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EVERSE

Paving the way towards a European Virtual Institute for Research Software Excellence

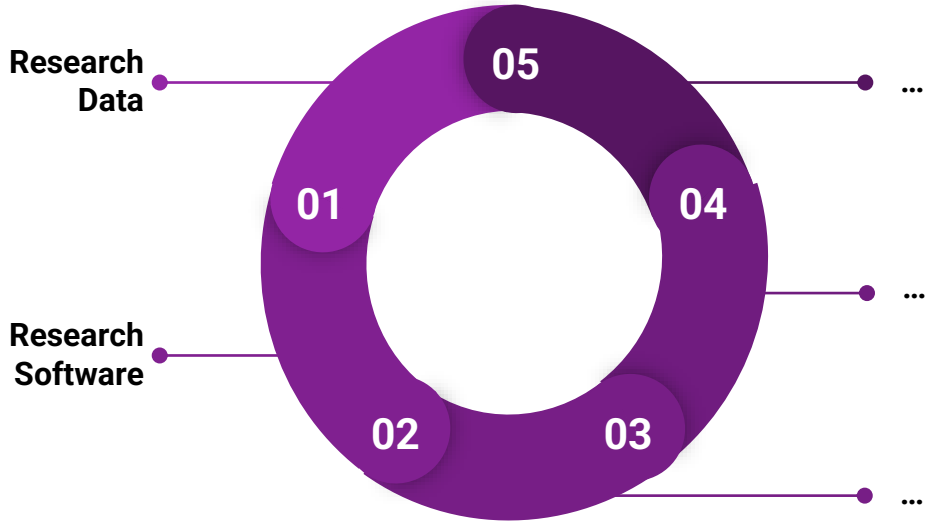
Funded by the European Union

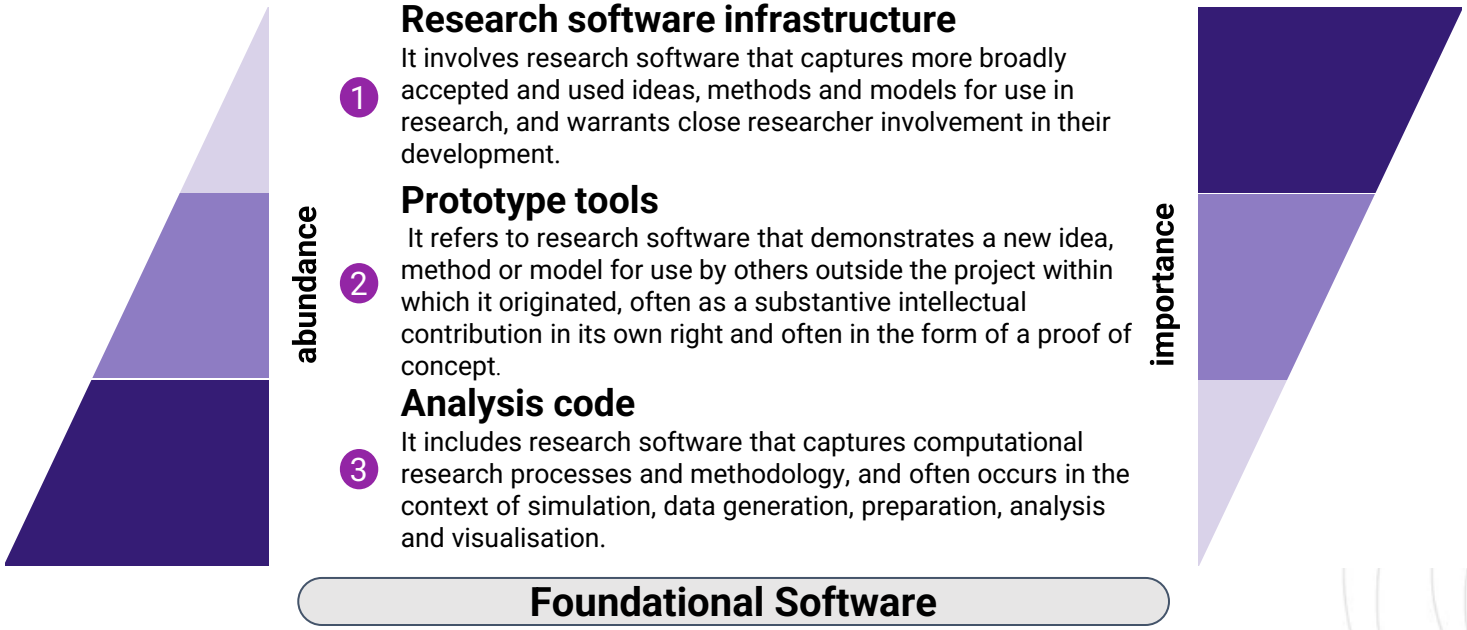
07 | 05 | 2025 by Graeme Stewart (CERN)

