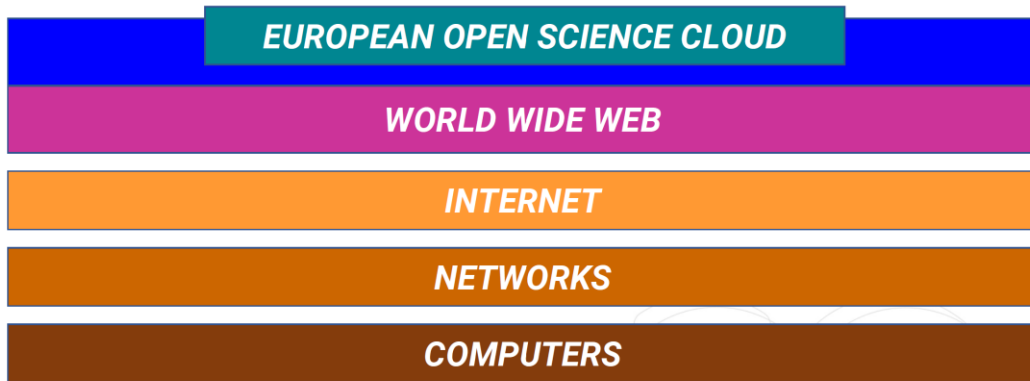INAF
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INAF ACTIVITIES IN THE CO-PROGRAMMED PARTERNSHIP EOSC (EUROPEAN OPEN SCIENCE CLOUD) TO REALIZE THE WEB OF FAIR DATA AND INTEROPEABLE SERVICES FOR SCIENCE

Serena Pastore – INAF Osservatorio Astronomico di Padova – 17 ottobre 2024

A layer over the www

An European web of data and interoperable services (*in terms of digital objects*) under the open science policy
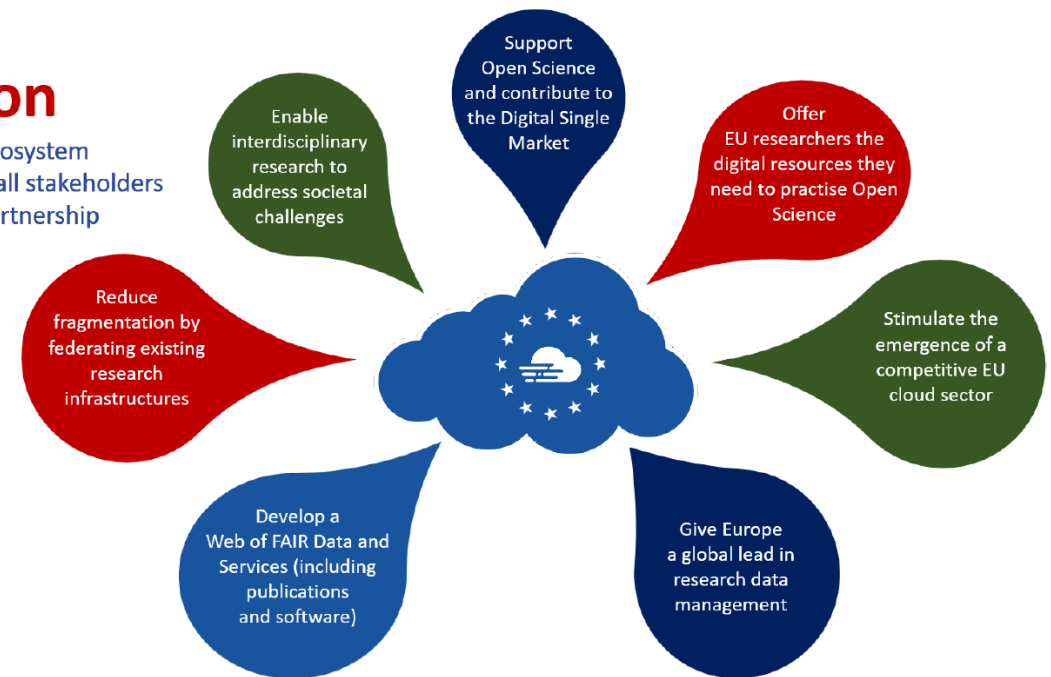

Modelled after: World Wide Web - Wikipedia

Additionality to the web of FAIR data

What is the EOSC vision

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*

As described in the Strategic Research and Innovation Agenda (SRIA)

The ambition of EOSC is to provide EU researchers, innovators, companies, and citizens an open trusted federated and multi-disciplinary environment where they can publish, find and reuse data, tools and services for research, innovation & educational purpuoses.

