OS & EOSC INTRODUCTION AND SKILLS LANDSCAPE

FIRST WINTER SCHOOL 2025
Bankya
04-07 February 2025

SARA DI GIORGIO
GARR,Skills4EOSC Coordinator

A

Funded by the European Union. Views and opinions expressed are however those of the auhor(s) only and do not necessarily reflect those of the European Union or the REA. Neither the European Union nor the granting authority can be held responsible for them.

Funded by the European Union

EOSC and Open Science: the European way for the digital transformation of research

REINFORCING

EOSC and Open Science, for the digital transformation of research

An effective **policy process** to mobilise, align and scale resources and engagement across Europe towards accelerating open science, higher quality, productivity and reproducibility in research.

An **open and trusted federation of collaborative, autonomous infrastructures** applying agreed, consensus-based policies and rules of participation, combined into a system of systems to enable researchers in Europe to store, share, process, analyse, and reuse research digital objects (e.g. data, publications and software).

European Research Area (ERA) Policy Agenda - Priority Action 1:
Enable the open sharing of knowledge and the re-use of research outputs, including through the development of the European Open Science Cloud (EOSC).

EU Strategy for Data: EOSC is the basis for a science, research and innovation data space that will be connected and fully articulated with the sectoral data spaces

EOSC vision in a nutshell

What

EOSC is the European web of FAIR data and related services for research

Research data that is easy to find, access, interoperate and reuse (FAIR)

Trusted and sustainable research outputs are available within and across scientific disciplines

Why

Unlock the full potential of research data to accelerate discoveries and innovation

How

- **Ensure that Open Science practices and skills are rewarded and taught, becoming the 'new normal'**
- **Enable the definition of standards, and the development of tools and services, to allow researchers to find, access, reuse and combine results**
- **Establish a sustainable and federated infrastructure enabling open sharing of scientific results**

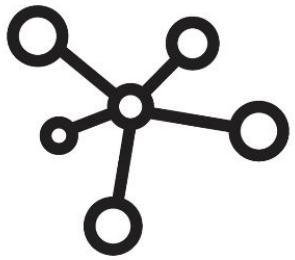
Strategic Research and Innovation agenda (SRIA)
eosc.eu/sria-mar

https://eosc.eu/wp-content/uploads/2023/08/EOSC-A_GA6_EOSC-slide-deck-May-2023.pdf

EOSC Focus
Funded by the European Union

From vision to implementation: “the EOSC federation”

The EOSC vision is to set up a ‘Web of FAIR Data and Services’ for science in Europe. Central to this ambition is the deployment of a trusted, virtual, federation of existing infrastructures in Europe to store, share and reuse FAIR research outputs across borders and scientific disciplines also called the “**EOSC Federation**”.



- EOSC is **NOT** a new digital infrastructure
- The EOSC ambition is to **federate existing data, research and e- infrastructures** nodes to make them all **available to European researchers across borders and across disciplines** (distributed EOSC ´system of systems´)
- In doing so, **the federation will be augmented with new additional services and tools** that will enable the EU web of FAIR data and related services (EOSC can be seen as a thin federation layer based on FAIR principles)
- The federation will provide **coordinated entry points primarily for researchers in Europe (the so called “nodes”)** to find and access FAIR data and interoperable services that address elements of the whole research cycle (from discovery and mining to storage, management, analysis, publication, and re-use)
- **The entry points for EU researchers will be via their traditional channels** (e.g. via the national, regional, pan-European or thematic infrastructure nodes they are currently using) **or via the EU EOSC node central instance** (for the researchers that do not have existing access channels in place)
- **EOSC rules of participation and access policies** will be developed for the users and providers of the federation

https://eosc.eu/wp-content/uploads/2023/08/EOSC-A_GA6_EOSC-slide-deck-May-2023.pdf

EOSC Focus
Funded by the European Union

Who is EOSC for?

EOSC aims to support all European researchers

How?

- **Enhancing scientific research** by providing access to a weath of data and research outputs from various fields and institutions
- **Fostering innovation** by making it easier for researchers to share, collaborate and build on each other´s work
- **Improving transparency and reproducibility** of research by making data and methods more open and accessible
- **Reducing data silos and duplication of efforts** by promoting data sharing and reuse
- **Facilitating interdisciplinarity research and cross-sectoral collaboration** by making data and resources from different domains more easily available

Individual researchers will benefits from EOSC through their existing channels (e.g. universities, research institutes, research infrastructures, associations, science clusters, etc.) that will act as intermediaries.

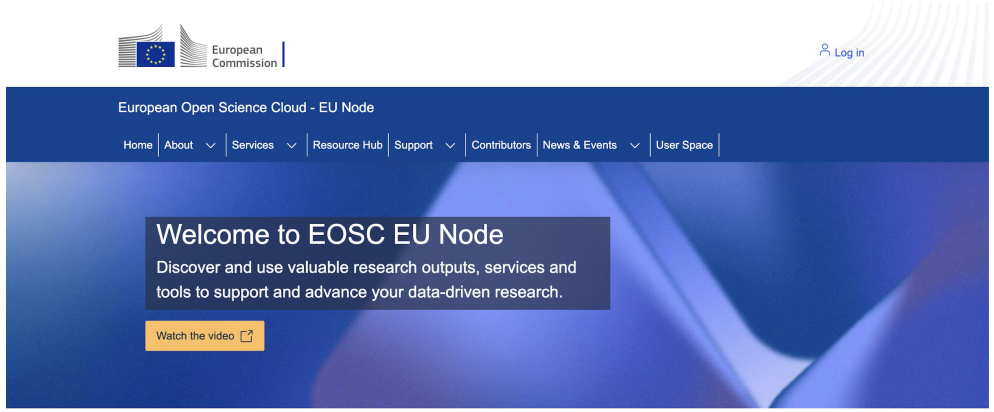
https://eosc.eu/wp-content/uploads/2023/08/EOSC-A_GA6_EOSC-slide-deck-May-2023.pdf

