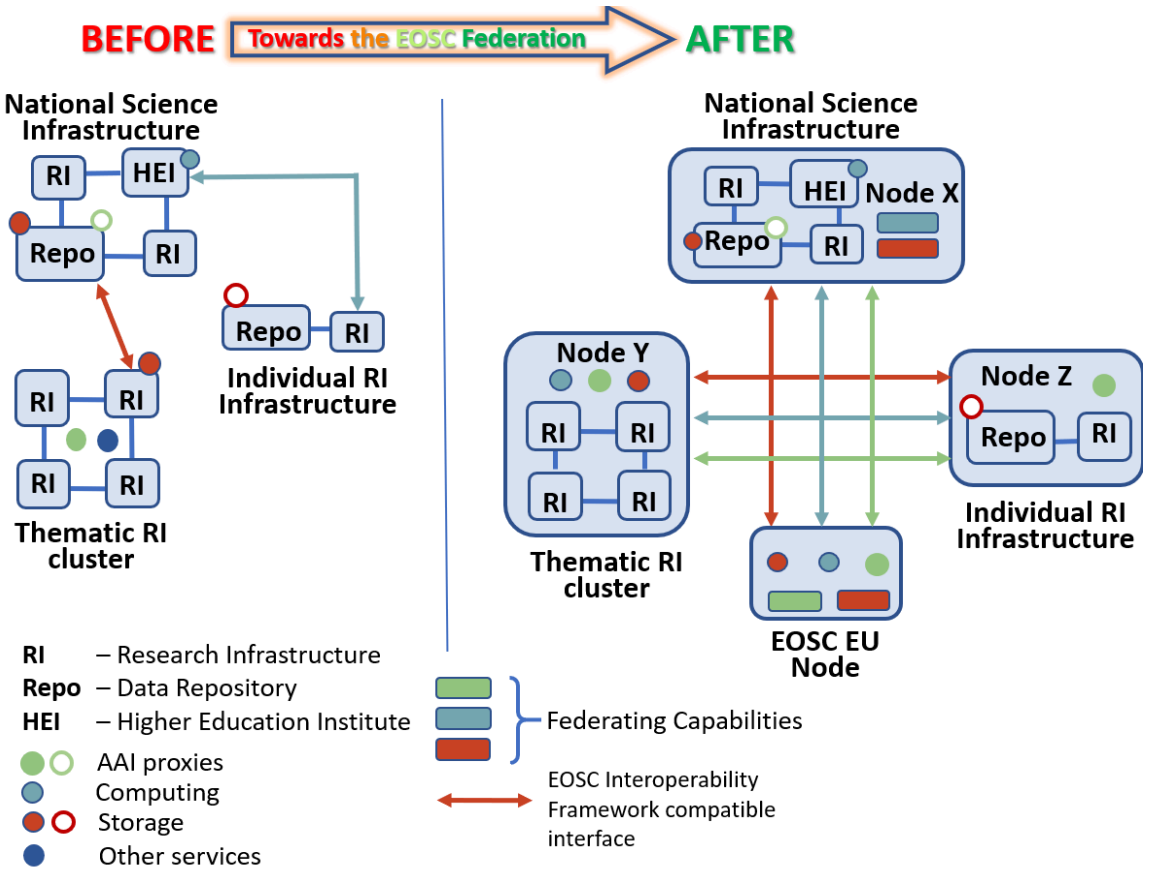

*Figure 1: Before and After - Schematic showing the effect of the EOSC Federation on research services. The **left side** is depicting the situation before the implementation of the EOSC Federation where some RIs and national infrastructures share computing resources and users of the National Science Infrastructure might be able to access storage of thematic RI clusters. In such a non-federated environment, nodes set up and manage services independently. A service to perform a function (e.g. storage) is implemented differently from node to node, thus preventing access from users of another node. The **right side** shows how the EOSC Federation will allow accessing services seamlessly between nodes. Node X on the top will enable the red and blue Federating Capabilities by integrating services from Node Y and Z. For example, the AAI Federated Capability is enabled by integration of the AARC Blueprint compatible AAI proxies.*

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1. Purpose and expected outcomes

1.1. Purpose

The EOSC Federation aims to provide Europe's researchers with the necessary digital resources to conduct research within and across disciplines and borders according to the FAIR principles for data and open science, in a trustworthy and secure environment driven by the scientific communities.

This is being done by putting in place what is known as a **system of systems**[3] with an appropriate organisational and operational structure, between institutional, regional, national, and European research resource providers including research infrastructures, e-infrastructures and other providers of scientific services. The resulting "system of systems" has been given the name of EOSC Federation: a network of federated nodes — referred to as the EOSC Nodes. An EOSC Node may be set up by a single organisation or a consortium of organisations, each with its own internal governance structure and providing resources and services to the Federation. EOSC Nodes must be represented in the Federation by a legal organisation and adhere to the Federation's decisions, rules, and policies.

The target end-users of the resources of the EOSC Federation are primarily researchers working at research performing organisations and research infrastructures across Europe and beyond. Other potential users of the EOSC Federation include citizen scientists and researchers in industry.

The organisations that participate in the EOSC Federation will work together to better understand and address the needs of researchers, equipping them with the right tools and providing support for researchers across service providers and borders.

The EOSC Federation will seek to provide a seamless experience to its users, aiming for a high degree of integration and interoperability of the provided resources. It will count on the latest community know-how, adopting and building on well-established and well-functioning structures and frameworks.

It will increase adoption of the FAIR principles through standardised FAIR practices and improved data and service interoperability and will foster a more collaborative and integrated scientific environment.

The EOSC Federation will act to secure long-term preservation of selected data and will contribute to the alignment of national guidelines facilitating openness wherever possible. It

[3] Definition of "system of systems": https://www.techtarget.com/searchapparchitecture/definition/system-of-systems-SoS (last accessed 17/12/2025).

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will monitor the activity of the Federation, the federated resources and create opportunities for consolidation.

To fully succeed in enabling Open Science and achieve global impact, the EOSC Federation will seek to establish links with similar initiatives in other regions of the world.

The development of the EOSC Federation will make a key contribution to the overall policy objectives of EOSC to mobilise, align and scale resources and engagement across Europe towards accelerating the adoption of Open Science practices, FAIR data management, higher productivity and increased reproducibility in research. It will establish the Common European Data Space for R&I[4], which is the EU's flagship initiative for the digital transformation of research and will also contribute to delivering the objectives of the EOSC Partnership, as set out in the EOSC Research and Innovation Agenda (SRIA)[5].

1.2. Expected outcomes

The expected outcomes of the EOSC Federation are:

- **Enhanced access to and use of digital resources:** The EOSC Federation will facilitate access to and use of digital resources needed to conduct research such as research data and metadata, publications, software, compute and storage capacity, analysis services and tools;
- **Facilitated research reproducibility:** The EOSC Federation will enable researchers to connect available data, tools and services into methodologically grounded, integrated, reproducible workflows based on Open Science practices and supporting principles;
- **Increased collaboration, community and knowledge sharing:** The EOSC Federation will foster a culture of collaboration, community and knowledge sharing;
- **Improved efficiency and higher impact of investment in research:** The EOSC Federation will make research more efficient, accelerate scientific discovery and make scientific outcomes more visible, facilitating re-use and cross domain research;
- **Increased standardisation and interoperability:** The EOSC Federation will promote the development and adoption of common standards and best practices to improve data quality, facilitate research across disciplines and borders and ensure compliance with national and European legislation;

[4] *Second Commission Staff Working Document on Common European Data Spaces, SWD(2024) 21*, https://digital-strategy.ec.europa.eu/en/library/second-staff-working-document-data-spaces (last accessed FAIR17/12/2025).
[5] The Strategic Research & Innovation Agenda and its Multi-Annual Roadmap: https://eosc.eu/sria-mar/ (last accessed 17/12/2025).

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- **Better support for research initiatives:** The EOSC Federation will contribute to the continued advancement and readiness of thematic, national and regional communities participating in the EOSC Federation;
- **Improved research integrity:** The EOSC Federation will enable and encourage the adoption of Open Science practices to produce FAIR data, contributing to improved integrity and excellence of research;
- **Increased robustness and trustworthiness:** The EOSC Federation will foster quality-control and authenticity of FAIR Digital Objects by the research community and pursue robustness from cyberattacks and malicious infiltration of unreliable digital objects;
- **Increased data sovereignty:** The EOSC Federation will enable EU Member States to exercise their full rights over documents, data and software, seeking to strike the right balance between ensuring sovereignty and ease of use. This will be achieved through inclusion of capabilities for identity and rights management that will offer individuals, organisations or governments the required control to ensure credit is attributed to the originators while keeping knowledge **as open as possible, and as closed as necessary**.

Overall, the EOSC Federation will through its outcomes contribute to the sustainability of research organisations in Europe, by taking advantage of commonly pooled digital resources, know-how and capabilities, reducing duplication of research and development costs.

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2. Governance

This chapter outlines the current governance structure of the EOSC Federation. It relies on the structure that was put in place in 2021, the Tripartite Governance, to provide the strategic steering necessary to implement the Co-programmed European Partnership for EOSC with the EOSC Association. Following the establishment of the Build-up Group in 2025 (comprising 13 candidate EOSC Nodes[6] and the EOSC EU Node[7]), an additional governance structure was introduced via the Memorandum of Understanding[8] (henceforth **MoU**) to operationalise the Federation. All nodes seeking to join the EOSC Federation must sign this MoU.

The governance structure consists of a decision-making body, a body for implementation and operational oversight of the EOSC Federation, and a dedicated representative body for the EOSC Nodes, supported by working groups of experts to address specific topics.

The decision-making body of the EOSC Federation is currently implemented by the EOSC Tripartite Governance (described below).

2.1. Structure of the EOSC Federation governance

The EOSC Tripartite Governance

The Tripartite Governance that was put in place in 2021 to drive the development of the overall EOSC initiative, including its objective of setting up a federation of data infrastructures and scientific service providers, is composed of:

a) the **European Commission** (**Directorates-General for Research and Innovation** [DG RTD] and for **Communications Networks, Content and Technology** [DG CNECT]);
b) the **EOSC Association**[9], a non-profit organisation seated in Brussels representing the broader EOSC stakeholder community; and

[6] First wave of EOSC Nodes selected were BBMRI ERIC, CERN, Digital Twin of the Ocean (CNR), Data Terra (CNRS), CSC – IT Center for Science, CVTI SR, Life Science Research Node (ELIXIR, EMBL, Euro-BioImaging ERIC, Instruct-ERIC), PaNOSC (ESRF), EUDAT, Foundation ICSC, NCN, NFDI, SURF (descriptions of each node can be found here: https://eosc.eu/building-the-eosc-federation/ (last accessed 20/12/2025))
[7] European Open Science Cloud - EU Node: https://open-science-cloud.ec.europa.eu/ (last accessed 17/12/2025).
[8] *Memorandum of Understanding on Preparing Operational Integration within the Envisaged EOSC Federation,* https://eosc.eu/wp-content/uploads/2025/10/20251103_MoU_Operational-Preparation_EOSC-Federation.pdf (last accessed 17/12/2025).
[9] EOSC Association, https://eosc.eu (last accessed 17/12/2025).

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c) the **EOSC Steering Board**[10], a European Commission expert group (**E03756**[11]) whose Members are representatives of the EU Member States and countries associated with Horizon Europe.

These bodies follow a consensual approach regarding the key strategic decisions for the development of the EOSC and organise their discussions and decisions under the **EOSC Tripartite Governance**. The three parties have, in addition, their individual roles and contributions to the development of the EOSC Federation. The Tripartite Governance has the right to invite, when needed, observers from the EOSC Federation bodies to its meetings and the ones of its subgroups.

The EOSC Tripartite Governance is the ultimate decision-making body responsible for setting out the overall strategy and operational planning, including at this stage the process towards establishing an operational EOSC Federation. It can also establish additional groups and/or task forces as it deems necessary to effectively carry out its activities.

The **European Commission** is a partner in the EOSC co-programmed European partnership[12], whereby it co-develops the EOSC Strategic Research and Innovation Agenda (SRIA)[13]. It provides funding opportunities under the Horizon Europe programme to support the development of the EOSC Federation and the overall Open Science and FAIR research data ecosystem. It also owns and operates – through a public procurement contract – the **EOSC EU Node**, a fully operational platform providing access to a portfolio of professional-quality research services and resources and enabling with Federating Capabilities the development of the EOSC Federation.

The **EOSC Steering Board** is composed of representatives of the 27 EU countries and countries associated with Horizon Europe to strategically advise on EU policy for research data infrastructures and services and the alignment of EU and national policy developments and investments with the EOSC objectives. The expert group also supports the Commission in coordinating and implementing the EOSC as part of the ERA Policy Agenda, in line with the

[10] Informal group set-up with the agreement of Commissioner Gabriel and Vice President Vestager, and published on the Register of Expert Groups on 16 February 2021, pursuant to the provisions of Commission Decision C(2016) 3301 of 30 May 2016 establishing horizontal rules on the creation and operation of Commission expert groups: https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups?lang=en (last accessed 17/12/2025).

[11] *Commission expert group to act as European Open Science Cloud Steering Board (E03756)*: https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&groupID=3756 (last accessed 17/12/2025).

[12] *Memorandum of Understanding for the Co-programmed European Partnership for the European Open Science Cloud*: https://eosc.eu/wp-content/uploads/2023/08/EOSC_Memorandum_30_July_2021-1.pdf (last accessed 17/12/2025).

[13] *Strategic Research and Innovation Agenda (SRIA) of the European Open Science Cloud (EOSC)*: https://www.eosc.eu/sites/default/files/EOSC-SRIA-V1.0_15Feb2021.pdf (last accessed 17/12/2025).

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Council conclusions of 26 November 2021[14] on the new ERA Governance. It is co-chaired by representatives from the European Commission and from the other members of the group.