What is the EOSC vision

A system of systems that enables a step change across scientific communities and research infrastructures towards
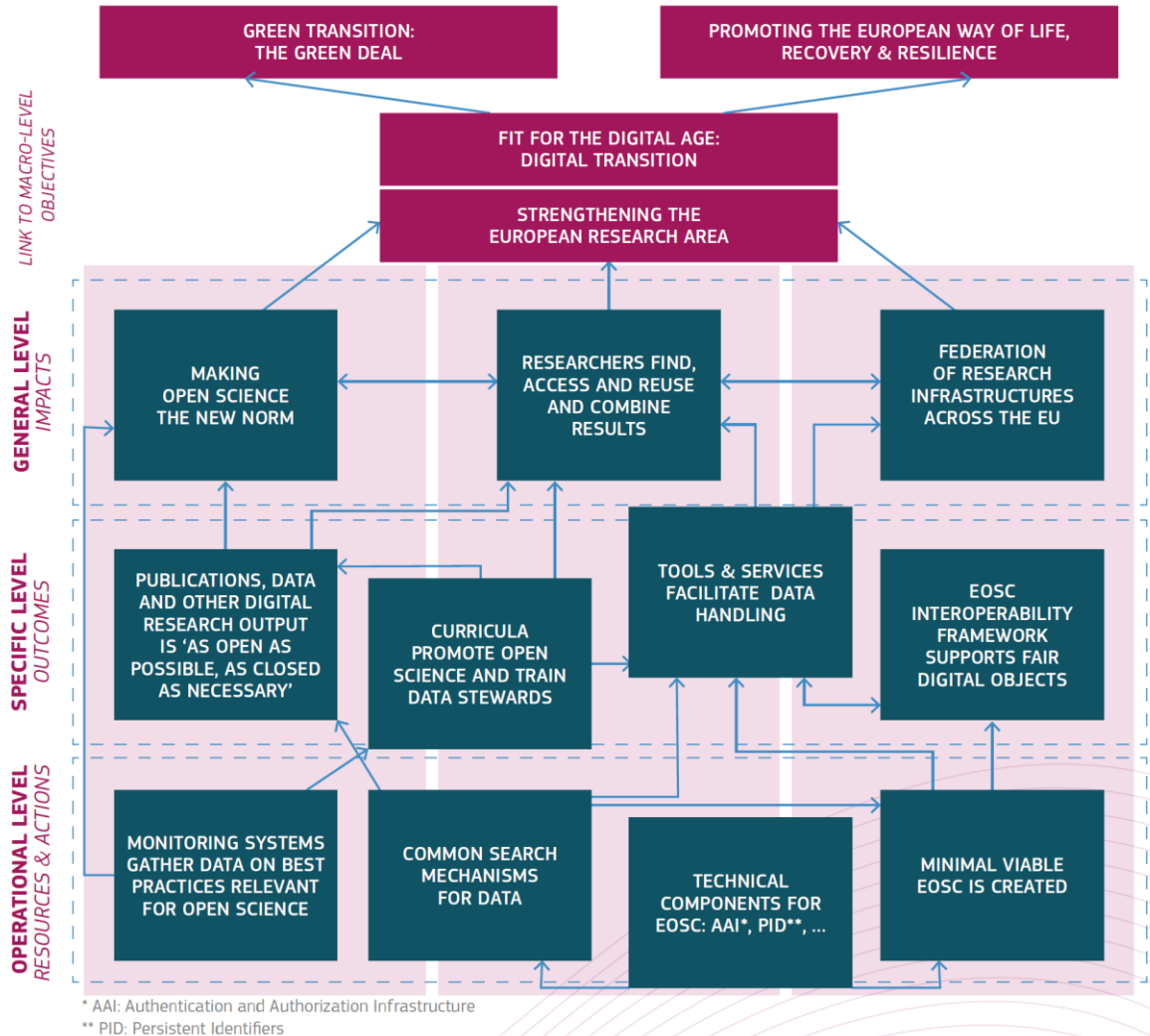
- Seamless access
- FAIR management
- Reliable use of research data and ALL OTHER DIGITAL OBJECTS produced along the research life cycle (e.g., methods, software, publications, workflows, procedures, methodologies, …..)