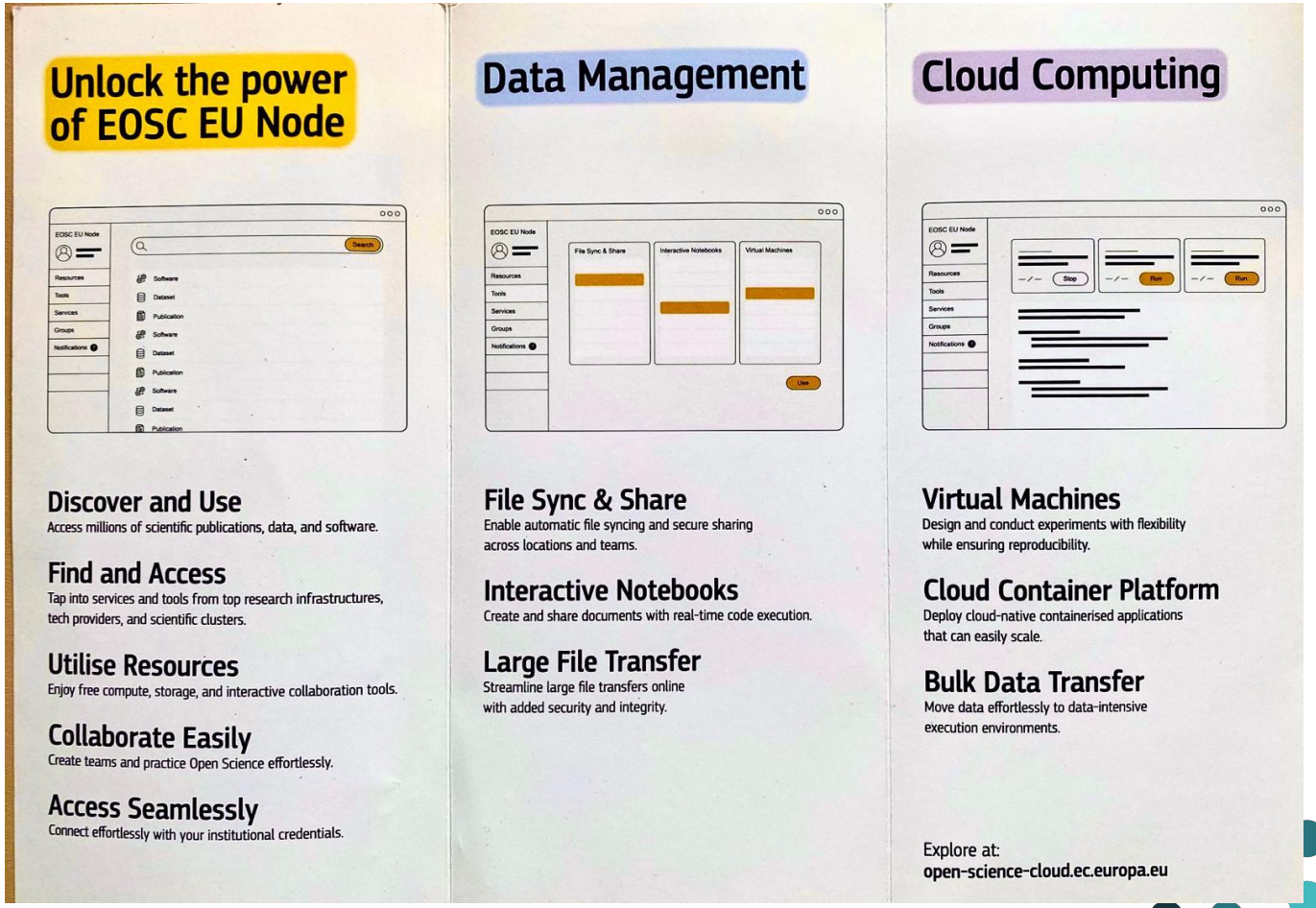
REINFORCING

EOSC EU Node

The **EOSC EU Node** was officially launched at the EOSC Symposium 2024.

It’s a collaborative environment built on **FAIR principles**, promoting transparency and accessibility with **Open Science** at its core, supporting **multidisciplinary** and **multinational** research and offering integrated storage and computing capabilities to meet all data needs.





REINFORCING

Build-up phase of the EOSC Federation

The EOSC Federation **will consist of multiple EOSC Nodes** that are interconnected and can collaborate to share and manage scientific data, knowledge, and resources within and across thematic and geographical research communities.

The **EOSC Nodes will be entry points for users to the EOSC Federation**, with each node offering its own and possibly third-party services, including data reposing and accessing services.

As the decision-making body for EOSC, **the EOSC Tripartite Governance oversees the structure, governance and operations of the EOSC Federation.**

More info on the EOSC website.

EOSC is not just about technical implementation

- The establishment of EOSC is not only a technical implementation issue
- There are at least six other crucial areas for its success
  - Governance
  - Financing
  - Policies and Regulations
  - Stakeholder Engagement & Adoption
  - Monitoring

https://eosc.eu/wp-content/uploads/2023/08/EOSC-A_GA6_EOSC-slide-deck-May-2023.pdf

EOSC Focus
Funded by the European Union

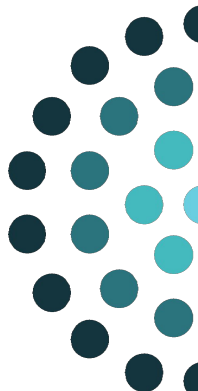
REINFORCING

The EOSC Federation Handbook

The EOSC Federation Handbook describes the **purpose**, **structure**, **governance**, **architecture** and operations of the EOSC Federation.

The Tripartite Group has endorsed EOSC-A to lead the **community-wide co-creation** of the EOSC Federation Handbook.

The EOSC Federation Handbook is being written collaboratively with open consultations, meetings, events and sprints.



Enrollment of EOSC Nodes

The Tripartite Group is working to identify and enroll candidate EOSC Nodes into the EOSC Federation. The Tripartite Governance agrees that this effort needs to be steered to ensure the coherent, sustainable and steady growth of the EOSC Federation.

A questionnaire was run by the Tripartite Governance over summer 2024 to gauge the scale and scope of interest in and readiness for the build-up phase of the EOSC Federation. Replying to the questionnaire was a first step in establishing the interest of parties to contribute to a testbed of EOSC Nodes.

A group of Potential Candidate Nodes have been invited by the Tripartite Governance to complement the EOSC EU Node to initiate the formation of the EOSC Federation in its first iteration. The selected Candidate Nodes will also serve to test the EOSC Federation Handbook in practice.

Nodes are representatives of their reference community, they provide resources (data, publications, services, training, …)

National

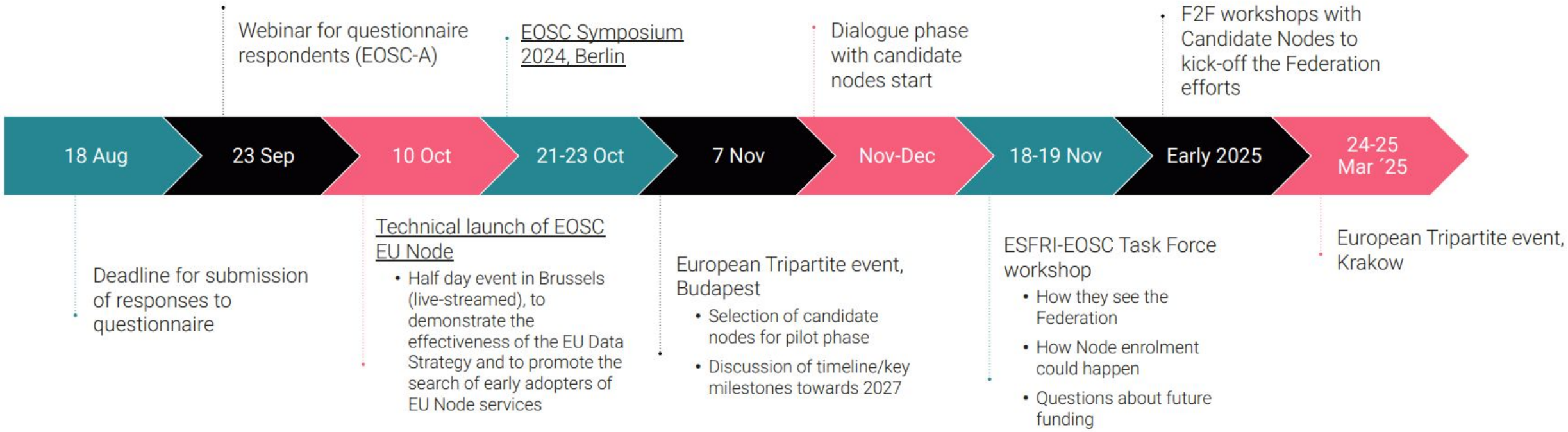
Themati

Disciplinary

www.eosc.eu

REINFORCING

EOSC Federation build-up phase timeline



REINFORCING

Horizon Europe support to EOSC

Horizon Europe (2021-2027) support to EOSC ~ EUR 490 million

2021-23

- **27 funded projects,** 587 participations
- **1 procurement** action for EOSC EU node

2024

- **9 new projects** selected for funding

2025-27: INFRAEOSC destination fully embedded in the Strategic Orientations for 2025-27 Research Infrastructures Work Programme.