The **EOSC Association** was set up in July 2020 as an international non-profit organisation under Belgian law (AISBL) with the aim to provide a single voice for advocacy and representation for the broader EOSC stakeholder community. It is the European Commission's partner in the EOSC co-programmed European partnership, whereby it co-develops the EOSC SRIA. The EOSC Association has a membership of more than 250 organisations from across Europe[15]. Further to participating in the EOSC Tripartite Governance, the EOSC Association also provides the operational capacity and secretariat of the current interim EOSC Federation governance. This includes organising consultations of the broader community, coordinating and carrying out activities related to the interim phase of the EOSC Federation, including the drafting of the present Handbook, carrying out communication activities, and providing administrative support to task forces and groups related to the EOSC Federation.

The EOSC Federation governance (following the MoU described in 2.2)

The **EOSC Nodes** provide research resources and federate the services they provide to the EOSC Federation. As such they will need to comply with decisions, rules and policies that are common across the EOSC Federation. However, each EOSC Node will be fully autonomous to set its own rules and internal management of its consortium and bilateral agreements with other Nodes or organisations as long as they do not contradict those of the EOSC Federation. For example, an EOSC Node may decide to set up additional Rules for Participation and/or Access and Use Policies of the resources it offers through the Federation, or it may set up specific requirements for onboarding services in addition to the rules defined by the Tripartite.

The Interim **EOSC Node Coordinator Committee** serves as the main forum for strategic discussion, alignment of priorities, and endorsement of policies and recommendations. It is composed of the coordinators of the EOSC Nodes or their delegated representatives and invited observers from the Tripartite. More details about the operational EOSC Federation governance structure introduced through the MoU can be found in section 3.2.

[14] *Future governance of the European Research Area (ERA) - Council conclusions* (adopted on 26/11/2021). https://data.consilium.europa.eu/doc/document/ST-14308-2021-INIT/en/pdf (last accessed 17/12/2025).
[15] Members and Observers of the EOSC Association: https://eosc.eu/members/ (last accessed 17/12/2025).

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2.2. Memorandum of Understanding

The **Memorandum of Understanding** (MoU) (see footnote 8), developed in 2025 by the first wave Nodes of the EOSC Federation build-up phase, is a legally non-binding statement of mutual understanding and intent signed by the parties (the EOSC-A and the EOSC Nodes) seeking to establish the EOSC Federation. The MoU establishes the framework for governing the Federation's transition from its interim phase to full operation. It defines the principles, interim governance structure and the roles and responsibilities of the signatories. Specifically, all organisations wishing to create an EOSC Node need to sign the MoU and thereby agree to:

- **Collaborate voluntarily** to test and prepare practical approaches for future operational integration within the EOSC Federation;
- **Establish approaches and frameworks** for future service integration, interoperability, and quality assurance, including the application of FAIR principles, technical standards, and ethical, legal, and social aspects (ELSA[16]);
- **Participate in interim governance** and coordination structures (see Section 2.1);
- **Appoint individuals to key roles** such as: Coordinator, Operation Officer, Legal Officer, Cybersecurity Officer, Communications Officer.

The commitments made by signing the MoU are understood to be voluntary and are in-kind i.e. not funded by the Federation or the European Commission.

Signing of the MoU is a mandatory prerequisite for any organisation seeking to become an EOSC Node to join the EOSC Federation and is as such one of the formal steps in the enrolment process.

The rules, terms and procedures agreed in the MoU remain lightweight and inclusive to establish mutual trust and alignment between signatories with the objectives of the EOSC Federation. The MoU is envisioned to cover the interim period until the EOSC Federation becomes operational. It is foreseen that it will evolve over time, and eventually be superseded by legally binding agreements and further documents that specify the policies, operational responsibilities and commitments of the EOSC Nodes as these become available (see Chapter 3 for more details).

[16] Ethical, Legal, and Social Aspects - https://en.wikipedia.org/wiki/Ethical,_Legal_and_Social_Aspects_research, (last accessed 17/12/2025)

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2.3. Responsibilities of the EOSC Federation bodies

During the interim phase of the EOSC Federation, the EOSC Federation bodies, i.e. the EOSC Tripartite Governance and the EOSC Nodes, will develop, under their respective roles, the key elements of the EOSC Federation, such as:

- **Federation strategy:** defining the long-term objectives of the EOSC Federation and the roadmap for achieving them.
- **Enrolment and onboarding policies:** selection criteria and process for enrolment of new Nodes, their ongoing obligations, compliance measures, removal and mechanisms for appeal. Policies for onboarding resources to Nodes.
- **Federating capabilities:** common services that will be implemented across the EOSC Federation and the requirements for the Nodes when participating in Federating Capabilities. These can include e.g. a common EOSC Authentication and Authorization Infrastructure (AAI), a common catalogue of EOSC resources etc.
- **Technical standards and requirements:** technical standards that will be part of the EOSC Interoperability Framework and the technical requirements that will need to be fulfilled by the Nodes when joining the Federation, e.g. Cybersecurity, Persistent Identifiers (PIDs) etc.
- **Federation policies:** cybersecurity policy, ethics policy, and Rules for Participation and policies related to the provision, access and use of resources that are provided across the Federation.
- **Monitoring:** the mechanisms to measure the performance of the EOSC Nodes.
- **Collaborations:** establish partnerships and/or collaborations with other organisations in and beyond Europe.
- **Governance:** how the EOSC governance should evolve in the future, on the short-term to realise the objectives of the Federation in production.
- **Service Level Agreement** (SLA), includes the terms of the service expected from providers and precautions and actions to be undertaken in the case the terms of the SLA are not met.

As the EOSC Federation moves towards production the EOSC Federation bodies will develop these elements in close cooperation with and consultation of the wider EOSC stakeholder community.

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3. Operational structure and responsibilities

3.1. Operational tasks across the Federation

The day-to-day operations of the EOSC Federation during the interim phase include the following tasks:

- Inform the stakeholder community about ongoing activities and progress of the EOSC Federation and decisions made by the Tripartite Governance.
- Contribute to and support the development of the procedures for enrolling Nodes in the Federation and of the Federation's common policies and technical standards.
- Coordinate and support the EOSC Nodes in joining the Federation.
- Establish and support working and stakeholder groups to further develop the EOSC Federation.
- Support the activities of the EOSC Tripartite Governance.
- Represent the EOSC Federation governance in discussions with the EOSC Nodes and with external stakeholders.
- Carry out the administration of the applications by candidate EOSC Nodes
- Assess the compliance of candidate EOSC Nodes wishing to join the Federation.
- Maintain the web presence of the EOSC Federation and define a common User eXperience (UX) across the Federation
- Promote the EOSC Federation in Europe and internationally.

Once the operational EOSC Federation is in place, additional tasks will need to be carried out for which appropriate guidelines still have to be defined, such as:

- Measuring and reviewing the performance of the Federation against agreed objectives and KPIs.
- Coordinating, updating and reviewing compliance with the EOSC Federation Interoperability Framework of the EOSC Nodes.
- Preparing and managing contracts with the EOSC Nodes.
- Gathering and reporting monitoring data of the EOSC Federation.
- Coordinating the technical implementation of the Federation and providing technical advice, guidelines and recommended tools to members of the Federation and those planning on joining it.
- Coordinating the EOSC Federation on a daily basis including coordinating the legal and policy framework within the EOSC Federation and reviewing compliance of the EOSC Nodes with such frameworks.

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3.2. Operational structure of the interim phase

To achieve the objectives of the interim phase the MoU establishes the governance and operational structure made up of the following bodies:

- **The Interim EOSC Node Coordinator Committee:** the main forum for strategic discussion, alignment of priorities, and endorsement of policies and recommendations, composed of one appointed representative from each Node, plus up to four representatives of the EOSC Tripartite Governance, who may be invited as guests to attend meetings to facilitate alignment and the wider process of establishing the EOSC Federation.
- **The Interim EOSC Node Operations Committee:** the Committee for technical matters, in particular the coordination of onboarding of resources to the EOSC Nodes, the advancement of interoperability, and the monitoring of technical implementation. It will pay attention to emerging practices that enable seamless integration of resources across EOSC Nodes.
- **Interim Working Groups:** Established by the Coordinator Committee to address specific areas and propose recommendations for consideration by the Coordinator Committee.
- **Interim Secretariat:** The EOSC Association will coordinate the necessary administrative, organisational, and communication support, including the organisation of meetings, keeping records (e.g. signed originals of the MoU, official documents etc.), and dissemination of outcomes, required by the other interim governance structures.

The governance and operational bodies will operate on the basis of consensus and mutual understanding, without creating enforceable rights or obligations, to prepare the ground for the future framework for an operational EOSC Federation.

3.3. EOSC Nodes

An EOSC Node represents a specific community of reference (national, regional, or thematic), or large collaborations at a European level (e.g. e-infrastructures, science clusters, etc.). An EOSC Node will typically be formed by (multiple) research institutions, universities and other stakeholders with a European, regional or national or thematic scope. The goal of establishing a Node is to make resources available to the EOSC Federation. Resources which are made available to the EOSC Federation are referred to as EOSC Exchange. The type of resources that a Node could provide or contribute to for Federating Capabilities and Research Resources are defined respectively in Chapter 4 and Chapter 5.

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3.3.1 Application process to become an EOSC Node

The application process for organisations to create an EOSC Node during the interim phase of the EOSC Federation has been defined by the EOSC Tripartite Governance.

This process specifies the eligibility and evaluation criteria for organisations interested in operating an EOSC Node. The requirements and process for applying to create an EOSC Node in the second wave are documented in the **Requirements for EOSC Nodes** document[17] by the EOSC Tripartite Governance. The requirements will be formalised as the **Rules of Participation for EOSC Nodes** in the future.

Readers are referred to Chapter 6 for more information on the application process.

3.3.2 Operations

The resources onboarded by an EOSC Node in the Federation may be provisioned by the Node itself, by members of the community associated with the Node or by third-party providers. Regardless of the provider, all resources (e.g. Services and Research Resources) must conform to the technical and operational requirements of the EOSC Federation. These include the EOSC Interoperability Framework[18] and the EOSC Rules of Participation[19]. The EOSC Federated Resources and EOSC Exchange are further explained in Chapter 4. Compliance and monitoring procedures, agreed among the parties, will be put in place to ensure conformity with the requirements to be laid out in the Node's EOSC Collaboration Agreement (to be developed). A non-conforming Node will be asked to address any issues identified and may be subject to suspension from the Federation. EOSC Nodes are expected to collaboratively implement Federating Capabilities to augment their offer to EOSC users.

3.3.3 Key Roles for EOSC Nodes

In order to facilitate their interaction with the Federation, organisations applying to become EOSC Nodes must designate individuals for the following key roles:

1. A **Coordinator** who represents the Node in the Federation.
2. An **Operations Manager** who is the contact person with the Operations Team of the Federation on operations.

[17] EOSC Federation - Second wave of EOSC Nodes enrolment call: https://eosc.eu/wp-content/uploads/2025/11/20251103_EOSC-Tripartite-Governance_Enrolment-call-documents.pdf (last accessed 17/12/2025).
[18] See D. Scardaci et al. (Technical Interoperability of Data and Services Task Force) (2023), *A landscape overview of the EOSC Interoperability Framework - Capabilities and Gaps*, https://zenodo.org/records/8399710.
[19] European Commission: Directorate-General for Research and Innovation, *EOSC rules of participation*, Publications Office, 2021, https://data.europa.eu/doi/10.2777/30541 (last accessed 17/12/2025).

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3. A **Cybersecurity Officer** who is the contact person for all cybersecurity related issues.
4. A **Legal/Privacy Officer** for legal issues
5. A **Communication Officer** for dissemination activities

These persons must be identified at the time of submitting an application to become a Node. Should any of the persons nominated in these positions be replaced after the Node has been accepted to join the Federation, the Node must communicate the new names to the **EOSC Node Operations Committee.**

3.3.4 Transitioning to an operational EOSC Federation

The EOSC Federation was officially launched at the EOSC Symposium in November 2025. The transition to an operational federation is planned to happen in 2026 through implementation of the following objectives:

- **Operational structure:** Migrate to the operational structure outlined in the MoU and evolve the federating capabilities and the interoperability framework;
- **Transition to production status:** Address legal, governance, operational and engagement requirements to move the EOSC Federation from prototype to production status;
- **Expansion of the Federation:** Enrolment of EOSC Nodes following open calls by the Tripartite Governance as well as onboarding additional resources and use-cases.

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4. The EOSC Federation and Node Architecture

This chapter describes the technical architecture and structure of the EOSC Federation, giving details about how its main components, the EOSC Nodes, are to be set up. The chapter begins with a high-level description of the EOSC Federation Architecture, and then provides information about the capabilities foreseen to be offered by the EOSC Nodes, referred to as **Node Capabilities**, as well as descriptions of the EOSC **Federating Capabilities (FCs)** and the EOSC **Interoperability Framework (IF)**. The architecture of the EOSC Nodes is established by specifying a set of mandatory Node Capabilities which define an integrated digital platform that can be realised with the tools of preference of the communities of the EOSC Nodes. The architecture of the EOSC Federation during the interim phase is defined by specifying how the Node Capabilities link to each other. This chapter will become the reference document for organisations interested in setting up an EOSC Node in the EOSC Federation.

The chapter follows the definitions, models, procedures and diagrams for the Federation Architecture developed in the EOSC Beyond project (https://www.eosc-beyond.eu)[20] and outputs of the EOSC Build-up Groups on AAI and Catalogues for the implementation of the mandatory Federating Capabilities. Besides defining the components of the EOSC Federation Architecture, the chapter includes technical descriptions of:

- the Federating Capabilities and underlying services enabled during the interim phase of the EOSC Federation (Section 4.3);
- the operating procedures (Section 4.5) and security requirements (Section 4.6 Cybersecurity and Section 4.7 EOSC Node Data Protection) for EOSC Nodes.