- Software is a critical part of our scientific process
  - From simulation and digital twins, to data acquisition and analysis of results - software is vital to transform data into knowledge!
    - 92% of academics use software tools; 70% of researchers say their work would be impossible without software*
  - The size of the software required to support recent experiments is growing
    - Our organisations are still evolving to recognise this increasing need for software
- Consequently, *software quality* really matters to us
  - Software has to be a good fit for its purpose
- We strive to make our software FAIR
  - Findable; Accessible; Interoperable; Reusable

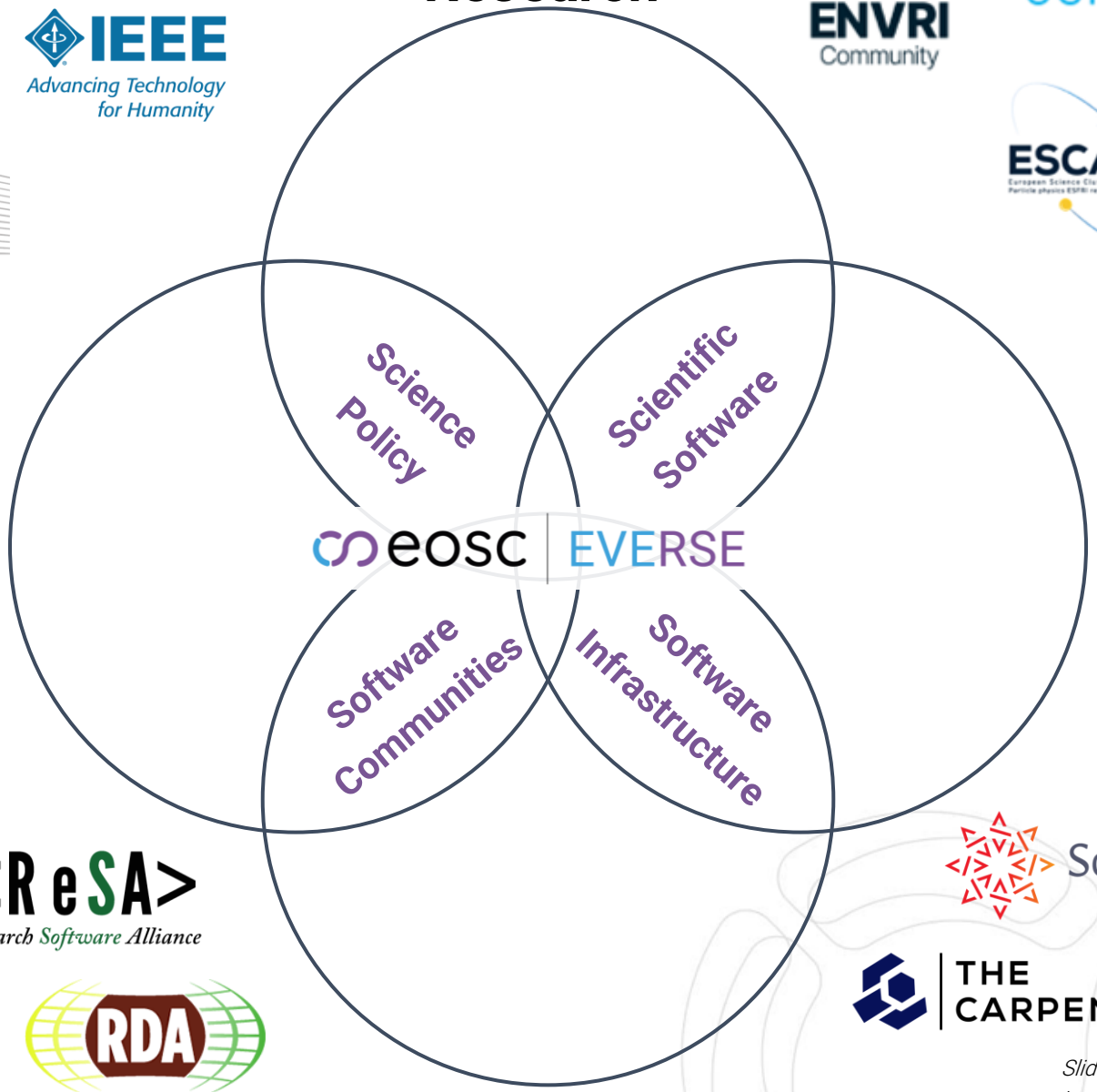
*https://www.software.ac.uk/blog/its-impossible-conduct-research-without-software-say-7-out-10-uk-researchers