- WP25: adoption expected for April 2025
- WP26-27: adoption expected for December 2025

Key Inputs for WP25:

- EOSC Partnership and the EOSC Strategic Research &Innovation Agenda
- EOSC Steering Board opinion papers
- ESFRI-EOSC Task Force recommendations
- Stakeholder consultations

Fostering coordination and synergies:

EOSC-ESFRI Task Force: reinforced links with **research infrastructures**
3rd edition of **EC coordination meeting of EOSC projects**, June 2024
Enhanced **feedback to policy** instruments

We need skills to make Open Science the ‘New Normal’: Skills4EOSC for creating a Training Ecosystem for Open and FAIR Science

REINFORCING

A 5th Freedom on Research, Innovation and Education

"Operationalizing the fifth freedom requires a multifaceted approach encompassing **policy initiatives, infrastructure enhancements**, collaborative frameworks, and an unwavering commitment to foster innovation, **open science and digital literacy**'

Much more than a market – Speed, Security, Solidarity Empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens

REINFORCING

Skills4EOSC Main Objective

Advance Open Science skills by unifying the current training landscape into a common and trusted pan-European ecosystem, closing the three gaps identified in the **EOSC Strategic Research and Innovation Agenda 2021** in relation to Open Science competences:

- lack of **Open Science and data expertise**,
- lack of a clear definition of **data professional profiles and corresponding career paths**, and
- **fragmentation** in training resources.

REINFORCING

Skills&Training SRIA priorities and Skills4EOSC

SRIA Priorities

Priority 1: Developing the **next generation** of Open Science and data **professionals**

Priority 2: Bridging the education gap: **coordinating and aligning curricula** for students and researchers

Priority 3: Building a trusted and long-lasting **knowledge hub of learning materials** and related tools

Priority 4: Influencing national Open Science **policy for skills** by supporting strategic leaders

Skills4EOSC contribution

Skills4EOSC Network of **Competence Centres**

Minimum Viable Skillset defined for different roles acting in the OS context

Training of Trainers and **FAIR by design** methodology for **learning materials**

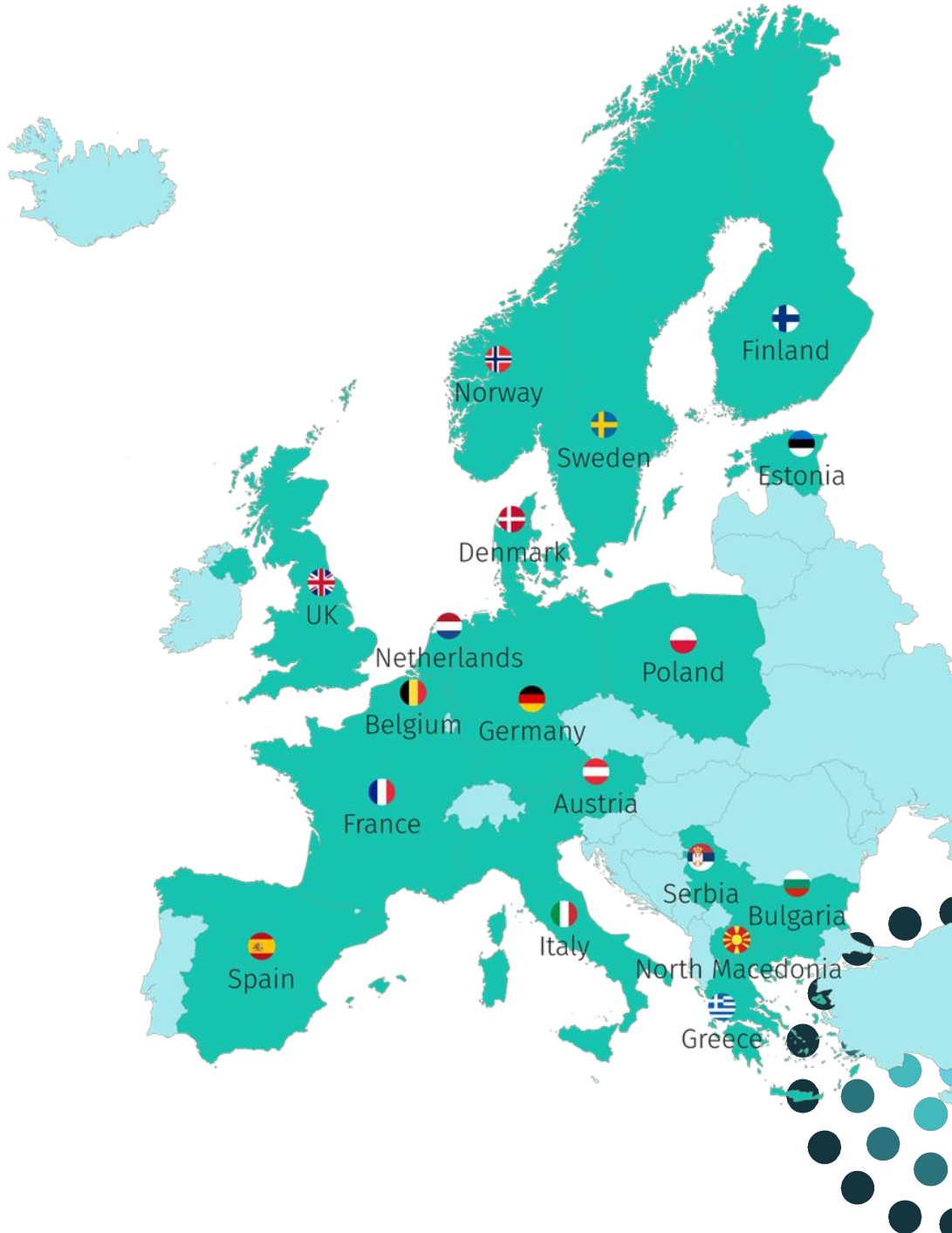
Supporting **Professional Networks** for lifelong learning

Target **Science for Policy interface roles** (policy makers,knowledge/honest brokers, civil servants)

REINFORCING

Skiiis 4 eosc

- 46 **partners**, 18 **countries**
- "**Key doers**" in Open Science in their country/region/domain
- 2 ESFRI **Research Infrastructure**
- 7 million €
- September 2022 - August 2025



Key Concepts

- Competence Centre and network
- Minimum Viable Skillset
- FAIR-by-design methodology for learning material
- Training of Trainers
- Master trainer
- Professional Networks
- User Support Network
- Co-Creation Mechanism