4.1. The EOSC Federation Architecture

The EOSC Federation is conceived as a network of autonomous nodes — the EOSC Nodes — that interact with each other to deliver additional capabilities to users, according to the objectives described in Section 1.1. Figure 4.1 provides a high-level view of the components of the EOSC Federation, consisting of:

- **EOSC Nodes** (blue boxes), encompassing national, regional, thematic, as well as nodes of European scope (i.e. those formed by e-infrastructures that provide services across the continent), including the EOSC EU Node;
- **Capabilities** that support end-users needs for exploiting data and other resources to do research and allow providers to exploit services, in the Federation, referred to as

[20] Scardaci D. et al., *EOSC Beyond D5.3 EOSC Platform Architecture and Network of EOSC Nodes*. https://zenodo.org/records/16566006

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Federating Capabilities (depicted as coloured **rectangles**), enabled by one or more Federating Services provided by the EOSC Nodes;

- **Interfaces** (black lines), comprising APIs and metadata schemas, that connect Node services (shown as coloured **circles**) to the Federating Capabilities. As indicated in the figure below, the interfaces between EOSC Nodes have to comply with the guidelines and standards in the EOSC **Interoperability Framework** (EOSC IF).

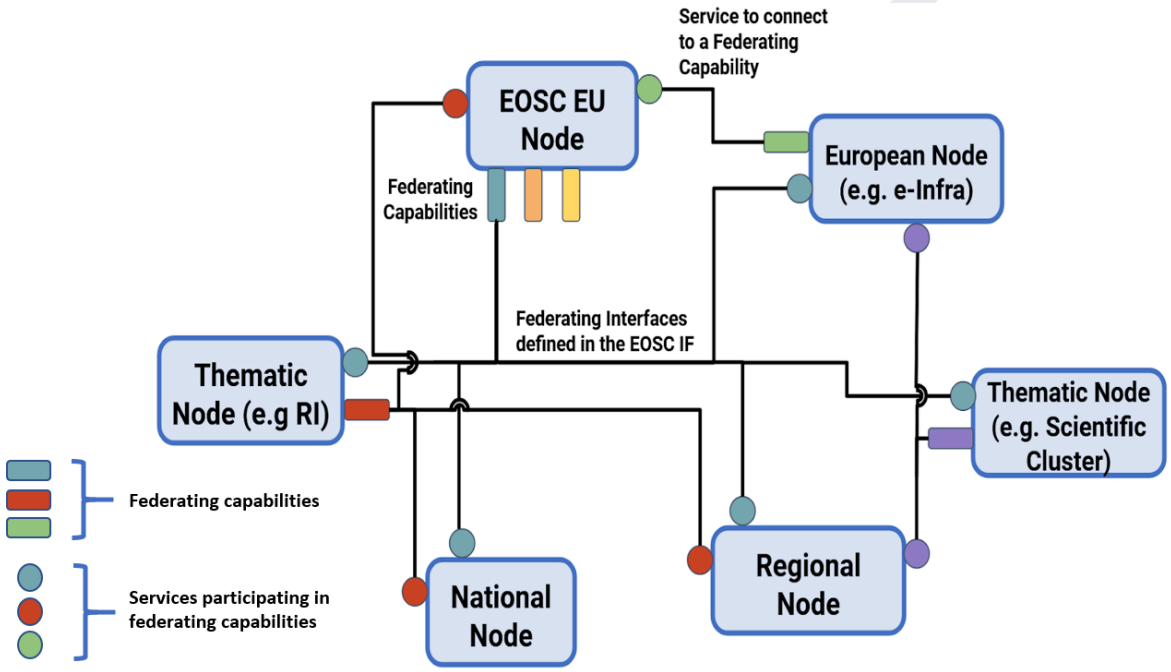

*Figure 4.1 - Schematic (or **conceptual**) view of the EOSC Federation Architecture*

In the following, the term **Node Capability** is used to refer to the tasks performed by an EOSC Node implemented by one or more services within the Node. When Node Capabilities are extended to serve the entire EOSC Federation, they are called **Federating Capabilities** (described in Section 4.3). In both cases, Node and Federating Capabilities are implemented using **Services**. For example, the assistance expected to be provided by Nodes to its users via a **Helpdesk** requires a federated **Helpdesk Service** that is operated by the Node. Federating Capabilities can refer to hardware, software or processes being federated.

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4.2. EOSC Node Architecture

This section describes the Node Capabilities that EOSC Nodes need to have in place in order to participate in the EOSC Federation, and which define the reference **EOSC Node Architecture**. A Node can be modelled as depicted in Figure 4.2, where two main elements are identified:

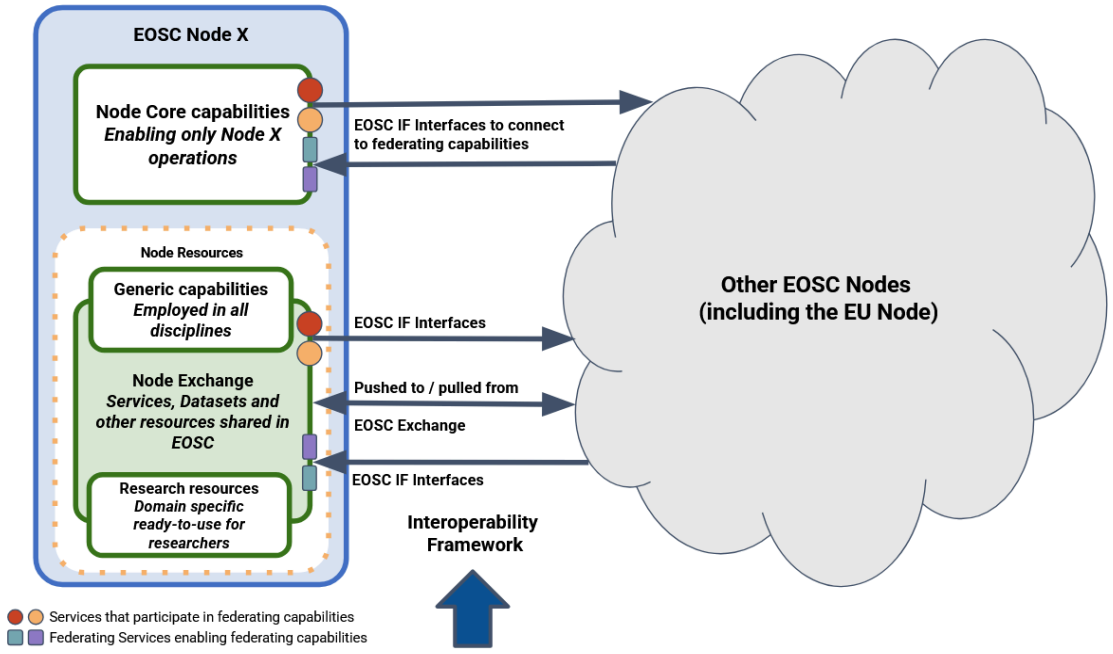

Figure 4.2: EOSC Node Architecture

- **Node Core Capabilities** that enable the operations of the Node (e.g. AAI, Helpdesk, Monitoring, etc.).
- **Node Resources:** services, data and other research resources usually listed in a catalogue, that end-users of the Node can access directly. These are split into three categories:
  - **Node Generic Capabilities**: employed in the vast majority of scientific disciplines (and therefore relevant to all EOSC Nodes) to perform everyday tasks related to research data management (e.g. a data transfer service or accessing a cloud infrastructure).
  - **Node Research Resources**: domain specific services, datasets and other research products ready-to-use by researchers using the Node (e.g. domain-specific datasets or application to process thematic datasets). See Chapter 5 for a description of Research Resources to be provided by EOSC Nodes.

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- **Node Exchange**: a subset of the generic capabilities and Research Resources a Node makes available to the EOSC Federation. These contribute to the collective EOSC Exchange[21].

Services enabling or participating in Federating Capabilities are specific services within an EOSC Node (subset of the Node Core Capabilities or of the Node Resources) that allow the Node to enable or participate in Federation-wide activities. In simple terms, an EOSC Node contributes to the Federation by connecting some of its local services to shared EOSC capabilities. For example, the EOSC EU Node enables the *Resource Catalogues and Registry* federating capability by operating a central catalogue that collects information about services from all participating Nodes. Other Nodes participate by linking their own Node Core catalogues to this central service. Similarly, Nodes participate in the *Authentication and Authorisation Infrastructure (AAI)* federating capability by connecting their Node Core AAI to the federation. They can also contribute to the *Service Monitoring* federating capability by sharing performance and availability information from their Node Core monitoring systems with a federation-level repository (see Section 4.3 for more details).

The resulting architecture defines a system-agnostic integrated digital platform for organisations establishing an EOSC Node. This is referred to as the Node reference architecture in the Handbook[22]. In line with the general principle that members of a federation retain autonomy to perform certain operations, organisations willing to establish an EOSC Node can implement the reference architecture with the technologies of their choice to create a platform where services and resources are made available. The first wave of EOSC Nodes, including the EOSC EU Node, are the first Nodes to implement the EOSC Node Architecture, with some extensions and modifications.

A more detailed version of the EOSC Federation Architecture (see Figure 1) which takes into account the Node Architecture is shown in Figure 4.3.

[21] The **EOSC Exchange** is the set of services, datasets and other research products collectively provided by autonomous EOSC Nodes and made accessible through the EOSC Federation.

[22] A **reference architecture** provides a general solution or template for the (software) architecture of a system. It defines the functions, services and interfaces required for the system to work, but does not specify a particular implementation. See e.g. https://en.wikipedia.org/wiki/Reference_architecture (last accessed 17/12/2025).

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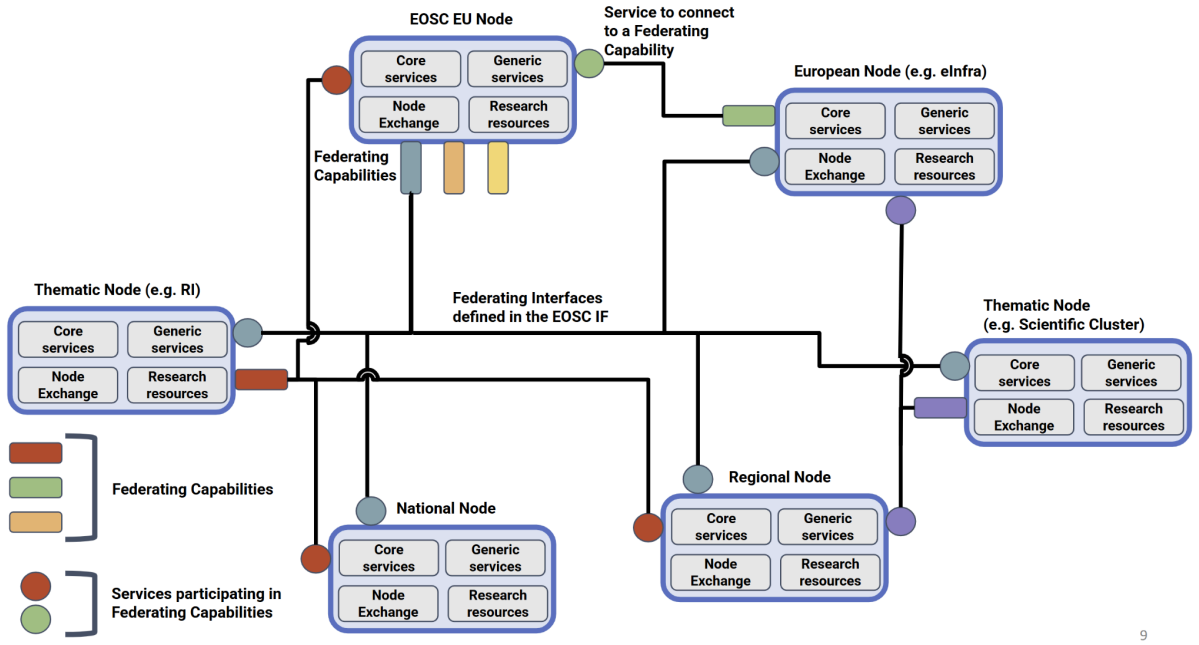

Figure 4.3: The EOSC Federation Architecture highlighting the EOSC Node Architecture

Building on the EOSC Platform Architecture proposed by the EOSC Future[23] project, with enhancements introduced by EOSC Beyond[24] and the EOSC EU Node, a list of Core and Generic capabilities for the EOSC Nodes is given in Sections 4.2.1 and 4.2.2. Tables 4.1 and 4.2 list respectively the capabilities that are currently recommended to be implemented in the platforms operated by the EOSC Nodes, and serve as a guide by candidate EOSC Nodes. The final classification of these capabilities (i.e. whether they become mandatory) will be decided during the interim phase.

4.2.1. Node Core Capabilities

The Node Core Capabilities listed in table 4.1 can be implemented by an EOSC Node as capabilities of a platform, individual services, or acquired through the EOSC Federation (offered as-a-Service or by deploying the same solution implemented by the EU Node).

[23] D. Scardaci et al., EOSC Future D3.3b: *Architecture and Interoperability Guidelines for Operational Services of the EOSC Core*, https://bit.ly/architecture-interoperability-EOSC-Core (last accessed 17/12/2025).
[24] D. Scardaci et al. (2024), EOSC Beyond Concept Document - *EOSC Federation: Architecture and Federating Capabilities*, https://zenodo.org/records/13939396 (last accessed 17/12/2025).

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Node Core Capabilities	Description
Resource Catalogue and Registry services	Catalogue of resources that can be accessed through the EOSC Node with a search engine to discover, access and order them
AAI	AAI (AARC Blueprint compliant) enabling access to Node resources (Core and Exchange) via federated credentials (i.e. community AAI and Infrastructure Proxy)
Helpdesk	Support incident response and service requests for services and other integrated resources
Service Monitoring	Monitor the availability and quality of the Node services
Service and Research Product Accounting	Track and record usage of resources
Order Management	A framework for providers to define offers and a unique interface for end-users to request access to resources
Configuration Management System	Shared space to store information on Node capabilities and on how services are provided through the node to ensure consistent service delivery (only for internal use)
User space	Dynamic customisable dashboard, where the node user logs-in, offering easy access to the Node resources
Application Deployment Management	Automated deployment and execution of services on the underlying Node provisioned infrastructure
Resource provisioning	Support users in identifying all available resources for a project and then assign a subset of them to the project

Table 4.1: EOSC Node Core Capabilities

4.2.2. Node Resources

The Node Resources are services, data and other research products a Node offers to its end-users. They are classified in Node Generic Capabilities and Research Resources as introduced in Section 4.2. Generic Capabilities are presented in this section, while Research Resources are described in more detail in Chapter 5, as they are a much larger and varied type of services compared to the Generic Capabilities and are the main components necessary for creating a Web of FAIR Data and Services. Both Generic Capabilities and Research Resources contribute to the Node Exchange.