Research Software as a first-class citizen for scientific endeavours





- Not all software has the same *level* of importance, but it is all important!
- Differentiated criteria and metrics



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IEEE Advancing Technology for Humanity

ENVRI Community

LIFE SCIENCE RI

panosc photon and neutron open science cloud

European Commission

ESCAPE

SSHOpenCluster Social Sciences & Humanities Resources

eosc

Bioconductor OPEN SOURCE SOFTWARE FOR BIOINFORMATICS

julia

PyTorch

SCIENCE FOR AFRICA FOUNDATION

HSF HEP Software Foundation

RSE

NUMFOCUS OPEN CODE = BETTER SCIENCE

<ReSA> Research Software Alliance

Software Heritage

Software Sustainability Institute

RDA RESEARCH DATA ALLIANCE

THE CARPENTRIES

Open Life Science

Slides adapted from the "OrgMycology - eResearch NZ 2024" by Jonah Duckles (orgmycology)

EVERSE: European Virtual Institute for Research Software Excellence

ORGANIZATIONAL MYCOLOGY

EVERSE

Paving the way towards a **E**uropean **V**irtual Institut**e** for **R**esearch **S**oftware **E**xcellence

EVERSE aims to create a framework for research software and code excellence, collaboratively designed and championed by the research communities, in pursuit of building a European network of Research Software Quality and setting the foundations of a future Virtual Institute for Research Software Excellence

- ensure research software curation, quality, preservation and adoption of best practices, by the Communities, for the Communities, build on collaboration with the five EOSC Science Clusters
- adopt a three-tier model for research software, i.e., analysis code, prototype tools and research software infrastructure, which captures the varying complexity of research software and its development, and can be used as a basis for research software excellence
- credit and recognition for both developers and software are essential components of our strategy to promote sustainable software practices

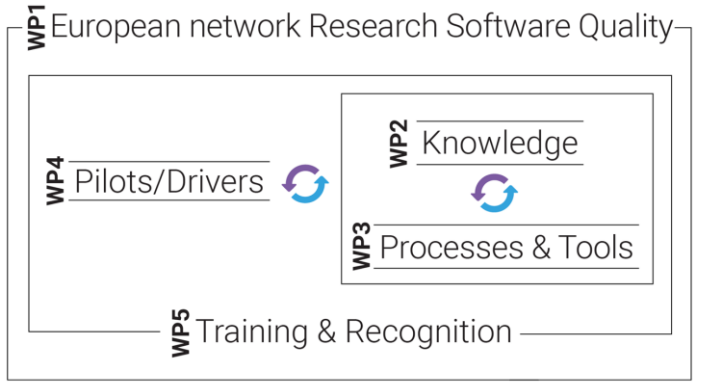
Mar/2024 → Feb/2027 (36 months)