It aims to develop a WEB OF FAIR DATA and SERVICES for science in EU upon a wide range of value-added services can be built.

These range from visualisation and analytics to long-term information preservation or the monitoring of the uptake of open science practices.

S. Pastore – 17.10.2024 – USCVIII General Assembly

EOSC partnership contributions to societal challenges

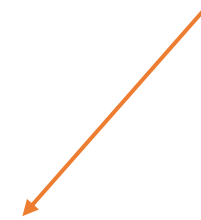**EOSC PARTNERSHIP CONTRIBUTIONS TO SOCIETAL CHALLENGES**

Funding opportunities:
«**INFRAEOSC destination**»
Enabling an operational, open and FAIR open science cloud ecosystem

Horizon Europe, Pillar I, Research Infrastructure

https://rea.ec.europa.eu/funding-and-grants/horizon-europe-research-infrastructures_en

PARTNERSHIP'S KEY PERFORMANCE INDICATORS

KPI NAME	UNIT OF MEASUREMENT	BASELINE	TARGET 2023	TARGET 2025	TARGET 2027	AMBITION >2027
RESOURCES (INPUT), PROCESSES AND ACTIVITIES						
Immediate open access availability of publications from EOSC members	% of publication record	N/A	70 % of total publication record by 2023	80 % of total publication record by 2025	85 % of total publication record by 2027	>95 % of total publication record
(European) Data stewards curricula recognition within national education systems	# of national education systems	N/A	5	10	15	>90 % of the EOSC-A member systems
Implementation of policies requiring data sharing and incentivise re-use.	% of EOSC research funding members	N/A	70 %	75 %	80 %	100 %
OUTCOMES						
Availability of pan-European infrastructures for preservation, management and sharing of research software	#	TBD	TBD	3	2	1 (the ambition is to integrate all the then existing infrastructure)
Percentage of the active data spaces that take up data management practices, including the FAIR data principles.	%	0	Qualitative: a number starting	50 %	75 %	>90 %
IMPACTS						
Number of geographically spread observer organisations that have joined EOSC from outside EU MS/AC	#	TBD	10	15	20	25
Number of interconnections with clouds and commons from outside the EU	#	TBD	2	4	6	8

KEY PERFORMANCE INDICATORS

EOSC implementation: a long-term process

- EOSC is a European Commission vision since **2015** recognised by the Council of the European Union among the 20 actions of the policy agenda 2022-2024 of the European Research Area (ERA) with the specific objective to deepen open science practices in Europe.
- A «science, research & innovation data space» linked with the other data spaces defined in the EU strategy for data.

- Initial phase of implementation (2015-2020), the EC invested to prototype components of EOSC through calls under the programme Horizon 2020.
 Interim EOSC governance to prepare the strategic orientations for the EOSC implementation post-2020