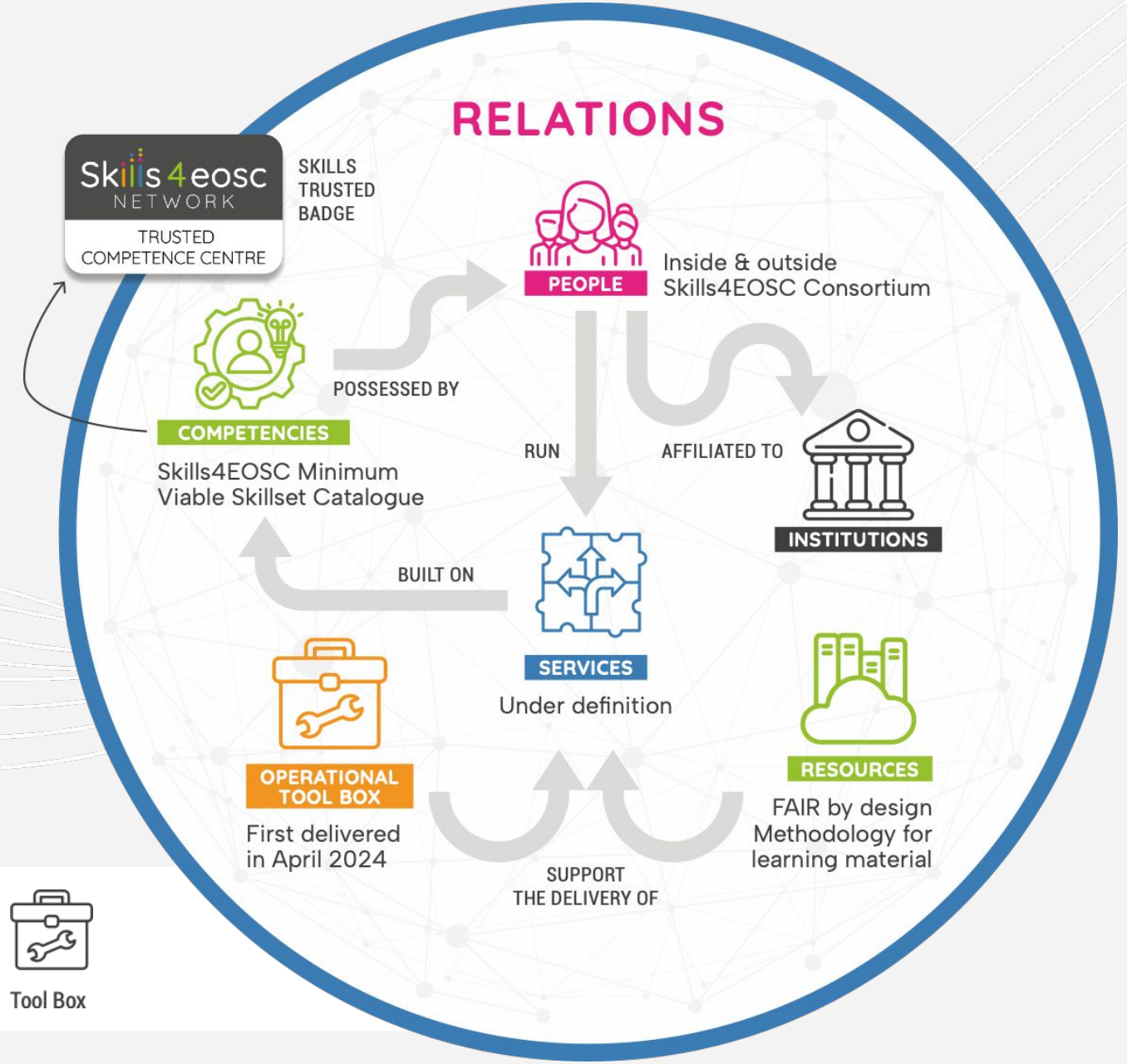
Silas Köhler on Unsplash

Skills 4 eosc
COMPETENCE CENTRE

Skills4EOSC Competence Centre

Skills4EOSC CC represent **a point of reference**

in a specific Country/Region/Theme to find **key competences** to enable the practice of **Open Science** with adequate knowledge of standards, applications and tools and best practices for delivering, managing, re-using, sharing and analysing **FAIR data**, as well as other digital research objects.



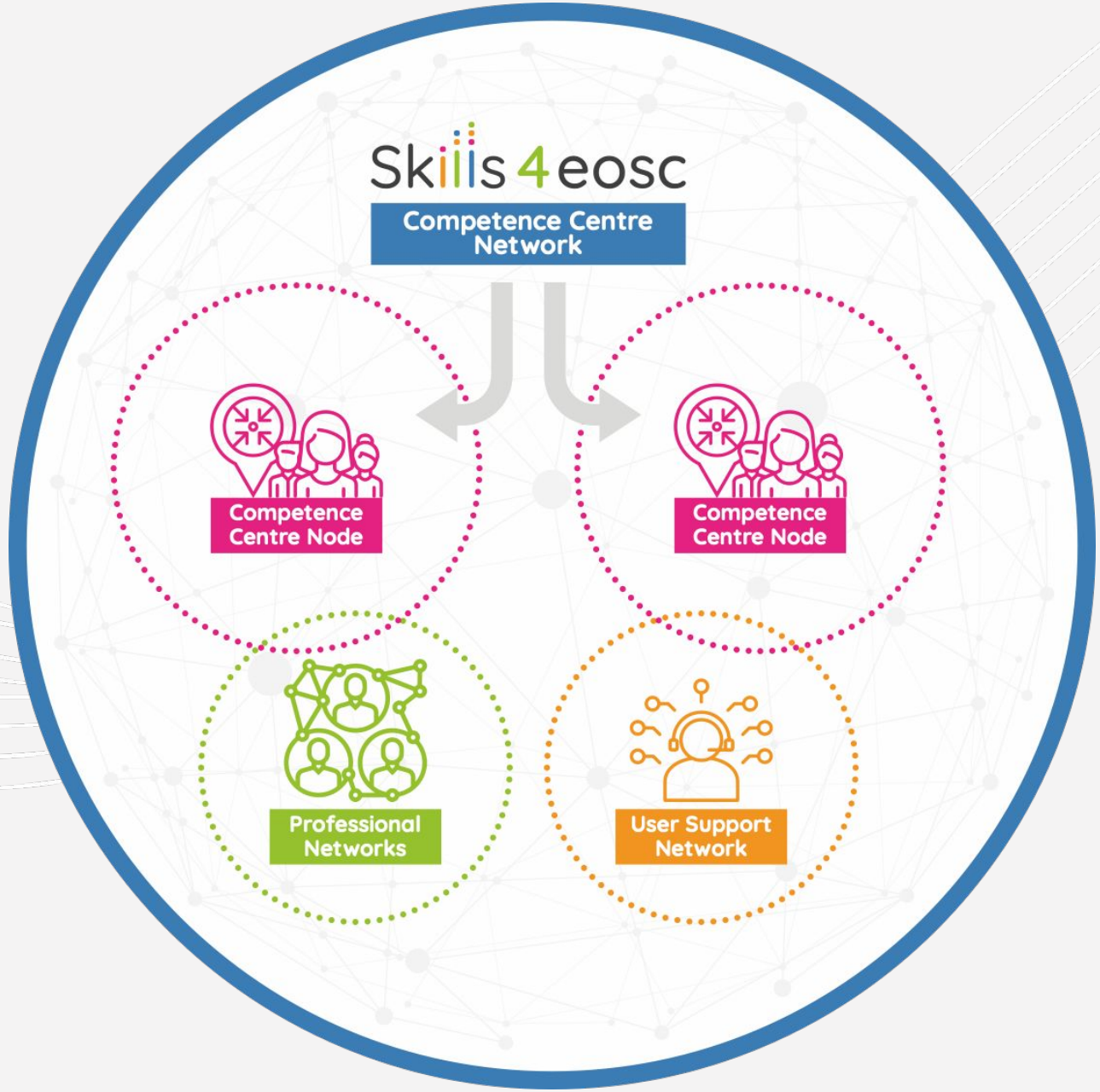
Competencies | People & Institutions | Services | Resources | Tool Box

Skills 4 eosc

Competence Centre Network

Link with **Local Network**

Skills4EOSC Competence Centres can be built involving **local members** that are not part of the Consortium.



Skills 4 eosc

Competence Centre Network

Skills4EOSC Competence Centre Network (CCNet)

- Skills4EOSC aims at building a **Network of Competence Centres** for Open Science, FAIR and EOSC in Europe (CCNet).
- The Skills4EOSC CCNet will be based on a lightweight mechanism to align and coordinate the **Network Node**.
- The **Nodes** ore the Skills4EOSC **Competence Centres** (CCs).

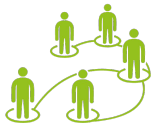
REINFORCING

Skills4EOSC Offering to Competence Centres

Harmonised profiles and curricula for the 'EOSC actor'	 **Minimum Viable Skillset** defined for different roles acting in the OS context
FAIR-by-Design methodology to improve accessibility and reusability of learning materials	 **FAIR by design Handbook** and Microlearning path on Github, Courses, Leaflet
Shared Recognition Framework for learning materials, trainer certification, and accreditation	 **Guidelines** including Open Badges and European Digital Credentials
'Train the Trainers' programme tailored to different profiles and research domains	 **Courses with self-paced and live sessions**, learning materials ready to be re-used and adapted

REINFORCING

Skills4EOSC Offering to Competence Centres

Development of **professional and user support networks**	 **Starter Kit for the creation of new Network,** mapping and harmonisation of existing ones
Guidelines on IT services to foster collaboration and sharing	 **Best practices** and methodologies across CCs to support collaborations and activities
Sustainability strategies of the Competence Centre(s) Network	 **Action plan** to maintain and enrlage the Network
Influencing national Open Science **policy for skills** by supporting strategic leaders	 Target **Science for Policy interface roles** (policy makers,knowledge/honest brokers, civil servants)
Space for discussing common issues and positions in the EOSC ecosystem	 **Networking & collaboration** on common challanges