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Node Generic Capabilities

Generic Capabilities, listed in Table 4.2, have been identified by the research communities. These capabilities are employed in most scientific disciplines to perform everyday research data management tasks, and are therefore expected to be offered by all EOSC Nodes to allow users to manage and process research data from the Node where they access the Federation. The EOSC Nodes can enable Node capabilities by leveraging services provided by other Nodes to make them available to its users.

Node Capabilities	Description
Data Management and Transfer	Management of data between storage locations
Interactive Notebooks	Support for data analysis
Compute and storage resources (including middleware)	Support for data analysis with relevant middleware (e.g. support for containers)
File Sync & Share	Syncing automatically data across devices (e.g. PCs, tablets, or smartphones) and securely sharing them within research teams

Table 4.2: EOSC Node Generic capabilities

Node Exchange

The EOSC Federation expects EOSC Nodes to make a relevant portion of their resources accessible via the EOSC Federation under the appropriate EOSC Federation Policies together with appropriate User Access Policies. The decision of which percentage of Node Resources are made available will be taken by the Governance of the Node, and/or the providers of specific resources. Resources shared with the Federation will be identified by the EOSC Node as part of the **Node Exchange** to be made discoverable, accessible and usable by any EOSC User[25] according to the conditions laid out in the respective Access Policies decided by the EOSC Nodes. Other services and resources that are *not* made available in the EOSC Federation do *not* need to be compliant with the EOSC Federation Policies.

Resources in the Node Exchange may include those that enable generic capabilities relevant to the majority of research communities, as well as domain-specific resources, like notebooks or workflows, Virtual Research Environments, datasets and research software. More details about research resources to be shared by the EOSC Nodes can be found in Chapter 5.

[25] Restrictions for some resources, or for some users are still possible as long as they are clearly stated in the User Access Policy.

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4.3. The EOSC Federating Capabilities

In the federated environment envisioned to be put in place by the EOSC Federation, Federating Capabilities are what binds EOSC Nodes together to make services work between and across them. They are thus essential in that they make the sum of the EOSC Nodes be more than the simple addition of their respective resources, and add value for providers and end users by facilitating the provision of and access to those resources and shared services. The Federating Capabilities encompass IT services that effectively establish the Federation from the users' perspective (e.g. authentication and authorisation), as well as for services that, while partially IT-based, are related to organisational aspects of the Federation and involve user support. Federating Capabilities will be hosted by one or several Nodes that act as **Federators**, with others connecting to them according to their specifications.

The technical and organisational arrangements required to federate a service and enable a Federating Capability vary between services. Two examples of Federating Capabilities are:

- **User support** - considered key to ensuring the success of the Federation. The Federating Capability for User support involves federating the Helpdesks operated by the Nodes, and their onboarded services. This requires, among other things, setting a standardised protocol or best-practice guideline for ticket escalation between EOSC Node helpdesks to provide the right support to users.
- **Monitoring** - the Federating Capability for Monitoring will require Nodes to implement a set of metrics (e.g. uptime, availability, number of users etc.) that need to be reported about their services in a standard format and an API for publishing these metrics, and setting up a system where the metrics can be collected.

The EOSC Federating Capabilities can be:

- **Mandatory**: Federated Capabilities which all EOSC Nodes must implement in order to join the EOSC Federation;
- **Recommended**: Federated Capabilities which EOSC Nodes should consider to federate with (i.e. connect to), but which are optional for EOSC Nodes joining the EOSC Federation[26].

EOSC Nodes can contribute to the delivery of a Federating Capability by either:

A. **Enabling a Federating Capability** that can be used by other EOSC Nodes (e.g. act as a federator, a Node enabling a federation of cloud resources); or

[26] The classification of a Federating Capability may evolve with time, i.e. the initial classification as **recommended** may be used to allow Nodes time to understand how to connect with/federate with it, and then **become mandatory** once the Nodes have stabilised and are accepted by the Federation Operations Committee.

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B. **Participating in the delivery of a Federating Capability** by integrating one or more services provided by the Node in a Federating Capability enabled by another Node (e.g. for example a Node participating in the federated AAI by integrating its AAI proxy with the AAI Federation enabled by the EOSC EU Node).

Federating Capabilities will be hosted by one or several Nodes that act as **Federators**, with others connecting to them according to their specifications.

The Federating Capabilities are enabled by one or more **EOSC Federating Services** provided by the EOSC Nodes[27]. The Federating Services expose interfaces (e.g. APIs and metadata schemas) that allow Nodes to federate their services. In order to be accepted in the Federation, the interfaces of the EOSC Federating Services are described in the EOSC Interoperability Guidelines in the EOSC Interoperability Framework (see Section 4.4). The Guidelines detail the procedures required to connect a node to a given Federating Capability.

4.3.1. Federating Capabilities in the EOSC Federation interim phase

The EOSC Federation will begin operating with an initial set of Federating Capabilities identified by previous EOSC related projects as key to enable the sharing, discovery, access, and composition of services and research products that cater to the diverse needs of researchers and scientists. The mandatory capabilities, summarised in table 4.3 and detailed below, will be implemented by all EOSC Nodes and the EU Node[28].

[27] Federating Capabilities are to be distinguished from EOSC Node Capabilities.
[28] The call topic HORIZON-INFRA-2025-01-EOSC-01 will fund projects expected to deliver new federating capabilities for the EOSC Federation. These projects will start during 2026.

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ID	Federating Capability	Description	Classification
FC-1	**AAI**	Ensures the AAI interoperability across the EOSC Nodes	**Mandatory**[29]
FC-2	**Resource Catalogues and Registry services**	Enables the discovery and access of resources (e.g. Services and Research Products) provided through EOSC Nodes within the EOSC Federation.	**Mandatory**[30,31]
FC-3	**Helpdesk**	Integrates the helpdesks of EOSC Nodes within the EOSC Federation to provide a federated support channel between users and providers from nodes.	Recommended (Will become **Mandatory in 2026**)
FC-4	**Service Monitoring**	Provide information about the quality and availability of services and resources made available through EOSC Nodes into the EOSC Federation.	Recommended (Will become **Mandatory in 2026**)
FC-5	**Service Management System**	EOSC Federation FitSM-based Service Management System. defining the essential processes between EOSC Nodes to enable efficient IT service management within the EOSC Federation. It also includes Security Coordination between Nodes.	Recommended (Will become **Mandatory in 2026**)
FC-6	**Service Accounting**	Provide information about the usage of services offered by EOSC Nodes within the EOSC Federation.	Recommended
FC-7	**Research Product Accounting**	Provide information about the usage of research products made available through EOSC Nodes in the EOSC Federation.	Recommended
FC-8	**Order Management**	Provides a framework that allows providers and users to manage the full lifecycle of service and resources requests and access granting across federated Nodes.	Recommended
FC-9	**Application Deployment Management**	Automated deployment and execution of services across multiple federated nodes.	Recommended

[29] C.Kanellopoulos et. al., *EOSC AAI Architecture 2025 (March 2025)* https://zenodo.org/records/15388270 (last accessed 17/12/2025).
[30] Manghi, P., Athanasiou, S., Karmas, T., & Szegedi, P. (2025), *Registration of EOSC Research Product Catalogues in the EOSC EU Node (3.0)*, https://zenodo.org/records/15516020 (last accessed 17/12/2025).
[31] Manghi, P., & Bloisi, G. (2025). Registration of EOSC Service Catalogues in the EOSC EU Node (5.1). Zenodo. https://doi.org/10.5281/zenodo.17641396 (last accessed 17/12/2025)

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Table 4.3: Federating Capabilities identified during the interim phase

This list of Federating Capabilities (FC) will be further refined and extended as a result of the dialogue with the candidate EOSC Nodes during the interim phase of the EOSC Federation. Federating Capabilities can be implemented and hosted by any Node. The first two FC's are currently enabled by the EU Node. The guidelines for the FC's are published as soon as they have been reviewed and officially endorsed (see Section 4.3.2). At the time of writing the guidelines for the mandatory FC's (FC-1 and FC-2) are the only official ones (see Annex 1) but more are expected to become available in 2026.

FC-1	*Authentication and Authorisation Infrastructure (AAI)*	Mandatory

Short description: EOSC AAI is the operational framework that ensures the interoperability of the Authentication and Authorisation Infrastructure (AAI) across EOSC Nodes
Added value/benefits for the Federation: EOSC AAI enables researchers and service providers within the EOSC to authenticate and authorize users to access resources in a secure and interoperable way. It integrates with national and institutional identity providers, allowing Single Sign-On (SSO) across EOSC services.

Classification: Mandatory

The implementation of the EOSC Federation AAI is detailed in the *EOSC AAI Architecture 2025* document (see Annex 1). This document outlines the Federation's essential functionality and specifies key architectural and technical decisions. The primary objective of the EOSC AAI Federation is to establish a full-mesh, dynamic topology that avoids introducing a centralized component into the European AAI ecosystem.

Current technological constraints—particularly those involving OpenID Federation—limit the immediate feasibility of such a model. These challenges are elaborated upon in the Implementation section of the *EOSC AAI Architecture 2025* document and include interoperability across Node AAIs, the adoption of OpenID Connect and OAuth2 as core protocols, and the integration of MyAccessID.

Regarding onboarding, a service is never directly integrated into the EOSC Federation; instead, services must be onboarded to Nodes already enrolled within the Federation. From a Federation perspective, each Node is required to have at least one Infrastructure Proxy that implements the AARC Blueprint Architecture and complies with the EOSC AAI requirements. While an EOSC Node may host one or more Community AAIs, a single Infrastructure Proxy or Community AAI cannot be registered by multiple Nodes.

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Finally, it should be noted that the baseline requirements for Nodes — including compliance with EOSC AAI policies as defined in the 2025 AAI architecture document — will continue to evolve alongside the implementation of the AAI architecture itself.

FC-2	*Resource Catalogues and Registry services*	Mandatory

Short description: The *Resource Catalogues and Registry services* Federating Capability enables the discovery of and access to resources provided through EOSC Nodes within the EOSC Federation.
Added value/benefits for the Federation: It allows both users and machines (via APIs) to discover all services and resources made available across the EOSC Federation through participating EOSC Nodes.

Classification: Mandatory

Resource Catalogues and Registry Services are essential components of the EOSC Federation, supporting the creation of the Web of FAIR data and services. Through this Federating Capability, a user accessing any EOSC Node can discover and request access to all the resources and services available across the EOSC Federation. To enable this, each EOSC Node is required to expose and make discoverable its own Resource Catalogues and Registry Services profile (i.e. metadata descriptions of services) to the entire Federation.

This Federating Capability is currently implemented through a central catalogue hosted by the EOSC EU Node, which aggregates resources and services metadata from all participating Nodes. The catalogue is accessible through the EOSC Resource Hub discovery portal[32] (as well as open APIs), and supports discovery, access, and monitoring of EOSC services across the Federation.

Guidance on how to register an EOSC Node Service Catalogue in the EOSC EU Node and on how to make research product profiles discoverable through the EOSC Resource Hub, is available in the Interoperability Guideline for the *Registration of the EOSC Service Catalogues in the EOSC EU Node*[33].

In addition to registering their resources in the central catalogue, EOSC Nodes are invited to propose domain specific search engine solutions that do not rely on the centralised Resource Hub and that allow users to search for resources across one or more Nodes. These complementary discovery services will rely on the Node specific catalogues tailored to the scientific domains supported by the Node.

[32] Resource Hub, https://open-science-cloud.ec.europa.eu/resources/all, (last accessed 17/12/2025).
[33] Manghi, P., & Bloisi, G. (2025). *Registration of EOSC Service Catalogues in the EOSC EU Node (5.1)*. https://zenodo.org/records/15516020, (last accessed 17/12/2025).

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FC-3	*Federated Helpdesk*	**Recommended** (will become **Mandatory in 2026**)

Short description: The Helpdesk Federating Capability integrates the helpdesks of the EOSC Nodes within the EOSC Federation to provide a federated support channel between users and providers from nodes.
Added value/benefits for the Federation: Enable joint ticket handling across the Federation to support users and providers in cross-node use cases.

Classification: Recommended (will become Mandatory in 2026)

The federation of Helpdesks enables joint ticket handling across Nodes, facilitating cross-node use cases through the seamless interoperability of their respective support systems. The EOSC Federation ticket-handling procedure allows for the exchange of tickets between EOSC Node Helpdesk systems, specifically when a user inquiry concerns services provided by a different Node.

As of this writing, the Helpdesk Federating Capability is classified as **recommended**. However, it is considered essential for moving the EOSC Federation into production according to the *EOSC Federation 2026* roadmap. Consequently, this capability will become **mandatory**, and a formal set of Interoperability Guidelines for Helpdesks will be released in 2026.

FC-4	*Service Monitoring*	**Recommended** (will become **Mandatory in 2026**)

Short description: Provide information about the quality and availability of services and resources made available through EOSC Nodes into the EOSC Federation.
Added value/benefits for the Federation: Through the Service Monitoring federating capability, it is possible to verify whether a Node delivers services that meet the EOSC quality requirements, enabling users to make an informed selection of services based on quality and availability metrics.

Classification: Recommended (will become Mandatory in 2026)

The Service Monitoring Federating Capability has two main objectives:

1. Allow the EOSC Federation Governance to verify that the resources delivered by a Node are compliant with the minimum level of quality required by the EOSC Rules of Participation.

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2. Allow EOSC users to gather information about the quality of the resources via a common set of public metrics/KPIs (e.g. uptime, availability)[34].