- Current phase (2021-2030) is taking place in the context of the EOSC European co-programmed partnership launched in 2021, and according to a Strategic R&I Agenda (SRIA) co-developed by EOSC community
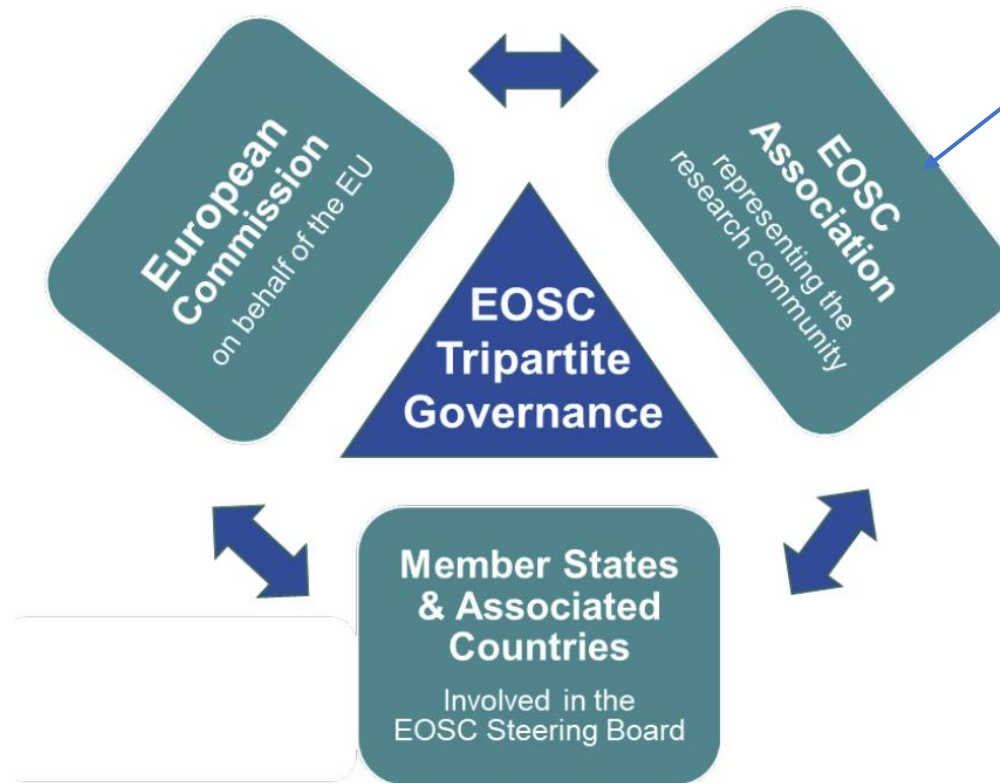
ERA - https://ec.europa.eu/info/sites/default/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_era-policy-agenda-2021.pdf
EU data strategy, https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en
SRIA - https://www.eosc.eu/sites/default/files/EOSC-SRIA-V1.0_15Feb2021.pdf

Tripartite governance

EOSC Association (EOSC-A)

Concept of strategic coordination between
- the EU represented by the EC,
- the participating countries represented in the EOSC steering board (EOSC-SB)
- the research community represented by the EOSC Association (EOSC-A) to resource and support the implementation of the EOSC ecosystem in Europe.

EOSC-A – the EOSC association

EOSC-A set up in July 2020 as an international non-profit organisatuon to provide a single voice for advocacy and representatuon for the broader EOSC stakeholder community.

Actual mandeted organisations/members/observers: 257 organizations (e.g. GARR is a mandate organisation, INAF is a member)

Defines the strategic R&I agenda (SRIA) and its Multi-Annual Roadmap (MAR) [https://eosc.eu/sria-mar/] to devise a set of priorities and outcomes.

A community consultation on updates to the MAR 2026-2027 is running through 22.09.24 considering the 3 levels for implementation (European, national, institutional).

EOSC-A Task Forces

The **FAIR Metrics and Digital Objects** Task Force aims to address the challenges associated with the federation of FAIR data by extending traditional FAIR metrics, which predominantly focus on repository features. The Task Force's main goals include evaluating data reusability and defining new FAIR metrics to assess data and repository suitability for federation.

- surveying existing technologies for metadata schemas,
- identifying limitations in managing private data in repositories,
- exploring synergies with Data Spaces, proposing new FAIR metrics, and developing data quality indicators.

https://eosc.eu/eosc-task-forces/

EOSC-A – opportunity area expert groups

A mechanism for voluntary collaboration on technical and related matters, including representatives from current HE EOSC-related projects and EOSC-A TF.

The six EOSC Opportunity Area Expert Groups are designed to maximise the impact of the HE EOSC-related projects through strategic collaboration and co-creation of outputs with experts from the EOSC-A Task Forces.

⌄ OA Expert Group 1

Persistent Identifiers

⌄ OA Expert Group 2

Metadata, Ontologies and Interoperability

⌄ OA Expert Group 3

FAIR Assessment and Alignment

⌄ OA Expert Group 4

User and Resource Environments

⌄ OA Expert Group 5

Skills, Training, Rewards, Recognition & Upscaling

⌄ OA Expert Group 6

Open Scholarly Communication

EOSC EU Node

- a reference node for EOSC provided by the EC, that offers access to a diverse range of research outputs, services and tools.
- A EU platform and information gateway to explore, engage, and enrich research collaborations.
- A platform that facilitates the creation of the EOSC Federation, to provide a technical and administrative blueprint and interoperability framework for other potential infrastructure node candidates (e.g, an Italian EOSC Node ??)
- The first EU-level node of the EOSC Federeation, promoted by EC as an operationalised platform in production.