15 Beneficiaries, 1 Associated partner & 2 Affiliated entities

Coordinated by CERTH and BSC

Partners, associates, and affiliated entities

Objectives



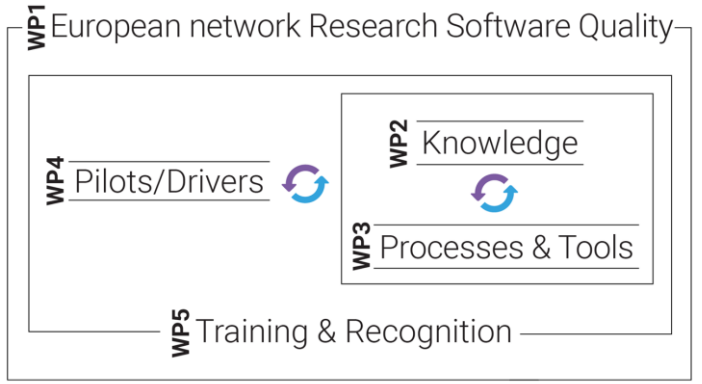
Objective #1: *Ensure that Open Science practices and skills are rewarded and taught, becoming the new normal*
EVERSE will:

- ✓ Provide a framework that will ensure appropriate recognition, reward, and career development for researchers and RSEs who implement research software and code quality assurance practices and policies

Objective #2: *Enable the definition of standards, and the development of tools and services, to allow researchers to find, access, reuse and combine results*
EVERSE will:

- ✓ Leverage existing tools and resources to support the evaluation, verification and improvement of research software and code quality, based on existing practices and standards across research communities represented by the five EOSC Science Clusters.
- ✓ Establish a sustainable and collaborative ecosystem of stakeholders across the research communities associated with the five EOSC Science Clusters to ensure research software and code quality assurance and support the advancement of reliable and reproducible research.

Objectives

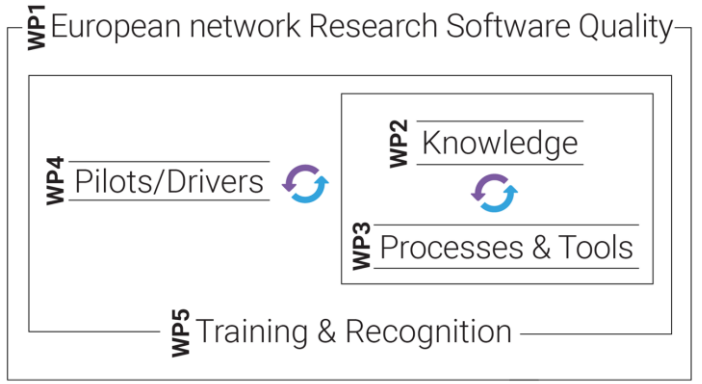


Objective #3: *Establish a sustainable and federated infrastructure enabling open sharing of scientific results*

EVERSE will:

- ✓ Build a collaborative, community-led structure for evaluating, verifying, and improving the quality of research software and code, by actively involving researchers, software developers, and other stakeholders in the research community.

EVERSE Workflow



- Knowledge about software best practices is captured and distilled in WP2: *Community-led* best practices for developing high-quality research software
  - The Research Software Quality Kit, a.k.a. the RSQkit is the concrete output of commonly applicable practice
- Tools to help ensure software quality are identified and curated in WP3: Tools and services for software quality and FAIRness
  - Help integration into software quality pipelines and develop appropriate software quality indicators that can be used by the communities
- Informing and testing these outputs are the WP4: EVERSE Pilots and Drivers
  - Michael will discuss these after me
- Helping to ensuring that people writing code have the correct skills and receive appropriate rewards is WP5: Training and Recognitions
  - Kenneth will talk in detail about this in the afternoon
- Finally, WP1: Framework of the European Network of Research Software Quality helps dissemination, connections to the science communities (2-way!) and building the European Virtual Institute for Research Software Excellence as a common endeavour

ESCAPE/HEP Projects:
- Optimise ML enabled data Compression
- Refine reconstruction and data analysis software built for Open Science