Competences Definition

Skills4EOSC defines a minimum set of competences for each target in the **Minimum Viable Skillset**

Design learning paths & material

Through the **FAIR by design methodology**, learning materials for Training of Trainer programmes will be developed for various targets

Training of Trainers delivery

Year 3

Training of Trainers will be delivered to a group of Master Trainers to multiply the specific competences inside the Skills4EOSC Consortium

National courses training target

Year 3

Once **Master Trainers** are equipped with adequate competences, they will organise courses to train target roles in their **country/community**

Developing Paths for Different Targets

Science for policy: honest brokers, civil servants, policy makers

Institutions: undergraduate, PhD, data stewards and professionists, including data librarian and curators, legal and ethical experts

Research Infrastructures and thematic communities: designing training with and for researchers and professionists

Professional networks: lifelong learning through peer networks

Photo by Majestic Lukas on Unsplash

REINFORCING

Designing Learning Paths for RIs Professionals

Social Science & Humanities

Solid Earth Science

Climate Change

Open scientific collections

The Minimum Viable Skillset profiles

- Address the **skills needed** for various EOSC actors considering the OS mission and planned outcomes.
- Address the need to **summarise OS essentials**.
- Provide **high level guidance** for curricula and trainings.
- Are **adaptable** to contexts / domains.
- Are intended to complement the **European Competence Framework for Researchers**.

Whyte, A., et al. (2023). D2.1 Catalogue of Open Science Career Profiles - Minimum Viable Skillsets (v1.2). Zenodo. https://doi.org/10.5281/zenodo.8101903

REINFORCING

MVS Describe Diverse Roles

Available *

Data Steward
Legal Expert
Ethics Advisor
Knowledge Broker
Masters Student
Undergrad Student
Senior Researcher
Early Career Researcher
Policymaker – Research/ General
Research Infrastructure Professional

Progressing

Scholarly Communications Specialist
Digital Collections Curator

Considering

Data Analyst
Data Scientist
Data Engineer
Research Manager
Research Software Engineer
Digital Preservation Specialist

* Currently published MVS are here: https://zenodo.org/records/8101903

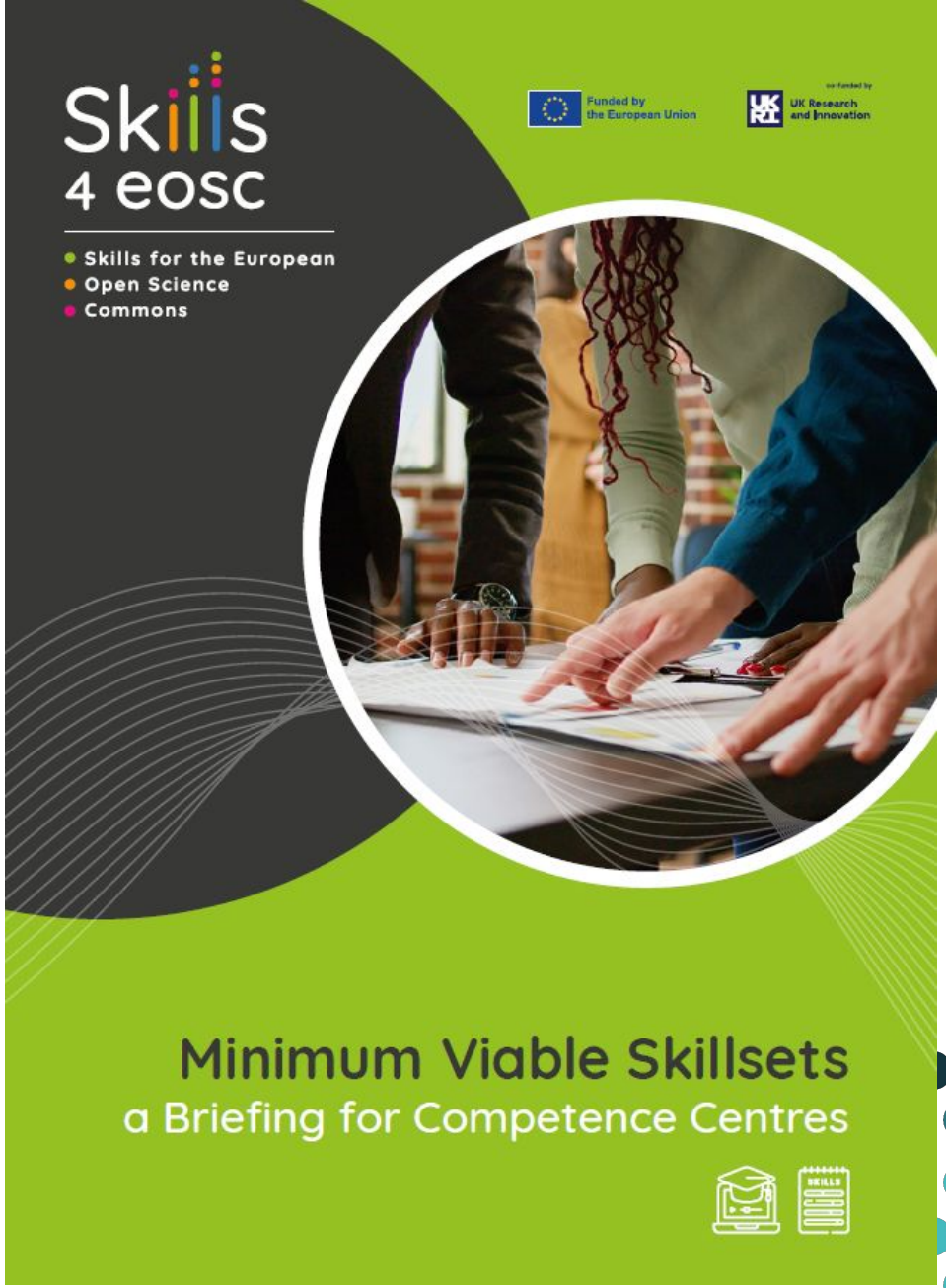
Main ref: report Digital skills for FAIR and Open Science

REINFORCING

Booklet on MVSs

This publication introduces the Minimum Viable Skillsets (MVS) methodology, defining essential profiles for research data professionals to support Open Science. It provides Competence Centres and Data Stewards with guidance on using MVS profiles for skills development and outlines the collaborative approach behind them.

Download it at https://zenodo.org/records/14006581



REINFORCING

Booklet on MVS Data Steward

Skills 4 eosc

MVS Data Steward Skills Profile

INTRODUCTION

Open Science mission for this role

The Minimum Viable Skillset (MVS) sets out to describe a shared framework for the recognition of competencies required for Open Science practitioners.

Data Stewards put Open Science principles into practice and are a key role for the European Open Science Cloud. They work with stakeholders to establish, govern and maintain processes to collect research data, make it usable for research objectives, facilitate its transformation into research output, assist in quality assurance, and support informed decision-making on its openness for reuse according to ethical, legal and social expectations.

In the EOSC, Data Stewards are likely to be both consumers and providers of services or resources, in their roles as practitioners and champions of Open Science, and as trainers and enablers of others in their organisation (researchers especially).

The MVS includes two variations of the role, one described as 'Coordinator' and the other 'Embedded'.

These titles represent two ends of a spectrum, with 'Coordinator' describing a role providing support across an organisation's research domains and units, and 'Embedded' describing a role close to a research team and to its domain-specific practices. We acknowledge that these roles can overlap, influenced by the availability of resources, and by disciplinary and organisational cultures.

Data Stewardship expertise is typically distributed across a team, drawing on in-house capabilities and external services provided to the Research Performing Organisation, e.g. by Research Infrastructures, Service Providers (e.g scholarly communications), and Competence Centres.