The Service Monitoring Federating Capability will be implemented by establishing a central Monitoring Repository that aggregates data from all participating Nodes. Each Node must implement a standardized Interface to periodically publish a basic set of metrics/KPIs (e.g., uptime, availability, usage) to the repository. This data must adhere to a predefined Metric Profile to ensure interoperability.

As of this writing, the Monitoring Federating Capability is classified as **recommended**. However, it is considered essential for moving the EOSC Federation into production according to the *EOSC Federation 2026* roadmap. Consequently, this capability will become **mandatory**, and a formal set of Interoperability Guidelines for Monitoring will be released in 2026.

FC-5	*Service Management System*	**Recommended** (will become **Mandatory in 2026**)

Short description: The EOSC Federation FitSM-based[35] Service Management System. This will define the essential processes between EOSC Nodes to enable efficient IT service management within the EOSC Federation. These processes are essential for a functional EOSC Federation and to manage expectations between EOSC Nodes and between users and providers.
Added value/benefits for the Federation: Harmonised IT service management across Nodes that leads to a uniform user experience within the EOSC Federation.

Classification: Recommended (will become Mandatory in 2026)

The Service Management System focuses on managing the services of the EOSC Federation across nodes. The EOSC Federation Management System is a FitSM-based Service Management System (SMS) that federates the SMS processes of EOSC Nodes to coordinate the delivery of the EOSC federating capabilities. It covers a minimal set of processes while relying on each Node's own SMS for the remaining processes, ensuring a balance between centralised oversight and decentralised autonomy across Nodes. This approach guarantees harmonised IT service management throughout the Federation, resulting in a consistent user experience across the EOSC Federation.

Notably, SMS implements a Continual Improvement process[36] to perform regulatory compliance checks against the EOSC Interoperability Framework, a Change Management

[34] KPIs and related target values will be defined by the Operations Committee.
[35] FitSM lightweight IT service management: https://www.fitsm.eu/, (last accessed 17/12/2025).
[36] Continual Improvement process - https://en.wikipedia.org/wiki/Continual_improvement_process, (last accessed 17/12/2025).

process to coordinate updates to the federating capabilities across the entire Federation, and an Information Security Management process to support Security Coordination between Nodes. User-facing processes that enhance the experience of users accessing resources from multiple Nodes complete the Management System (e.g. Customer Relationship Management and Incident and Service Request Management).

As of this writing, the Service Management System Federating Capability is classified as **recommended**. However, it is considered essential for moving the EOSC Federation into production according to the *EOSC Federation 2026* roadmap. Consequently, this capability will become **mandatory**, and a minimum set of Service Management System guidelines will be released in 2026.

FC-6	*Services Accounting*	Recommended

Short description: Provide information about the usage of services offered by EOSC Nodes within the EOSC Federation.
Added value/benefits for the Federation: Enables monitoring of resource consumption (CPU, storage, network, licenses, etc.) and supports cost attribution and allocation to end-users and research projects. It also facilitates the implementation of usage policies and capacity planning at Federation level, enhancing cross-Node coordination and efficient resource management.

Classification: Recommended

The Service Accounting Federating Capability delivers consistent tracking of service usage across Nodes, enabling:

1. **Monitoring and reporting**: track resource consumption and provide reports for EOSC Federation managers, users, and other stakeholders.
2. **Capacity planning**: support decisions on infrastructure investments and the evolution of services based on historical and projected usage.
3. **Budget planning**: facilitates cost allocation by assigning value to resource usage units.
4. **Policies implementation**: enable the definition and monitoring of allocation policies at the Federation level.

Service Accounting Federating Capability efficiently collects, aggregates, and exchanges usage metrics across EOSC Nodes. It allows seamless integration of EOSC Node accounting data and offers an interface for EOSC stakeholders and end-users to access usage information for specific time periods. The system also supports the definition of custom metrics to accommodate the diverse range of services offered across the EOSC Federation.

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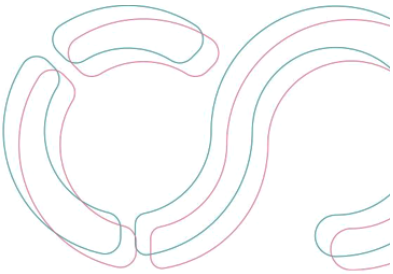

As of this writing, this Federating Capability is classified as recommended, and it will remain so in the roadmap of the EOSC Federation 2026 for the transition of the EOSC Federation to production. The corresponding Interoperability Guideline will be released when it is established within the EOSC Federation.

FC-7	Research Product Accounting	Recommended

Short description: Provide information about the usage of research products made available through EOSC Nodes in the EOSC Federation.
Added value/benefits for the Federation: Enable measurement of the impact of the research products by generating standardized usage metrics.

Classification: Recommended

The EOSC Research Products Accounting collects usage activity from EOSC services that host collections of research products, like articles, books, datasets, etc. and include data repositories, software repositories, and publication repositories. The service generates comprehensive usage metrics of these data sources, categorizing the data retrieved by number of downloads, number of views, number of repositories and other derivative quantitative open metrics.

Providers making data sources available in the EOSC Federation, including EOSC Nodes, can participate in the Research Products Accounting Federating Capability following its Interoperability Guidelines[37]. These guidelines specify methods and standards for collecting and processing usage data, ensuring the generation of comparable, standardised, and Federation-wide usage statistics.

As of this writing, this Federating Capability is classified as recommended, and it remains so in the roadmap of the EOSC Federation 2026 for the transition of the EOSC Federation into production. The corresponding Interoperability Guideline will be released when the Research Product Accounting Federating Capability is established within the EOSC Federation.

FC-8	Order Management	Recommended

Short description: The Order Management Federating Capability provides a framework that allows providers and users to manage the full lifecycle of service and resource requests including granting access across federated Nodes. Providers can define service and resource offers and manage users requests to access resources, while users can submit, track, and manage orders for services and resources made available through the EOSC Federation.

[37] Not yet available

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Added value/benefits for the Federation: Simplifies and harmonises the process of ordering and granting access to services and resources across multiple Nodes, improving usability for users and operational efficiency for providers.

Classification: Recommended

The EOSC Order Management consists of a set of services, processes, and guidelines that facilitate an integrated and coherent ordering process for services and resources in the EOSC Federation. It provides users with a consistent end-to-end journey from resource discovery to access provisioning, while enabling providers to efficiently manage requests and allocations.

Through this Federating Capability, providers can integrate their local order management systems and align their operational processes with those adopted by EOSC Nodes. At the same time, EOSC Node order management systems and processes are aligned with the Order Management Federating Capability at the Federation level. This enables seamless communication between EOSC Nodes and providers, supporting efficient order management, access provisioning, and resource composability across the Federation.

As of this writing, the Order Management Federating Capability is classified as recommended, and it remains so in the roadmap of the EOSC Federation for 2026 for the transition of the EOSC Federation to production. The corresponding Interoperability Guideline will be released when the Order Management Federating Capability is established within the EOSC Federation.

FC-9	*Application Deployment Management*	Recommended

Short description: Automated deployment and execution of services across one or more federated nodes.
Added value/benefits for the Federation: Facilitate service deployment and data analysis through a standardised API for accessing compute and storage resources offered by the EOSC Nodes.

Classification: Recommended

The federation of Application Deployment Management[38] (ADM) will enable EOSC users to easily deploy and/or execute applications seamlessly across one or more Nodes. Researchers can discover application recipes and trigger their deployment or execution on an EOSC Node where suitable resources are available. Nodes participating in the ADM federation expose a standardised API, as will be defined in the (still to be written) ADM Interoperability Guideline. This API will allow users to programmatically discover EOSC Nodes offering ADM services,

[38] Application Deployment Management, previously referred to as Application Workflow Management (AWM), has been renamed to avoid confusion with Scientific Workflows (see Section 5.2.5)

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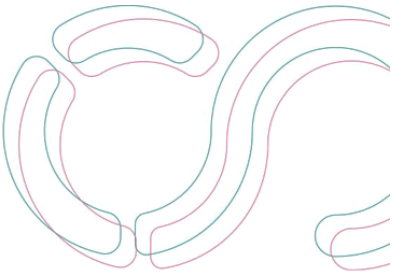

inspect available resource allocations on a remote node, and identify the application recipes they wish to deploy.

Each Node will be able to implement the ADM service using the technology of its choice while retaining full control over its compute infrastructure, enforcing local policies and security constraints through its own ADM service instance. The ADM Federating Capability will not require any central components, so that when a new Node joins the ADM federation, no changes are required from existing Nodes. This Federating Capability will enable new analysis models within the EOSC Federation, such as bring-your-own-compute (BYOC), allowing application recipes to be reused on community-owned or locally managed computing infrastructures.

As of this writing, the Application Deployment Management Federating Capability is classified as recommended, and remains so in the roadmap of the EOSC Federation 2026 for the transition into production. The corresponding Interoperability Guideline will be released when this Federating Capability is established within the EOSC Federation.

4.3.2. Extending the initial set of Federating Capabilities

The initial set of Federating Capabilities is expected to evolve during the Federation's interim phase to support more complex use cases that reflect the needs of the EOSC Node users. Various initiatives and EOSC related projects are currently developing new Federating Capabilities designed to strengthen the ecosystem. A comprehensive overview of these efforts has been published by the EOSC-A Technical and Semantic Interoperability Task Force[39]. This document utilizes a gap analysis of technical interoperability—informed by real-world scientific use cases and user stories—to propose enhanced or new capabilities and technical solutions that foster an integrated, user-centric research environment.

New Federating Capabilities may be defined by the EOSC Federation Governance based on requirements of users, research communities, Nodes, funders, and other stakeholders. Alternatively, they may be proposed by the EOSC Nodes themselves, following established governance procedures.

The decision to adopt a new Federating Capability rests with the EOSC Federation Governance body. This body is responsible for:

- Determining whether a capability is mandatory, recommended, or optional.

[39] D. Scardaci et al. (2025), *Technical interoperability in the EOSC Federation and initial gap analysis*, https://zenodo.org/records/17507570 (last accessed 17/12/2025). For more information on the Technical and Semantic Interoperability Task Force of the EOSC Association, see https://eosc.eu/advisory-groups/technical-and-semantic-interoperability-task-force/ (last accessed 17/12/2025)

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- Tasking suitable providers with the design and implementation of the required Federating Services and Interfaces.
- Finalising Service Level Agreements (SLAs) with the EOSC Nodes selected for operation.

During the interim phase (2026-2027), the *Interim EOSC Node Coordinator Committee*, supported by the *Interim EOSC Node Operations Committee*, governs the portfolio of Federating Capabilities.

4.3.3. Examples of EOSC Federating Capabilities

In parallel to the establishment of the first EOSC Nodes during the current interim phase, the first Federating Capabilities were implemented by the first wave EOSC Nodes to demonstrate the added value of the Federation via cross-node use cases. Figure 4.4 shows how the EOSC Federation Architecture and Federating Capabilities have been deployed to implement some of the use cases. In particular, it shows those Federating Capabilities classified as mandatory in 2025, i.e. AAI Federation and Federated Catalogues, as well as federating a Node Generic Capability (File Sync & Share), for two cross-Node use cases (out of the six use cases that were being tracked by the Build-up Group). The aim of the diagram is not to represent the full complexity of the Federation but to show with examples how Federating Capabilities will enable services deployed by the EOSC Nodes.

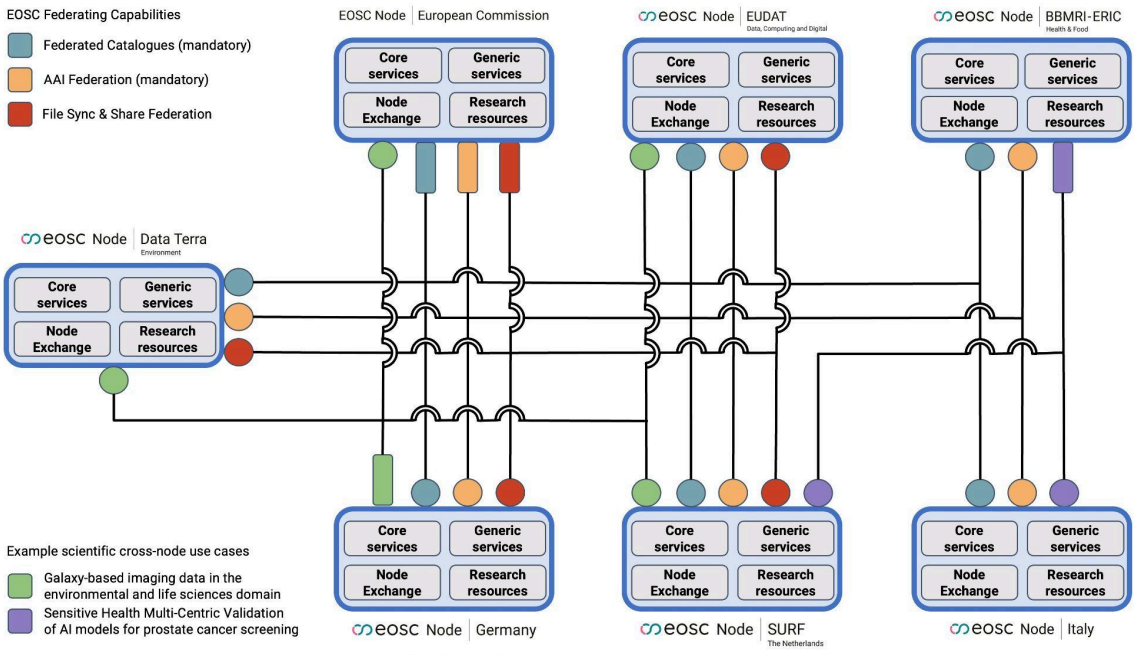

Figure 4.4: Schematic of EOSC Nodes interconnecting through Federating Capabilities to support two cross-node use case examples during the build-up phase.

The EOSC Nodes have developed six use cases to demonstrate the added value brought by the EOSC Federation to scientific work. The use cases, listed in Table 4.4, represent concrete examples of services across two or more EOSC Nodes and are thus indicative of how interdisciplinary and cross-border science will be boosted by the Federation.