Technical Overview

T1.1 Establish EU Research Software Quality Network

T1.2 Engage diverse science communities

T1.3 Establish global links for collaboration

T5.1 Organize domain-specific training

T5.2 A framework for recognition of Trainers and RSEs

T5.3 Long-term training activity

T2.1 Best practices in research software development

T2.2 Curate & standardize best research software practices

T2.3 Evaluate software quality, FAIRness, and maturity

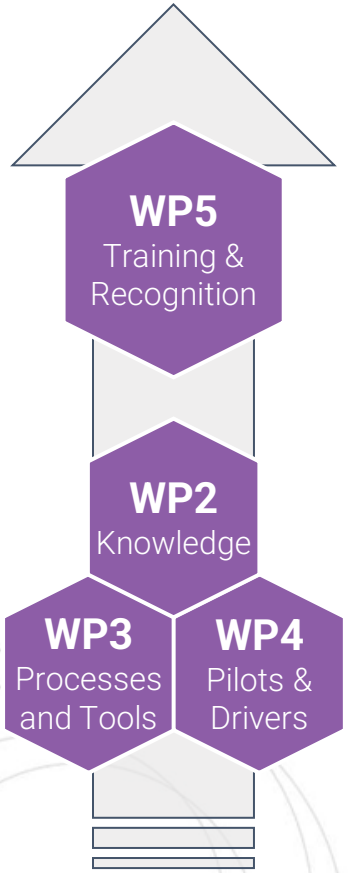
T3.1 Tools for enhancing scientific software quality

T3.2 Streamline tools for easier research community adoption

T3.3 Global measure of Science Clusters' software quality

T4.1 Software assessment in Science Clusters

T4.2 Best practices via community-driven pilots



Key impacts and deliverables

- A framework of community curation is established and promoted that ensures quality of software and code across the different disciplines.
- Infrastructure, tools and services are deployed that allow researchers to properly develop, describe with proper metadata, version, archive, share and reuse research software.
- The notion of software quality is defined in the context of EOSC and builds upon established practices by the FAIR and other communities.
- Baseline quality indicators of "minimum quality" defined for the different types of digital objects targeted (software, code, etc), taking into account the concept of "fit for purpose".

Expected impact

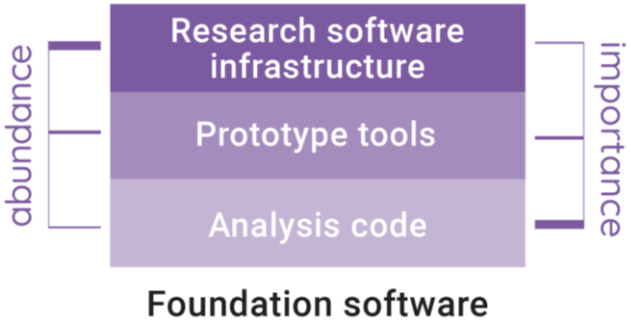
- ✓ The quality of research software (technical and organisational) improved, in general (e.g. software for data analysis) and in particular for software used in the services offered through EOSC.
- ✓ Software is developed in a sustainable way and its reuse is maximized.