Download it at https://zenodo.org/records/14006764

Skills 4 eosc

MVS Data Steward Skills Profile

DATA STEWARD COORDINATOR

Coordinator Data Stewards act as a 'centralised knowledge and communication hub' for researchers. They advise and train on policy, guidelines, data management plans and institutional infrastructure and tools implement FAIR and CARE principles across the organisation.

ASSOCIATED FUNCTION TITLES:

Data Steward, Data Librarian, Research Data Management Specialist, Research Data Manager, Research Data Management Consultants, Reproducibility Librarian.

EMBEDDED DATA STEWARD

Embedded Data Stewards serve research teams, faculties, departments, sections of organisations directly involved in producing research outputs, supporting them to plan and implement FAIR and CARE principles, meeting needs of researchers as they arise, and working with others to ensure outputs are preserved and reusable in the long term.

ASSOCIATED FUNCTION TITLES:

Data Steward, Data Manager, Data Curator, Research Data Manager

REINFORCING

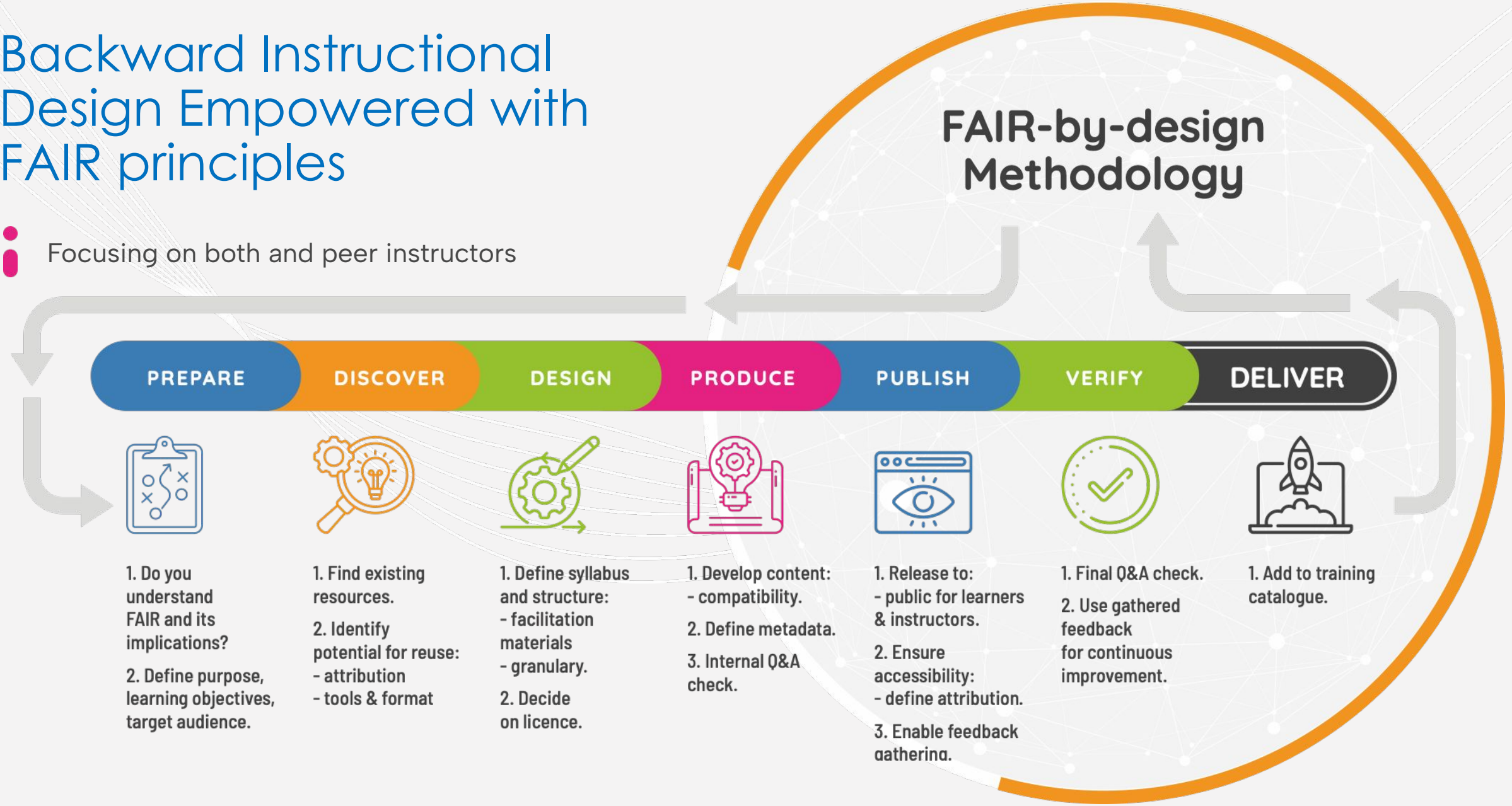
MVS Template

Template for a Minimum Viable Skillset, April 2024, DOI https://zenodo.org/records/10977747

This template provides guidance on structuring a Minimum Viable Skillset (MVS) Profile, outlining key skills and competencies essential for practicing Open Science (OS).