Use case	Short description	Nodes involved
Marine microbiomes	Exploring the impact of marine microbiomes on carbon sequestration	EOSC-DTO, EOSC-LSC, EOSC-IT, EOSC-PL, EOSC-Data Terra
Reana	Cross-node workflow for the analysis of CERN's ATLAS/CMS experiment's open data on the REANA data platform.	EOSC-FI, EOSC-SURF(NL), EOSC-EU-Node, EOSC-IT, EOSC-PL, and CERN (nascent)
Galaxy*	Cross-node workflow for the processing of imaging data from the environmental and life sciences using the Galaxy platform	EOSC-CERN, EOSC-Data Terra, EOSC-EUDAT, EOSC EU Node, EOSC-PL, EOSC-LSC, EOSC-DE(nascent), EOSC-SURF(NL)
PaN-Finder	The Photon and Neutron federated knowledge finder, PaN-Finder, an AI-enabled data search tool for navigating the large data sets of European Research Infrastructures	EOSC-PaNOSC, EOSC-DE(nascent)
MCVAL*	A prostate cancer screening tool, MCVAL, that employs multi-centric validation of AI models	EOSC-IT, EOSC-SK, EOSC-PL, EOSC-SURF (NL), EOSC-FI
AMR	Federated analysis of pathogen genomes	EOSC-SK, EOSC-PL
* Cross-node use cases displayed in figure 4.4.		

Table 4.4: Overview cross-node use cases implemented during the first EOSC Federation build up phase

4.4. The EOSC Interoperability Framework

To enable users to interact with resources from different providers and/or different EOSC Nodes as seamlessly as possible, the EOSC Federation requires the Nodes to implement the interoperability standards endorsed by the Federation. These will be described in the **EOSC**

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Interoperability Framework (EOSC IF)[40], a key part of the EOSC Federation Architecture that compiles standards, and EOSC Federating Capabilities guidelines accepted by the Federation for the interoperability and composability of resources offered by the EOSC Nodes.

The EOSC IF is made up of the following three components:

- the **EOSC Interoperability Guidelines (EOSC IG)**, which detail the mechanisms for communication between nodes, and the procedures to connect the Nodes to the Federating Capabilities of Section 4.3;
- the **EOSC Interoperability Registry** that registers the EOSC IGs promoted in the EOSC Federation;
- the **EOSC IF Governance** that oversees and manages the evolution of the EOSC IF.

The term **Framework** refers to the fact that the EOSC IF is the result of combining the three elements into a unified approach to interoperability, following the model of the European Interoperability Framework[41].

The EOSC IGs define the mechanisms for inter-operation at various levels of integration, from which a Node joining the EOSC Federation can select the best option that fits its needs. The EOSC IF is thus not normative in that it offers the freedom to Providers and Nodes to develop and operate Provider- or Node-specific implementations as long as they conform to the EOSC IF guidelines and standards.

Currently (end of 2025) the EOSC Interoperability Framework is not complete. The Resource Hub[42] of the EOSC EU Node proposes some basic descriptions of Interoperability Guidelines[43]. To support the mandatory Federating Capabilities, the EOSC Federation build-up sub-groups on the *Federated AAI* and *Service Catalogues, Interoperability & Integration* have developed Interoperability Guidelines for the *AAI* and *Resource Catalogue and Registry Services* Federating Capabilities. Additional Interoperability Guidelines will be developed during the interim phase. The same applies to the EOSC Interoperability Governance and Registry. These will be further developed during the transition to production. The EOSC United project[44] will

[40] See D. Scardaci et al. (Technical Interoperability of Data and Services Task Force) (2023), *A landscape overview of the EOSC Interoperability Framework - Capabilities and Gaps*: https://zenodo.org/records/8399710 (last accessed 17/12/2025), and M. Williams et al. (2023), EOSC Future D3.2b: *EOSC Architecture and Interoperability Framework,* https://bit.ly/EOSC-architecture-and-interoperability, (last accessed 17/12/2025).

[41] See e.g. *The New European Interoperability Framework* https://ec.europa.eu/isa2/eif_en/ (last accessed 17/12/2025) adopted in 2017, now superseded by the Regulation (EU) 2024/903, adopted on 11 April 2024. For more details see Interoperable Europe https://interoperable-europe.ec.europa.eu/interoperable-europe (last accessed 17/12/2025).

[42] https://open-science-cloud.ec.europa.eu/resources/all, (last accessed 17/12/2025)

[43] https://open-science-cloud.ec.europa.eu/resources/interoperability, (last accessed 17/12/2025)

[44] https://eosc.eu/eosc-united/, (last accessed 17/12/2025).

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support the establishment of the EOSC IF Governance, whereas EOSC Beyond will focus on the technical delivery of the enhanced registry[45].

4.5. The EOSC Node Services Management Systems

To ensure high-quality provision of services, EOSC Nodes are required to have a Service Management System (SMS) in place that complies with accepted standards like FitSM (see footnote 36) or ISO-20000-1[46] that is compatible with the best practices contained in the Information Technology Infrastructure Library (ITIL)[47]. The SMS will contribute to ensure that each Node respects the service levels agreed with the EOSC Federation Governance, as well as those defined internally by the Nodes with service providers. The service levels are expected to cover all aspects of service performance management across all components of the Nodes, including:

- Service provisioning,
- System integration,
- Performance monitoring,
- Support and coordination activities,
- Service quality,
- Change Management.

EOSC Nodes that do not already have an SMS in place are recommended to adopt the FitSM standard. FitSM was developed to ensure a seamless experience when integrated services are provided by multiple providers and is particularly suited to the federated nature of service delivery in the EOSC Federation. FitSM has been adopted as the IT Service Management standard in the EOSC EU Node and is compatible with both ISO-20000 as well as with ITIL. The SMS of the EOSC EU Node can be used as a reference by EOSC Nodes.

4.6. EOSC Node Cybersecurity

EOSC Nodes must ensure that their operations, as well as those of their service providers, comply with all applicable cybersecurity regulations, policies, standards, and guidelines relevant to their activities, operations, and services. Clear security controls defining roles, responsibilities, procedures, and best practices must be established and implemented based on a documented risk assessment.

[45] Bardi A. et al. *EOSC Beyond D13.2 First report on EOSC Execution Framework Architecture and capabilities*. https://zenodo.org/records/17234674
[46] https://www.iso.org/standard/70636.html, (last accessed 17/12/2025).
[47] https://www.axelos.com/certifications/itil-service-management/what-is-itil/. (last accessed 17/12/2025)

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Any non-compliance with the Node security policy or relevant regulations must be promptly handled and reported to **security@eudat.eu**. Incidents must be promptly handled and reported to **csirt@eudat.eu**.

In particular, EOSC Nodes must:

- Implement a comprehensive framework that ensures effective control of security aspects, covering participating services, users, and other related parties. This framework must align with the ISO/IEC 27001[48] standard and European information security regulations, considering the distributed, heterogeneous nature of the EOSC. As part of the risk management process, policies and procedures necessary for the security framework should be built and maintained implementing an adequate Risk Management methodology. The IT Security Risk Management Methodology of the European Commission (ITSRM[49,50]) is recommended for adoption.
- Conduct regular risk assessments to identify and evaluate potential threats, vulnerabilities and risks that could affect services in terms of their availability, integrity, and confidentiality of processed data. Implement appropriate technical and organisational measures, such as vulnerability scans, penetration testing, encryption, network segmentation, logging, automation, authentication, hardening, access control, and monitoring to prevent and minimise the impact of incidents.
- Regularly monitor and assess the security posture of their Node to identify risks and to enhance protective measures. Conduct periodic reviews to ensure compliance and drive continuous improvement.
- Provide a Computer Security Incident Response Team (CSIRT) capability to ensure security incidents are investigated, tracked, and properly resolved according to established guidelines and tooling. Guidelines, tooling, forensics expertise and investigation capabilities to investigate a security incident should be provided, all incidents should be tracked, and a final report should be produced on their resolution.
- Provide adequate Access Control mechanisms via an EOSC Federation compliant Federated Authentication and Authorization Infrastructure (AAI) and Single-Sign-On (SSO) solutions.

[48] *ISO/IEC 27000 family - Information security management*, https://www.iso.org/standard/iso-iec-27000-family, (last accessed 17/12/2025).
[49] Interoperable EU Risk Management Toolbox, https://www.enisa.europa.eu/publications/interoperable-eu-risk-management-toolbox (last accessed 17/12/2025)
[50] IT Security Risk Management Methodology v1.2, https://indico.cern.ch/event/1459614/contributions/6145690/attachments/3046562/5383183/ITSRM%20Methodology%20v.1.2%20-%20Description.pdf, (last accessed 17/12/2025).

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- Organise Training and increase awareness: provides stakeholders with ongoing education on security best practices and regulatory compliance.

Nodes must align with and refer to the outputs of the EOSC Federation Cybersecurity Working Group (once they have been reviewed and endorsed), and evolving documentation on the implementation of data protection.

4.7. EOSC Node Data Protection

Nodes must clarify their specific role under the **EU General Data Protection Regulation** (GDPR) (e.g. **Data Controller, Data Processor,** or **Third Party**) for the services they offer and implement the corresponding legal requirements. For international organisations where GDPR does not directly apply, equivalent safeguards to ensure compliance must be implemented. The following specific compliance points must be implemented:

- Data Minimisation: Process and store only personal data strictly necessary for intended operations, following GDPR principles.
- Ensure protection of data In-Transit and At-Rest by measures for encryption, access controls and risks assessments.
- Privacy by Design and by Default: Ensure that systems and processes embed safeguards from the outset (e.g. logging, pseudonymisation or anonymisation, limitation of storage) and are regularly tested and assessed for effectiveness.
- Assist Data Controller to respond to data subject rights requests, in audits, and to conduct Data Protection Impact Assessments.
- Report personal data breaches without undue delay to the Data Controller.
- When processing special categories of personal data, appropriate conditions and additional safeguards must be applied based on impact assessments.

EOSC Nodes must align with the evolving EOSC Federation documentation on the implementation of data protection.

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5. Research Resources

This chapter describes the categories of ready-to-use services and resources for researchers to be integrated in the EOSC Federation via the EOSC Nodes, and what the requirements are to be part of the EOSC Federation.

5.1. Research Resources Categories

The following table defines the categories of Research Resources for the EOSC Federation. All resources are expected to be referenced by a PID following the FAIR principles as best as possible.

Resource	Category	Description
Research Publications	Publications	Textual output of scientific research that enables to be used in new research or to verify research findings; it encompasses principally all peer reviewed publications in scientific journals, but includes other, non-peer reviewed cases such as preprints
Research Data sources	Sources	Sources where data can be found and retrieved, offering APIs or direct access to data searches across various query fields. Data repositories and archives, knowledge bases and scientific databases fall into this category
Research Data	Data	Data and associated metadata created or collected as a part of scientific research or of relevance to scientific research
Research Software	Software	Source code, algorithms, scripts, computational workflows, and executables that were created during the research process or for a research purpose
Research Tools	Software	Analytical, visualisation and other types of tools to aid in the interpretation, transformation and presentation of data. Tools may include dashboards, plotting software, data anonymization software and machine learning frameworks
Research Services	Services	Services that provide management, processing, and storage capabilities for research data and metadata. These may include DMPs, data cleaning, transformation, analytics, and computational power to support large-scale studies

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Resource	Category	Description
Research Training	Mentoring	Educational resources designed to improve data literacy, technical skills, and knowledge of best practices in all aspects relevant to the EOSC. This includes structured courses and schools, webinars, and hands-on workshops
Research Interoperability guidelines	Documentation	Guidelines to ensure compatibility and seamless data exchange between systems. This category includes metadata standards, data-sharing protocols, and frameworks for harmonizing metadata and data formats
Research Competence Centres	Mentoring	A Competence Centre (CC) is a virtual hub dedicated to fostering research excellence through training and knowledge transfer. In Open Science, CCs are community-based initiatives supported by a collaborative network of people who provide expertise, best practices and services on relevant topics and promote cross-disciplinary collaboration
Research Resources and Services Discovery	Discovery	Search engine for research resources and services tuned for researchers

Table 5.1: Resource Categories

5.2. Research Resources

The EOSC aims to promote the **Web of Data and Services** as a premier environment for discovering FAIR digital resources for scientific research. Consequently, an essential component of the EOSC Federation will be FAIR data alongside any other FAIR Digital Objects[51]. This section outlines the definitions and requirements for onboarding each category into the EOSC Federation.

5.2.1 Research publications

Research (or scientific) publications constitute a major output of scientific research. These are typically published by journals and referenced via Persistent Identifiers (PIDs). The EOSC Federation will automatically reference these publications through OpenAIRE making them searchable via the EU Node resource catalogue. In instances where a Node operates its own

[51] For a definition of **FAIR Digital Object** see e.g. K. De Smedt et al. (2020), *FAIR Digital Objects for Science: From Data Pieces to Actionable Knowledge Units,* Publications 8, 21; https://www.mdpi.com/2304-6775/8/2/21 (last accessed 17/12/2025).

publishing and/or publication discovery services, these services should be onboarded by the Node and made accessible via the EOSC AAI.

Finally, it is strongly recommended that research outputs are published via Open Access in Open Journals whenever possible.

5.2.2 Research Data Sources

The EOSC Federation aims to provide researchers with an open and trusted multi-disciplinary environment where they can publish, find and reuse data, tools and services for research and innovation[52]. Onboarding research data repositories to the EOSC Federation creates a web of FAIR and trustworthy data, enabling European researchers to collaborate effectively on shared challenges. Ensuring data is FAIR and integrated into machine-actionable workflows will allow and enhance the scientific endeavour. Workflows can be deployed across one or more EOSC Nodes.

Within the EOSC Federation, research data sources — including both repositories and databases — are classified as EOSC services. Data provided by these sources to the federation should adhere to the following principles:

- As open as possible and as closed as necessary,
- FAIR, by acknowledging the FAIR principles and implementing them in a way that is fit for both their own communities and the general EOSC user community, and
- Trustworthy, by implementing the requirements for trustworthy data repositories, preferably certified by a community-endorsed certification scheme such as CoreTrustSeal[53], Nestor Seal[54] or ISO 16363 certification[55].