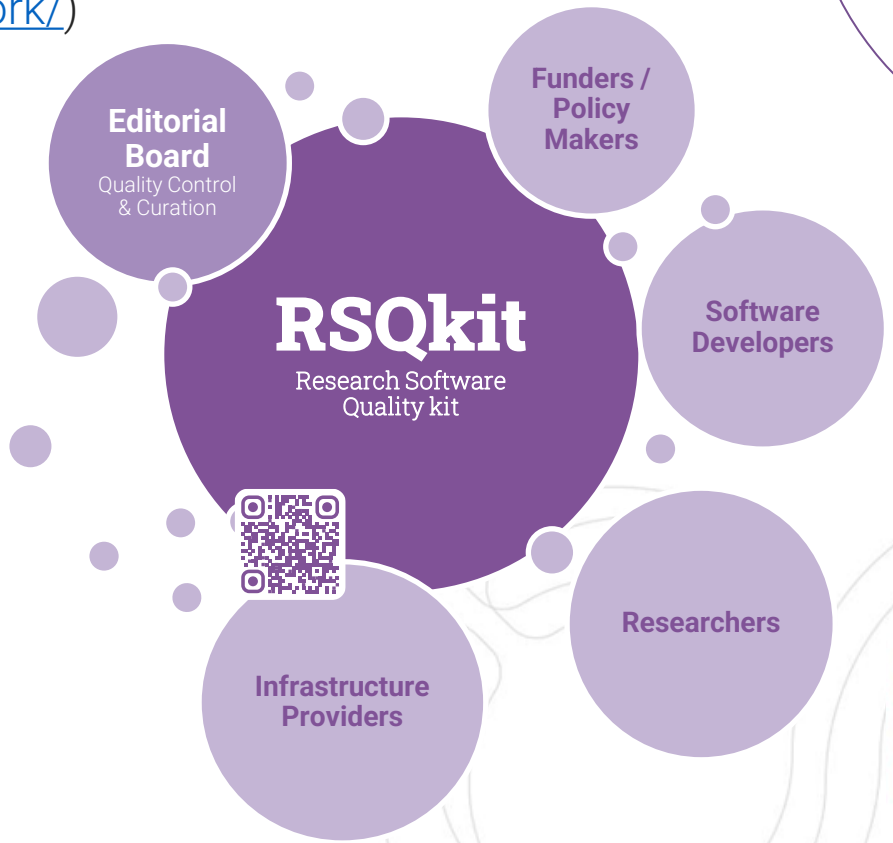
Establishing a Community

How to contribute to, and engage with EVERSE

Elements of EVERSE

- The Network (https://everse.software/network/)
- RSQkit (https://everse.software/RSQKit/)
- Software Reference model
- Training
- Recognition framework





Join Us

Any individual or organization that agrees with our vision statement is welcome to join the network

The EVERSE Network: Events, Training and Seminars

- We aim to gather topics of interest in software quality for community discussion and presentation (Indico)
  - February – Network Launch Event
  - April – Mapping the Landscale of Software Quality (EVERSE) WP2
  - May - Network Training: Research Software Quality Assessment
  - June – Julia and GPUs, held jointly with the HSF's Compute and Accelerator Forum
- Event engagement reaches out at community events to run training and hackathons
  - European Bio-hackathon
  - deRSE – RSQKit contentathon and a skill-up session on CITATION.cff and Codemeta
  - RSECon
  - Africa Event – co-organised with international partners (Talarify, Science for Africa, Research Software Alliance)
    - Engage with the African RSE community