Backward Instructional Design Empowered with FAIR principles

- Focusing on both and peer instructors

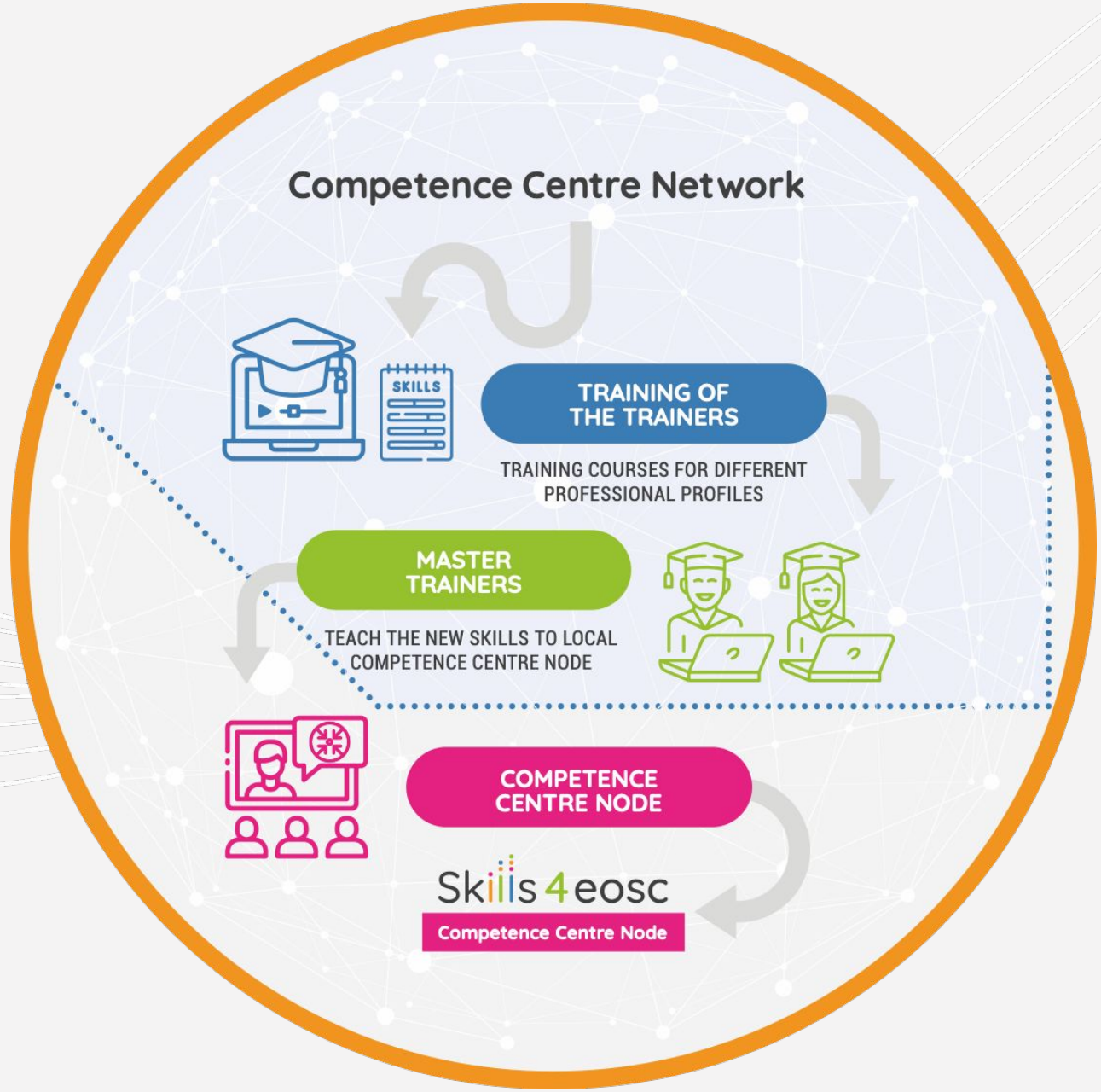


Filiposka, S., et al. (2023). Draft Methodology for FAIR-by-Design Learning Materials (1.2). Zenodo. https://doi.org/10.5281/zenodo.7875541 **and** Filiposka, S., et al. (2023). D2.2 Methodology for FAIR-by-Design Training Materials (1.4). Zenodo. https://doi.org/10.5281/zenodo.8305540

Training the Trainers Programme

- **Master Trainers** are trained by the Skills4EOSC community through the **Training of Trainers** sessions.

- After the Training the Trainers, the Master Trainers commit to **sharing best practices and lessons** learnt with their community trainers.



REINFORCING

Skills4EOSC Recognition Framework

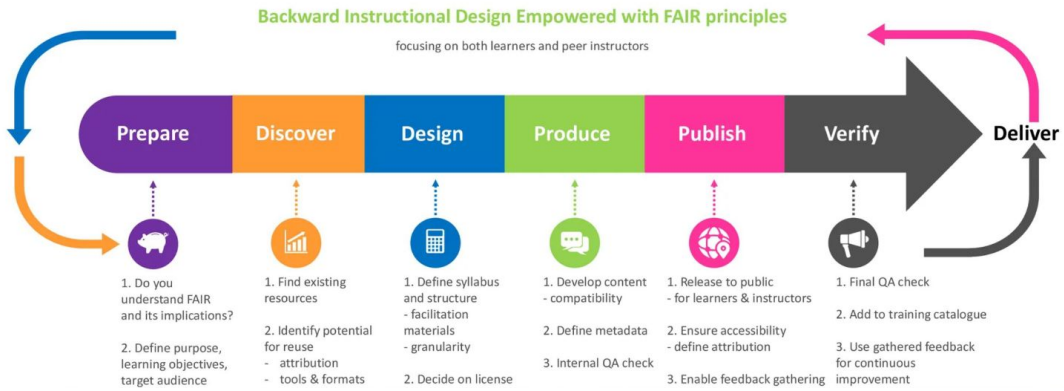
Skills4EOSC Recognition Framework – first iteration released on December 2023 DOI https://zenodo.org/records/10447619

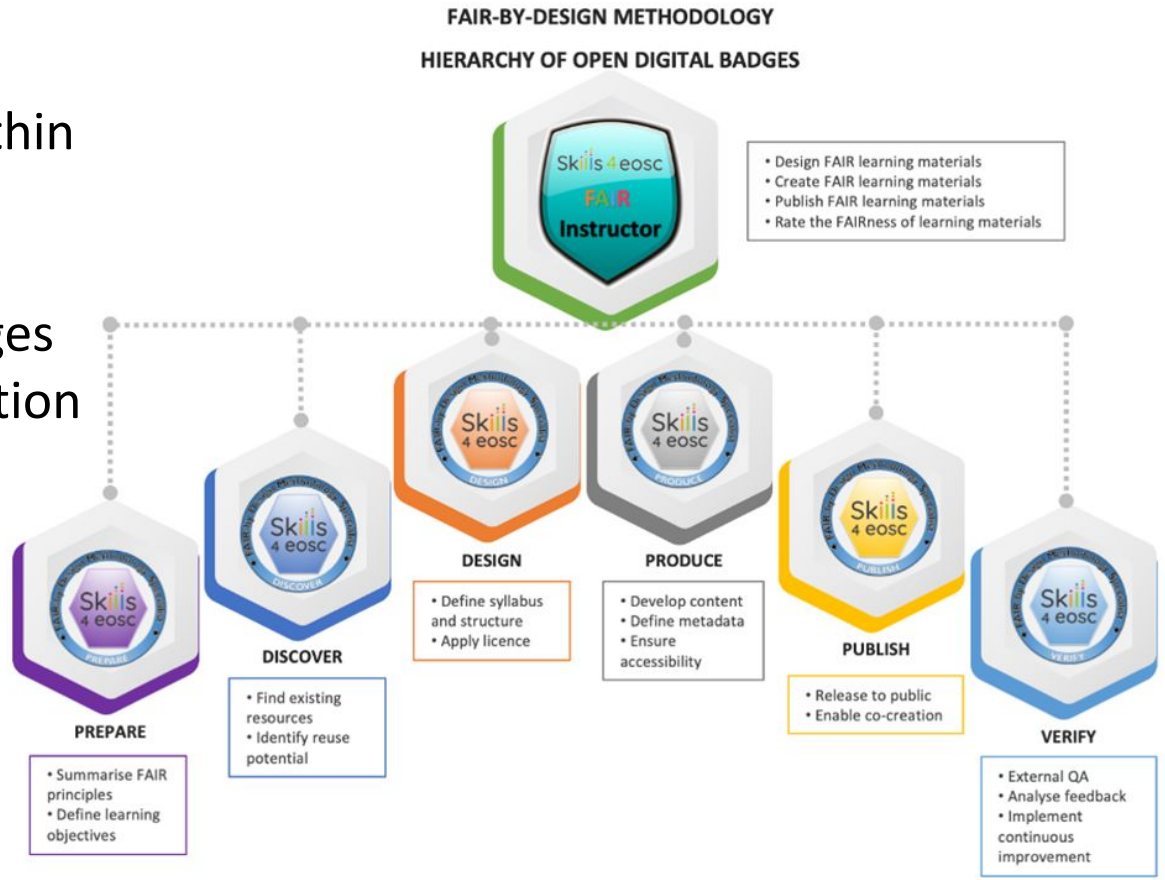
- A landscape report
- Badge templates and piloting results eg. for courses in FAIR-by-Design
- Guidelines for digital credentials (Open Badges & European Digital Credentials - EDC)

REINFORCING

FAIR-by-Design Trainer Accreditation

- **Structured into Six Stages**. Each stage consists of specific units.
- **Stage-Specific Open Badge**. Complete all units within a stage to earn a "FAIR-by-design Methodology Specialist" badge for that stage.
- **FAIR Instructor Badge.** Earn all stage-specific badges to certify proficiency in methodology implementation and qualify as a FAIR instructional designer.