[52] https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/our-digital-future/open-science/european-open-science-cloud-eosc_en (last accessed 17/12/2025).
[53] Core Trust Seal, https://www.coretrustseal.org/ (last accessed 17/12/2025).
[54] https://www.langzeitarchivierung.de/Webs/nestor/EN/Zertifizierung/nestor_Siegel/nestor_siegel_node.html (last accessed 17/12/2025).
[55] Equivalent to *Recommended practice CCSDS 652.0-M-1* from the Consultative Committee for Space Data Systems, https://public.ccsds.org/Pubs/652x0m1.pdf (last accessed 17/12/2025).

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While various EOSC-related projects provide valuable guidance for implementing and assessing these principles,[56,57,58] the EOSC Federation has not yet established a formal policy for their implementation[59].

Data sources need to be onboarded via one or more EOSC nodes and be registered with the EOSC Resource Catalogue as described by FC-2 in Section 4.3.1. Each EOSC Node may impose additional requirements for data sources.

5.2.3 Research Data

Research data are provided by the Research Data Sources (see Section 5.2.2) and are the evidence that underpins the answer to research questions. Research data can be used to validate findings regardless of its form (e.g. print, digital, or physical). These might be quantitative information or qualitative statements collected by researchers in the course of their work by experimentation, observation, modelling, interview or other methods, or information derived from existing evidence or outputs underpinning previous research. Data may be raw (e.g. direct from measurement or collection) or processed (i.e. derived from raw data for subsequent analysis or interpretation. Data may be defined as relational or functional components of research, thus signalling that their identification and value lies in whether and how researchers use them as evidence for hypotheses.

The EOSC Federation supports a diverse array of data types to foster a multidisciplinary Web of FAIR Data, including but not limited to: statistics, digital image collections, sound recordings, interview transcripts, survey data, fieldwork observations with annotations, artworks, organisational or personal archives, found objects, text corpora, and manuscripts. By integrating these resources into workflows running on the same Node or across multiple Nodes, the Federation enhances the transparency and impact of the scientific endeavor.

[56] Rouchon, O. et al. (2024). *D6.2 - Core metadata schema for legal interoperability (Version v1).* https://doi.org/10.5281/zenodo.11104269 (last accessed 17/12/2025).
[57] Bardi, A. et al. (2023). *EOSC IF Interoperability Guideline: Access to content via PID (2.1).* https://doi.org/10.5281/zenodo.8318608 (last accessed 17/12/2025).
[58] van Horik, R., & Hugo, W. (2024), FAIR-IMPACT D3.3: *Guidelines for creating a user tailored EOSC Compliant PID Policy (V2.0)*. https://doi.org/10.5281/zenodo.14092489 (last accessed 17/12/2025).
[59] Work is ongoing in the EOSC-A Task Force on FAIR for defining the EOSC policy on implementing FAIR principles https://eosc.eu/advisory-groups/fair-metrics-and-digital-objects-task-force/ (last accessed 20/12/2025)

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5.2.4 Research Software

Research Software is defined[60] as source code files, algorithms, scripts, computational workflows, and executables created during the research process or for a research purpose. The EOSC Federation recognises that software plays a critical role in the scientific process to collect, process and interpret data. Software should be developed following best practices for scientific software and be managed in a version control software system (e.g. Git[61]) and registered in a software catalogue. EOSC Nodes are recommended to register their software catalogues as a service in the EOSC Federation to make them findable through the EOSC Federated Catalogue. The EOSC Federation recommends EOSC Nodes providing Research Software to follow the guidelines for software metadata developed by the FAIR-IMPACT project (see **Research Software Metadata Guidelines (RSMD)** in Annex 1).

5.2.5 Research Services and Tools

Research services are services dedicated to supporting research e.g. Virtual Research Environments (VREs), data processing, management, and inference services. Tools refer to (mostly) software which researchers have to know or learn how to use on their own. Researchers often require a diverse set of tools to help them in their daily research-related tasks, including writing, maintaining, packaging and sharing software, using workflows to process, publish and share data, etc. and those offered with a service level support, i.e. as managed services, qualify as services. A common set of services needed for conducting research efficiently will be made available via the EOSC Federation include the following:

- **Notebooks:** widely used for processing data. The EU Node offers a generic Jupyter Notebook execution service. Nodes offering Notebook services should offer virtual environments customised for the research domain(s) they serve with direct access to research data to avoid having to move them especially if they are large data.
- **Workflow engines:** many scientists make use of workflows to process data. Workflows are more high-level than notebooks and often do not require programming skills. They are executed by so-called workflow engines. Many different workflow engines exist, and scientific domains and EOSC Nodes will have their preferred workflow engine(s). Nodes should provide workflow engine services close to the research data such that data does not need to be moved and the results can be archived and be made persistent.

[60] Gruenpeter, M. et al., 2021. *Defining Research Software: a controversial discussion.* https://zenodo.org/records/5504016 (last accessed 17/12/2025).
[61] Git https://git-scm.com/ (last accessed 20/12/2025)

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- **Virtual Research Environments:** temporary compute environments that contain tools and data, enabling researchers to work interactively and remotely[62]. They may include services like Notebooks, Workflows, etc. They offer a complete desktop environment with the relevant scientific software. Nodes should provide direct access to data.
- **Digital Publishing Services:** used across disciplines for all parts of the research process. The service can be part of a workflow, including one or more repositories, metadata interfaces and data management consultation.
- **Other:** Nodes will offer other services for scientific products depending on the needs of their community. Services which include access to experimental facilities are currently not considered as part of the EOSC Federation.

All federated Research Services must be accessible either anonymously or through an EOSC compliant AAI (cf. Chapter 4) in accordance with documented User Access Policies. The capacity of the services must be sufficient for the number of active user sessions foreseen when the Node enrolled.

5.2.6 Research Training

Training material for research services and other services is essential for scientists to use them properly. Training material should be made available as an integral part of service delivery and discoverable via thematic domain/national/institutional training platforms.

EOSC Nodes are encouraged to have domain-specific training platforms where domain specific training materials are registered and findable. EOSC Nodes should register training platforms with the EOSC Federation so they can be made findable. In the future, user needs should be gathered to the benefits of a central EOSC training registry.

Inclusion criteria for training resources

In addition to meeting the common inclusion criteria to onboard all resource types, these criteria must be met to onboard training resources:

- Specify the learning outcomes, resource type (e.g. recorded lesson, textbook, activity plan, etc.), content resource type (e.g. video, slides, audio, etc.), and estimated duration (e.g. estimated work hours).

[62] Virtual Research Environments, https://www.uu.nl/en/research/research-data-management/tools/software-and-computing/virtual-research-environments (last accessed 17/12/2025)

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- Be in at least one of the European languages[63] except for metadata information, which shall be available in English.
- Incorporate information about the expected level of training and expertise to be achieved (beginner, intermediate, advanced, all) and required qualifications to access the training resource.

Providers are encouraged to use the Quality Assurance Certification Framework produced by Skills4EOSC[64].

5.3. Research Interoperability guidelines

In order to enable seamless exchange of research resources across repositories intra- and inter-disciplines, thus fulfilling the Interoperability pillar of FAIR, standard protocols, metadata and ontologies are needed to ensure compatibility among systems. The key to making datasets, tools and services interoperable is standardisation[65]. Standards should always be informed by a set of clear science goals to be fulfilled. To this end, they are expected to be domain-specific and developed within technical working groups of the target science community. It is likely that a layered architecture is required to connect the resources layer to the users in a seamless and transparent manner. The EOSC Federation Interoperability Guidelines will follow recommendations of community standards for interoperability and implementing FAIR guidelines.

5.4. Research Competence Centres

Scientific communities are key to the EOSC Federation. They have the expertise necessary to carry out research in their domain as well as process, manage and analyse research data. The competences held within communities are therefore essential for the progress of science and are especially relevant for scientists who are beginning their career or are new to the domain and want to reuse data. EOSC Nodes are encouraged to create Research Competence Centres to gather competences necessary to use their services and data and make them available to users of the EOSC Federation. Established Research Competence Centres are encouraged to join the Competence Centre Network created in the Skills4EOSC[66] project. As the Federation develops, common understandings of Competence Centres and their relationships to Nodes will be defined, taking into consideration other existing centres (national, thematic, institutional) developed outside of the EOSC.

[63] https://european-union.europa.eu/principles-countries-history/languages_en (last accessed 17/12/2025).
[64] https://www.skills4eosc.eu/resources/quality-assurance-certification-framework (last accessed 17/12/2025).
[65] An example is the Virtual Observatory Alliance - https://www.ivoa.net/ (last accessed 17/12/2025).
[66] https://www.skills4eosc.eu/network/competence-centres (last accessed 17/12/2025).

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5.5. Research Resource and Service Discovery

Users need services to discover (search and find) research resources (including services) of their interest available in the EOSC Federation. Discovery is provided by catalogues and search engines and can be provided on all levels:

- EOSC Nodes are strongly recommended to provide a catalogue and a search engine to enable discovery of their scientific resources and services both to its local community as well as to users from other Nodes. See Section 4.2.1.
- The EOSC Federation will provide EOSC-wide search across all the resources and services using the metadata provided by each Node. The search engine will point users to the Research Data Sources where the resources of interest can be found. During the interim phase, the EOSC-wide search is provided by the EOSC EU Node in the form of a Resource Hub (see footnote 33). For more information, see the federating capability Resource Catalogues and Registry Services in Section 4.3, FC-2.

The objective of the EOSC Federation (see Section 1.1) implies the following high-level principles concerning Resource and Service Discovery:

- **Community-driven**: Domain knowledge is best and sometimes only understood by the domain experts. EOSC Nodes are thus expected to provide discovery in a way that meets the specific needs of their community, and requirements by the EOSC Federation should take these existing needs into account.
- **FAIR**: The FAIR principles for Findability[67] require usage of Persistent Identifiers (PIDs) and provision of rich metadata, to be registered and indexed in relevant catalogues.
- **User oriented**: To support researchers with discovery across EOSC Nodes, it is recommended that they contribute to an optimal user experience for cross-node discovery, e.g. by designing their landing page with a recognizable look-and-feel and by aligning with the categories as described in Section 5.1 for discovery, also taking into account the existing look and feel of their own community.

EOSC Nodes are required to register their resources and services in the Resource Catalogues and Registry Services Federating Capability of the EOSC EU Node (see Section 4.3).

[67] Findability is strongly related to the availability of metadata, and can be divided into four sub-principles, see e.g. https://www.go-fair.org/fair-principles/.

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6. Joining the EOSC Federation

The EOSC Federation is being built as a collaborative project between the European Commission, Member States of the European Union and countries associated with Horizon Europe, the EOSC Association, and the EOSC Nodes. The requirements for EOSC Nodes are being refined as the interim phase (2025-2027) progresses. This section defines the current state of the process and will be updated in forthcoming versions of the Handbook to reflect new developments. For the latest up-to-date information, readers should refer to the EOSC Association's website (https://eosc.eu).

6.1. Interim phase of the EOSC Federation

The building of the EOSC Federation follows a phased approach, by adding nodes in a succession of phases or **waves**. For the first wave of Candidate EOSC Nodes, the requirements to become a Node were defined mid-2024 with a call to the community for expressions of interest. A selection process was set up by the Tripartite Governance to select the first group of Nodes by assessing the capacity of each candidate. A total of 13 nodes were selected out of the proposals submitted by organisations and consortia, in addition to the EOSC EU Node, in early 2025 to form the nascent EOSC Federation (also referred to as the Build-up Group). At the end of 2025, a new call was launched for a second wave of nodes. The second wave of nodes to be selected are expected to join the EOSC Federation in 2026. The Federation is planned to go into production by the end of 2026 with EOSC Nodes that are production ready.

6.2. Applying to become an EOSC Node

The selection of the next wave of EOSC Nodes will be carried out in spring 2026 based on the proposals submitted by the deadline. The details of the call and which documents to submit are described in the call document[68]. The Tripartite Governance will make the selection of the second wave of EOSC Nodes to complement the list of countries, regions and thematic domains covered by the first wave of nodes. Candidate nodes need to submit all the required documents. Generally, EOSC Nodes need to comply with the requirements summarised here:

1. **Goals:** define the goals and type (thematic, national, e-infrastructure) of the future Node and what services and data it will offer; the goals must be shared by all the Node partners.

[68] https://eosc.eu/wp-content/uploads/2025/11/20251103_EOSC-Tripartite-Governance_Enrolment-call-documents.pdf

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2. **Documents:** project charter, endorsement letters, acknowledgement of corresponding authorities.
3. **Legal status:** the organisation responsible for the EOSC Node (*the host*) must be a public-benefit or not-for-profit legal entity (located in an EU Member State or an Associated Country) with legal personality and full legal capacity recognised in all Member States and Associated Countries, or an intergovernmental research organisation of European interest, in order to be able to conclude agreements with other partners that take part in the activities of the Node (e.g. providers who make their data or services available to the EOSC through the Node), with other Nodes, or with the organisation that may represent the EOSC Federation in the future.
4. **Scope:** EOSC Nodes must indicate their scope, which may be national or multinational (considering the geographical location of its constituents), thematic (i.e. domain-specific), or comprise European e-infrastructures.
5. **Nominate persons for roles:** In order to facilitate the interaction of the EOSC Node with the EOSC Federation, each Node must designate individuals for the roles defined in Section 3.3.3.
6. **Large-scale, quality service provision:** EOSC Nodes must be able to provide services that are commonly used and endorsed by the designated research communities at scale, operating in a compliant, sovereign, and secure environment.
7. **Capacity to onboard third-party services:** beyond offering its own services, an EOSC Node may have the capacity to onboard third-party services, and to ensure that these services comply with the common quality standards, rules, and policies of the Federation, including those related to security, sovereignty, transparency, and trustworthiness.
8. **Capacity to contribute to EOSC Federating Capabilities:** As members of the Federation, EOSC Nodes will use the Federating Capabilities offered across the Federation, such as Authentication and Authorization Infrastructure (FC-1) and Resource Catalogues and Registry Services (FC-2), already mandatory in 2025, and Helpdesk (FC-3), Monitoring (FC-4) and Service Management System (FC-5), expected to become mandatory during 2026.
9. **Compliance with EOSC Federation rules and standards:** organisations responsible for EOSC Nodes will retain autonomy to select which services they offer or share with the EOSC Federation, and to set specific policies for access and use of these services, including pricing-related policies for cost-intensive services. EOSC Nodes shall provide access to services under documented policies and be able to comply, or to provide action plans to achieve such compliance with policies, standards and access rules agreed across the Federation, including those in the EOSC Interoperability Framework, and other security (incl. cybersecurity) and sovereignty standards.