Connections and Collaborations

Immediate collaborations

OSCARS
Open Science Clusters' Action for Research & Society

Skills 4 eosc

eosc | OA Expert Group: Research Software

eosc | FAIRCORE4EOSC

SciLifeLab

related projects

eosc | FAIR-IMPACT
Expanding FAIR solutions across EOSC

AI4 | eosc

graspos
open research assessment dataspace

TIER 2

eosc | cancer

Scilake

eosc | RAISE
Research Analysis Identifier System

projects that can benefit from/contribute to EVERSE

ostrails

eosc | SIESTA

eosc | ENTRUST
European Network of Trusted Research Environments

HSF
HEP Software Foundation

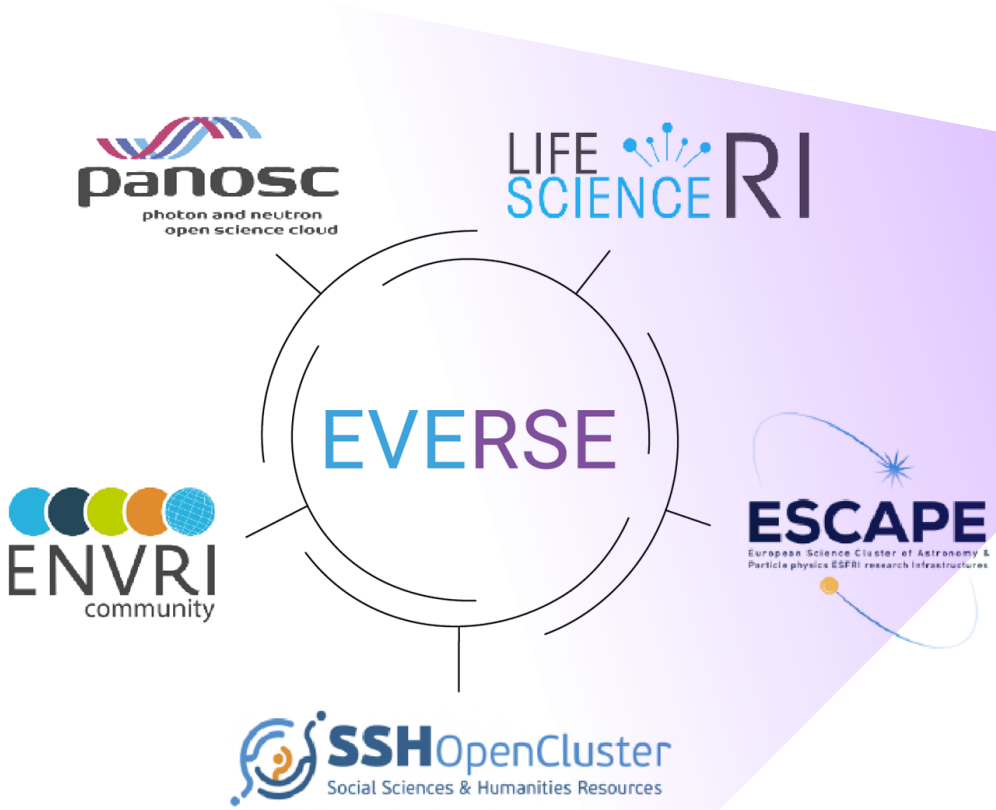
elixir | STEERS

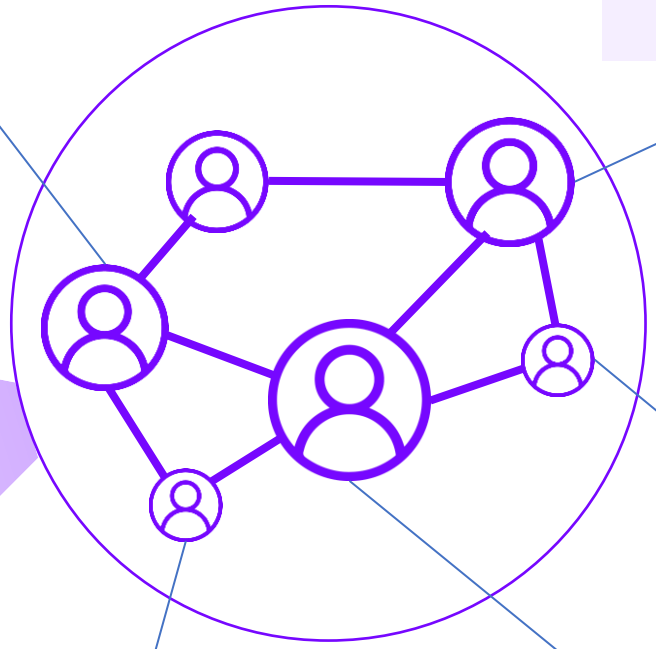
eosc | EuroScienceGateway

European Genomic Data Infrastructure

SWIFT HEP

Our Ambition





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Thematic community nodes

National nodes

Other data infrastructure nodes

Reference EOSC EU Node

European e-infrastructures

Thank you!

EVERSE@WLCG-HSF:

- EVERSE Overview – this talk
- Use Cases and the Research Software Quality Kit – next talk
- The EVERSE Training and Recognition Plan – in the training session this afternoon

Contact: contact@everse.software

EVERSE Network	https://ec.europa.eu/eusurvey/runner/EVERSENetworkJoinIndividual
Website:	https://www.everse.software/
BlueSky:	https://bsky.app/profile/eosc-everse.bsky.social
LinkedIn:	https://www.linkedin.com/company/eosc-everse/
FOSSTodon:	https://fosstodon.org/@eosc_everse

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