__EOSC EU Node__ as the first reference implementation of a gateway designed to streamline access to scientific data, publications, software and services. Video
https://www.youtube.com/watch?v=67mirPt-FhY&ab_channel=DigitalEU

https://open-science-cloud.ec.europa.eu/

INAF involvement in EOSC-related projects

EOSCpilot project (The European open science cloud for research pilot project GA n. 739563),

https://eoscpilot.eu/

ESCAPE project (European science cluster of astronomy & particle physics EFRI research infrastructure GA 824064)

https://projectescape.eu/

NEANIAS project (Novel EOSC services for emerging atmosphere, underwater and space challenges, GA 863448 2019-2021)

https://www.neanias.eu/

- In modern astrophysics observations from the ground and space are two inseparable and complementary aspects of the study of the Universe and both observatory and facility operations require global, open access to data, long term curation and sustainability as well as hardware and software infrastructures and tools for storing and processing data acquired from ground and space observations.
- A profound expertise in data stewardship practices come from a long collaboration with the IVOA (International Virtual Observatory Alliance, https://ivoa.net/) and thus the adoption of Virtual Observatory standards and methods following the FAIR principles.

INAF activities under the auspicious of USCVIII

Monitoring by EOSC-A : two parallel surveys (annually) for <u>additional activities</u> as the contributions of the members which are not financed by the EU

- EOSC-A contribution to Additional activities survey (**AAP- Additional activities plan**),
  https://eosc.eu/news/eosc-partnership-monitoring-framework-aap – estimation of contributions foreseen for the next year

- **AAR Additional activities report** - https://eosc.eu/additional-activities-surveys-training-and-support/ - validation of the contributions provided in the AAP of the previous year (e.g, in 2024 the AAR for the AAP 2023).

2024

- **Training & skills development (cat5):** *Education, training & skills development in Open Science & FAIR data management of research artifacts*
- **Contribution to the development of new standards, regulations and policies (cat6):** *support research communities to develop &/| adopt domain-specific standards as well as to consolidate common metadata and/or schema for use in the EOSC context (e.g. IVOA)*
- **supporting ecosystem development (cat7):** *development of consensual EOSC frameworks and guidelines (e.g, for interoperability, AAI infrastructure);* support to knowledge building and sharing across disciplines; activities contributing to strategic and operational alignment, coordination/synergies with other structures; being contact point for EOSC uptake
- **communication, dissemination, awareness rasing, citizen engagement (cat 8):** *EOSC-related communication, dissemination, outreach & awareness raising activities; promoting EOSC at all levels by engaging with revelant communities and stakeholders*
- other (cat 9): supporting open access; adoption of new policies in open science - COLLABORAZIONE CON con "INAF open science Working Group https://openscience.inaf.it/

AAP 2024

Example of some INAF activities in AAP 2025

- **Support to additional R&I (cat1)**: *Deployment of online tools for FAIRification for astrophysical community*
- **Training & skills development (cat5)**: *Education, training & skills development in Open Science & FAIR data management of research artifacts*
- **Contribution to the development of new standards, regulations and policies (cat6)**: *support research communities to develop and/or adopt domain-specific standards as well as to consolidate common metadata and/or schema for use in the EOSC context (e.g. IVOA)*
- **supporting ecosystem development (cat7)**: *development of consensual EOSC frameworks and guidelines (e.g, for interoperability, AAI infrastructure);* **building industry-academia cooperation;** *activities contributing to strategic and operational alignment, coordination or synergies with other structures; being the contact point for EOSC uptake at national or institutional level*
- **communication, dissemination, awareness rasing, citizen engamenet (cat 8):** *EOSC-related communication, dissemination, outreach and awareness raising activities; promoting EOSC at all levels by engaging with revelant communities and stakeholders.*

2025

EOSC group @INAF

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Other interested?