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10. **Effective monitoring:** EOSC Nodes shall be able to monitor and report the activity of the services they provide in the EOSC Federation (e.g. monitoring usage of data, services and other relevant activities) to ensure their quality and compliance with rules and standards, including for third-party services provided by third parties.
11. **Community engagement:** EOSC Nodes will strive to contribute to community engagement activities of the EOSC Federation, such as training activities, consultations, usability testing, communication, etc. as well as with their designated communities.
12. **Sustainability:** EOSC Nodes shall be able to confirm continued operations compliant to the EOSC Federation's requirements for a minimum of 2 years and ideally 5 to ensure that they are reliable members of the EOSC Federation.

In the second wave of the EOSC Federation's interim phase, priority will be given to those countries/disciplines/e-infrastructures not yet present in the EOSC Federation.

6.3. Legal and organisational steps

EOSC Nodes formed by several partners need to agree internally on a legal representative at the time of submitting their application. They also need to agree on their internal arrangements to manage the Node according to their scope and composition of the consortium, and on how they will comply with the policies of the EOSC Federation. At a minimum, and after their candidacy to the EOSC Federation has been accepted, EOSC Nodes need to sign the EOSC Federation MoU. Note this is different to the internal node MoU that defines the role and responsibilities of each partner of the Node: For multi-partner Nodes the partners will likely be required to sign an internal MoU (or node agreement) which specifies the rules and responsibilities governing the Node. It is up to each Node to decide how to manage themselves and will depend on the links existing between the partners and providers or resources which will be onboarded.

6.4. Policies and procedural steps

The EOSC Federation needs to ensure that all its members i.e. all EOSC Nodes, comply with a common set of policies concerning the different aspects which are considered to be part of the Federation e.g. privacy, cybersecurity, data, user access etc. The complete list of policies is under development by the EOSC Federation Policies Working Group. The list of policies will be updated in future editions of the Handbook once they have been decided by the EOSC Federation Tripartite Governance.

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6.5. Technical steps to set up an EOSC Node

An organisation willing to join the Federation should understand how its infrastructure can be mapped to the Node functions according to the figures in Section 4.2, identify gaps to be filled, and implement the connections to the Federating Capabilities. This can be translated into the steps described in table 6.1 below:

Steps		Description
1	**Compliance with the EOSC Node Reference Architecture** **(Mandatory)**	The digital infrastructure behind each EOSC Node should offer services and other resources with an adequate quality. To achieve this, EOSC Nodes should embed key support functions such as a catalogue listing the services made available through the Node, AAI, helpdesk, monitoring, accounting system, etc. The EOSC Node architecture of Chapter 4 assembles all the services to support organisations in making their digital infrastructure an EOSC Node. The list of functions for EOSC Nodes are described in Section 4.2 (Tables 4.1 and 4.2). Nodes must align as much as possible the architecture of their infrastructure to the EOSC Node reference architecture.
2	**Professionally operate the digital infrastructure** **(will become Mandatory in 2026)**	The EOSC Node digital infrastructures must implement a Service Management System based on IT Service Management (ITSM) standards for their Technical Operations (see Section 4.5) and ensure Cybersecurity (Section 4.6).
3	**Publish/expose resources in/to the EOSC Federation Catalogue (Resource Hub)** **(Mandatory)**	Each Node must identify its Node Exchange by selecting a subset of resources (services, datasets or other research products) that can be discovered and accessed by EOSC users under proper AUPs. Resources in the Node Exchange must be published in the EOSC Federation Catalogue operated by the EOSC EU Node (Resource Hub). Details on how to register resources in the EOSC EU Node Resource Hub are reported in Annex 1, guideline 2 and 3.
4	**Access to the Node resources via eduGAIN IDPs** **(Mandatory)**	Each Node must operate an AARC Blueprint compliant AAI infrastructure made up of a Community AAI and an Infrastructure Proxy. The Node also needs to join the eduGAIN Federation as Service Provider[69] and implement the guidelines reported in Annex 1 guideline 1.

[69] https://wiki.geant.org/display/eduGAIN/How+to+Join+eduGAIN+as+Service+Provider (last accessed 17/12/2025)

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Steps		Description
5	**Connect to existing Federating Capabilities** **(Mandatory + Recommended)**	Each Node should analyse the Federating Capabilities of the EOSC Federation, connect its services to the mandatory ones, and select which of the recommended ones it would like to federate with. To connect, EOSC Nodes must follow the instructions of the relevant Interoperability Guidelines. Nodes can use technologies of choice or the reference implementation delivered by the EOSC EU Node to connect (see Annex 1). The list of the Federating Capabilities available in the EOSC Federation are listed in Table 4.3 of Section 4.3.1.
6	**Enable new Federating Capabilities** **(Optional)**	Each Node can decide to enable new Federating Capabilities in the EOSC Federation in accordance with the EOSC Federation Governance.

Table 6.1: Steps to setup an EOSC Node

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Annex 1 - Recommended Guidelines

The following guidelines describe the mandatory Federating Capabilities which are part of the requirements for joining the EOSC Federation:

1. **EOSC AAI Architecture 2025**, https://doi.org/10.5281/zenodo.15388270
2. **Registration of EOSC Research Product Catalogues in the EOSC EU Node**, https://doi.org/10.5281/zenodo.15516019
3. **Registration of EOSC Service Catalogues in the EOSC EU Node**, https://doi.org/10.5281/zenodo.17513487

Further guidelines will be made available via the EOSC EU Node Interoperability Guideline registry[70].

In addition, EOSC Nodes are encouraged to implement the following recommended guidelines:

- **Guidelines for recommended metadata standard for research software within EOSC**, https://doi.org/10.5281/zenodo.10786147
- **Guidelines for creating a user tailored EOSC Compliant PID Policy (2024),** https://doi.org/10.5281/zenodo.14092489

[70] Interoperability Guidelines, https://open-science-cloud.ec.europa.eu/resources/interoperability (last accessed 10/12/2025) - note: at the time of writing (December 2025) this registry contains guidelines from previous projects which are not official.

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Annex 2 - Definitions

The EOSC Federation is under development and therefore many terms are not yet clearly defined. The following definitions explain some of the organisational and technical concepts and vocabulary used in the EOSC Federation Handbook. These definitions aim to concisely describe the meaning of the terminology used.

- **Cybersecurity Officer:** The contact person for all cybersecurity-related issues.
- **Enrolling:** an EOSC Node is enrolled in the EOSC Federation when the node has signed the EOSC Federation MoU, has implemented the minimum requirements for Nodes and has been registered in the EOSC Federation. Once a node has been enrolled, it shares the Nodes resources with the Federation. Resources can be hosted by the Node or onboarded.
- **EOSC Exchange:** The EOSC Exchange is the set of services, datasets and other research products collectively provided by EOSC Nodes and made accessible through the EOSC Federation.
- **EOSC Federation:** the network of EOSC Nodes, which collectively integrate their resources to provide shared system-level functions, known as Federating Capabilities. These capabilities - which include a common catalogue for resource discovery, a federated user login system (AAI), and coordinated monitoring - are the glue that ensures consistency and interoperability across the network.
- **EOSC Interoperability Framework (IF):** An extensible framework of guidelines that define the technical requirements to implement the interoperability and composability of the EOSC Federated resources. The EOSC IF is a reference framework to promote standards and best practices while offering providers the freedom to develop and operate provider-specific implementations which conform to the EOSC IF guidelines and standards.
- **EOSC Node:** An organisation complying with the EOSC Federation policies and legal framework, sharing resources at the local, national, regional, thematic or European level. An EOSC Node offers Resources which provide added value to the EOSC Federation and implements Federating Capabilities in collaboration with other EOSC Nodes. Each EOSC Node is responsible for its autonomy, governance and resources. It operates its own platform, complying with the EOSC IF technical framework, and the EOSC Node architecture.
- **EOSC Node Architecture:** A reference architecture that can be implemented by each Node of the federation for the operation of their services and resources.
- **EOSC Node Coordinator:** The person representing the Node in the Federation.
- **EOSC Node Host:** The legal entity representing an EOSC Node, which signs the EOSC Memorandum of Understanding.

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- **EOSC Resource Provider:** An organisation making a Resource available through an EOSC Node to the EOSC Federation. The resource is then called an EOSC Federation Resource and becomes part of the EOSC Node Exchange of the EOSC Node.
- **EOSC Thematic Node:** An EOSC Node representing communities working in a specific scientific domain of research or with specific scientific techniques. A technique can cover a wide range of scientific domains, e.g. life sciences, photon sources.
- **EOSC Tripartite Governance:** The strategic coordination between the EU (represented by the EC), the Member States and Associated Countries represented by the EC Expert Group (**EOSC-Steering Board**), and the EOSC Association (represented by EOSC-A Board). The EOSC Tripartite Governance is responsible for the governance of the EOSC Federation.
- **EOSC Tripartite Group:** The group of appointed representatives of the three parties of the EOSC Tripartite Governance.
- **EOSC User:** Anyone who is granted access to the EOSC Federation resources based on the recognition of their identity by a service provider registered with the EOSC AAI system and who would not otherwise have access to the resources in question.
- **FAIR principles:** The FAIR principles, initially defined for scientific data in 2016 (see footnote 2), are that data should be **Findable, Accessible, Interoperable,** and **Reusable**. The EOSC Federation requires research data and other resources to follow the FAIR principles.
- **Federating Capabilities:** System of services provided by more than one EOSC Node in order to implement the federation of resources in the EOSC Federation.
- **Interim EOSC Node Coordination Committee:** The main forum for strategic discussion and policy endorsement during the interim phase.
- **Node Capability:** Refers to a capability that is implemented by one or more services within one EOSC Node.
- **Federating Services:** The services that are federated through implementing Federating Capabilities.
- **Node Core Capabilities:** The capabilities that enable the operation of a Node (e.g. AAI, Helpdesk, Monitoring).
- **Node Exchange:** services and other resources a Node makes available to the EOSC Federation
- **Node Operations Manager:** The primary contact for technical operations between the Node and the Federation.
- **Resource Provider**: an organisation making a Resource available by onboarding it to a Node.
- **Node Generic Capabilities:** Common tools used across most scientific disciplines (e.g. workflow service, notebook service, data transfer, VRE or compute & storage).

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- **Onboarding:** Resources are onboarded in an EOSC Node when they are integrated into an EOSC Node. The provider selects the most appropriate node based on the characteristics of the resource. For example, if a provider has a domain-specific data repository, it may choose a thematic node that best represents and serves that domain. A resource can be onboarded to multiple nodes.
- **Open Science:** The practice of making scientific research and its dissemination accessible to all levels of society.
- **Persistent Identifier (PID):** A long-lasting reference to a digital object, essential for FAIR findability.
- **Research Resource:** Services, catalogues, digital research objects (e.g. data, software), training resources, infrastructure and other assets that may be available in an EOSC Node and offered in the EOSC Federation.
- **Service Level Agreement (SLA):** A contract specifying the expected terms of service and actions for compliance.

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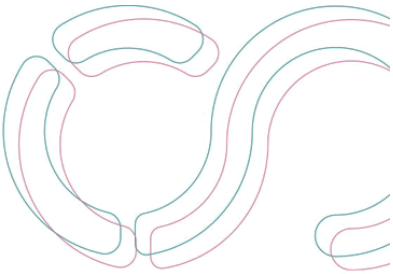

Annex 3 - How the Handbook was written

First version - March 2025

The first version of the EOSC Federation Handbook (or **Handbook** for short) was written collaboratively by a team of Writers, Reviewers and Editors. The Editors' team was led by Andy Götz (EOSC Association and ESRF) together with Miguel Rey Mazón (TU Graz) from the EOSC Focus project, Mark Dietrich (EGI), and Robert Jones (EOSC-A and CERN). The Handbook is coordinated and owned by the EOSC Association.

Contributors

The following groups of people contributed to the Handbook:

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3. **Editors** - Andy Götz (EOSC-A + ESRF), Bob Jones (EOSC-A), Miguel Rey Mazón (TU Graz/EOSC Focus).

Second version - December 2025

The present document constitutes the second version of the EOSC Federation Handbook updated by the Handbook sub-group of the interim phase in 2025. This version of the Handbook focuses on the period up to the end of 2027, when the current Framework Programme Horizon Europe will finish; more specifically, it serves as a starting point for the interim phase of the EOSC Federation during 2025-2026. During this period, the goal is to demonstrate the EOSC Federation is in production, with participating organisations expected to finance their contributions using their own resources (national, regional, thematic). Although the Handbook makes recommendations about the components that should be put in place to ensure a successful transition from 2027 and beyond, at the time of writing

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(2024-2025) many topics remain undefined and will require input from the Framework Programme 10. The results of the interim phase will establish a long-term, sustainable plan on which the EOSC Federation can be based. The Handbook will need to be updated regularly to reflect changes in governance, and mandatory technical and legal requirements of the EOSC Federation.

Contributors

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The EOSC Association thanks the volunteers of the build-up phase Handbook sub-group who updated the first version based on their expertise and experience as candidate nodes, and the feedback from the INFRAEOSC projects, Task Forces and Opportunity Area Groups.

Last but not least the EOSC Association would like to thank the EOSC Tripartite Governance for reviewing and endorsing the Handbook.

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