REINFORCING

European Digital Credential - EDC

- Skills4EOSC Recognition Framework will fit into the **European Digital Credential for Learning**
- **EC provides EDC, an online tool for getting or issuing a digitalised version of credentials.**
- **EDCs** are standardized electronic documents verifying skills or learning outcomes.
- **EDCs linked to Europass** and can be issued by any European universities or training providers for free, securely sealed with an e-seal, and delivered via email or deposited to Europass profiles.

europass
European Union

Year 3 Plan: Full implementation of EDC via GARR, offering both Open Badges and EDCs for project courses

REINFORCING

Training the Trainers Programme

1. General Courses
   - Training the Trainers Guide
2. Science4Policy Courses
   - Open Science and Evidence-informed Decision-Making
3. Courses for Open Science Ready Institutions
   - Open Science Course for Undergraduates and for PhD candidates
4. Thematic Open Science Training
   - The Research community in SSH, Solid Earth Sciences, Climate Change, Digital Museum Collections
5. Training on Building and Animating Professional Networks

REINFORCING

Skills4EOSC CCs Network

- Internal workshops on Competence Centres:
  - 5 July 2023
  - 18 January 2024
  - 16 April 2024
- Public launch 25 June 2024, online
- First in person meeting 21 October 2024 in Berlin: workshop '**Making the Competence Centres Network sustainable and enhanced**'
- Next meeting online **6 February 14.30- 16.30 CET**

REINFORCING Skills4EOSC CCs Registry

Skills 4 eosc

ABOUT | KERS | NEWS | RESOURCES | NETWORK | PARTICIPATE

HOME | NETWORK | COMPETENCE CENTRES

COMPETENCE CENTRES

ITALIAN COMPUTING AND DATA INFRASTRUCTURE (ICDI)

READ MORE

OPEN SCIENCE CLOUD COMPETENCE CENTER IN GREECE

READ MORE

THE CSC RESEARCH DATA MANAGEMENT COMPETENCE CENTER

READ MORE

SWEDISH NATIONAL DATA SERVICE (SND)

READ MORE

OPEN SCIENCE AND RESEARCH DATA COMPETENCE CENTRE OSC@MK

READ MORE

RECHERCHE DATA GOUV

READ MORE

LUXEMBOURG NATIONAL DATA SERVICE LNDS

READ MORE

REINFORCING Skills4EOSC CCs Registry

Furthermore, ongoing discussion with:

1. **Denmark:** Danish e-Infrastructure Consortium (DeIC)
2. **Germany**: NFDI (National Research Data Infrastructure)
3. **The Netherlands**: Local Digital Competence Centres Network (LCRDM)
4. **Norway**: ongoing discussion led by HKDIR
5. **Portugal:** Universidade do Minho
6. **Slovenia**: University of Ljubljana
7. **Slovacchia**: Slovak Centre of Scientific and Technical Information
8. **Hungaria**: KIFU (Kormányzati Informatikai Fejlesztési Ügynökség /Governmental Agency for IT Development)
9. **Czech Republic**: Czech EOSC Training Centre
10. **Tunisia** CNUDST Centre National Universitaire de Documentation Scientifique et Technique

REINFORCING

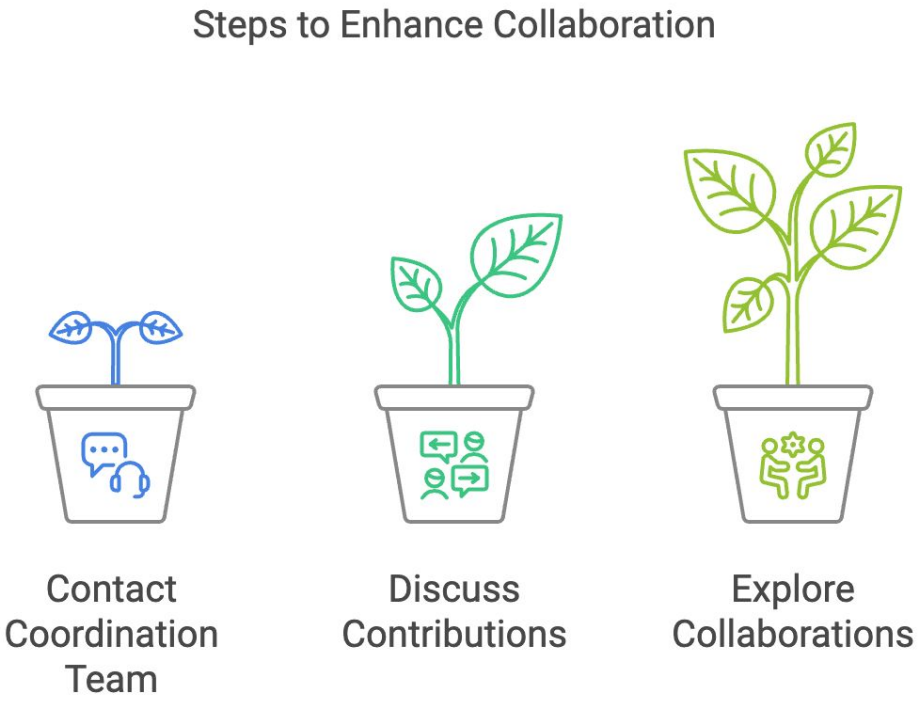
How to join the CC Network

Joining Process

- Sign the Memorandum of Understanding (MoU)
- Demonstrate organizational capability in:
    * Open Science training
    * Guidance on research data management
    * Supporting FAIR data principles

Next Steps

- Contact Skills4EOSC coordination team
- Discuss your organization's potential contribution
- Explore network collaboration opportunities



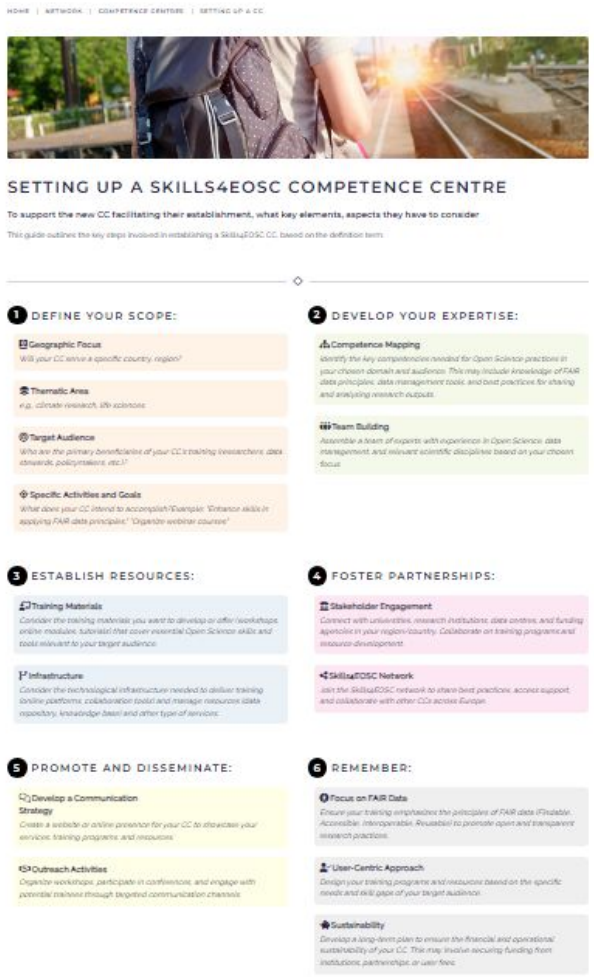
REINFORCING

Skills4EOSC for supporting the Bulgarian Competence Centre

- Need to **define key skills at national level**? get inspired and implement the Minimum Viable Skillset methodology in your Country
- Familiarise with the **FAIR by design methodology for learning materials** and apply it in your local context. Participate to the co-creation of its final version and let us know how you adapted it to the needs of your community
- Would you like to **onboard your Competence Centre to the Skills4EOSC network**? contact us!

Skills4EOSC for supporting the BulgarianCompetence Centre

- **Starting from scratch**? we are here to help!
- Need to **acquire specific competences in you local CC**? Join our Training of Trainers sessions
- Would you like to know more about the **Skills4EOSC Competence Centre network**? Join the **Network online meetings**: next on **February 5th 2025**.



REINFORCING

Skills4EOSC for supporting the Bulgarian Competence Centre

Bulgaria is making progress in Open Science but challenges remain in awareness, infrastructure, and policy implementation.

Skills4EOSC offers a structured approach to address these gaps through:

- A comprehensive training curriculum designed for key Open Science professionals.
- Capacity-building for researchers, administrators, and policymakers.
- A strong **network of National Competence Centres to share experiences and learn from peers**.

REINFORCING

THANK YOU

Sara Di Giorgio

sara.digiorgio@garr.it

www.reinforcing.eu