

EVERSE

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

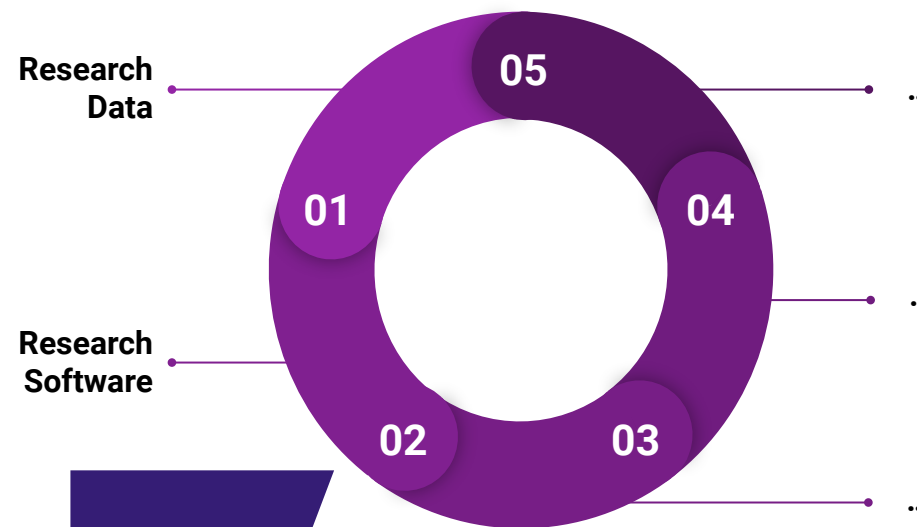
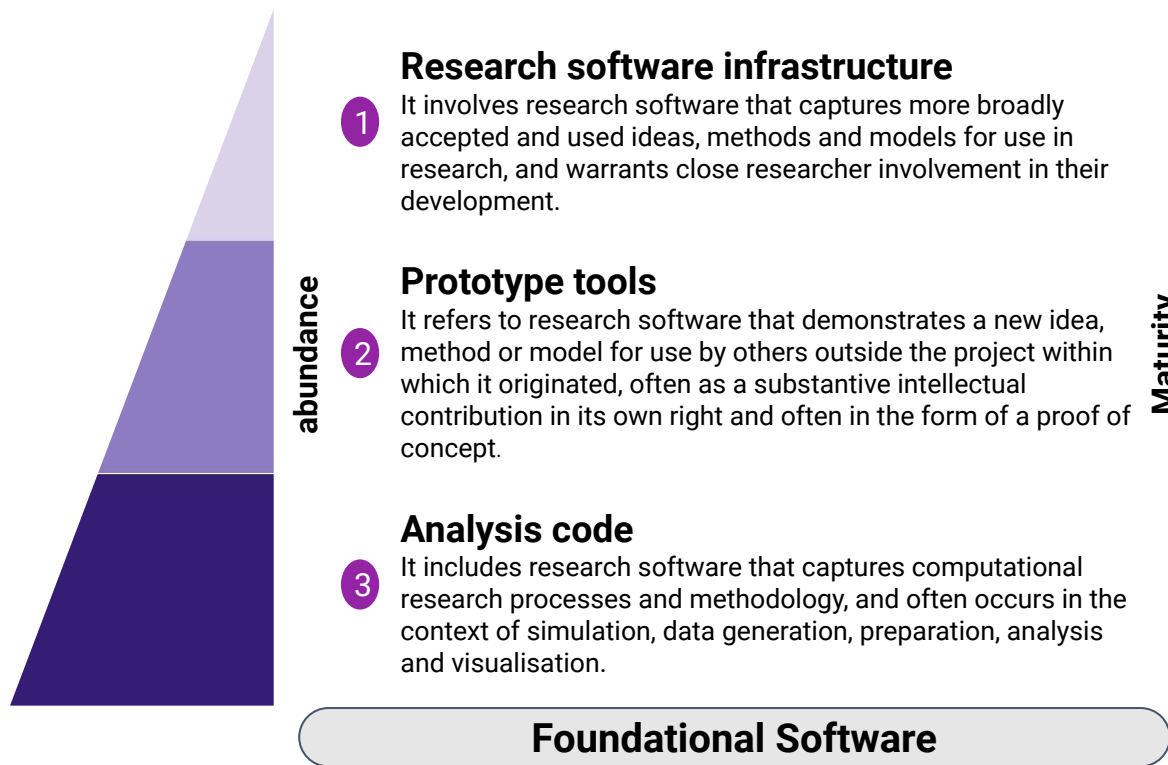


**Funded by
the European Union**

24 | 09 | 2024 by **Daniel Garijo** (Universidad Politécnica de Madrid), using slides from Fotis Psomopoulos (CERTH) and the EVERSE consortium
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Research Software as a first class citizen for scientific endeavours



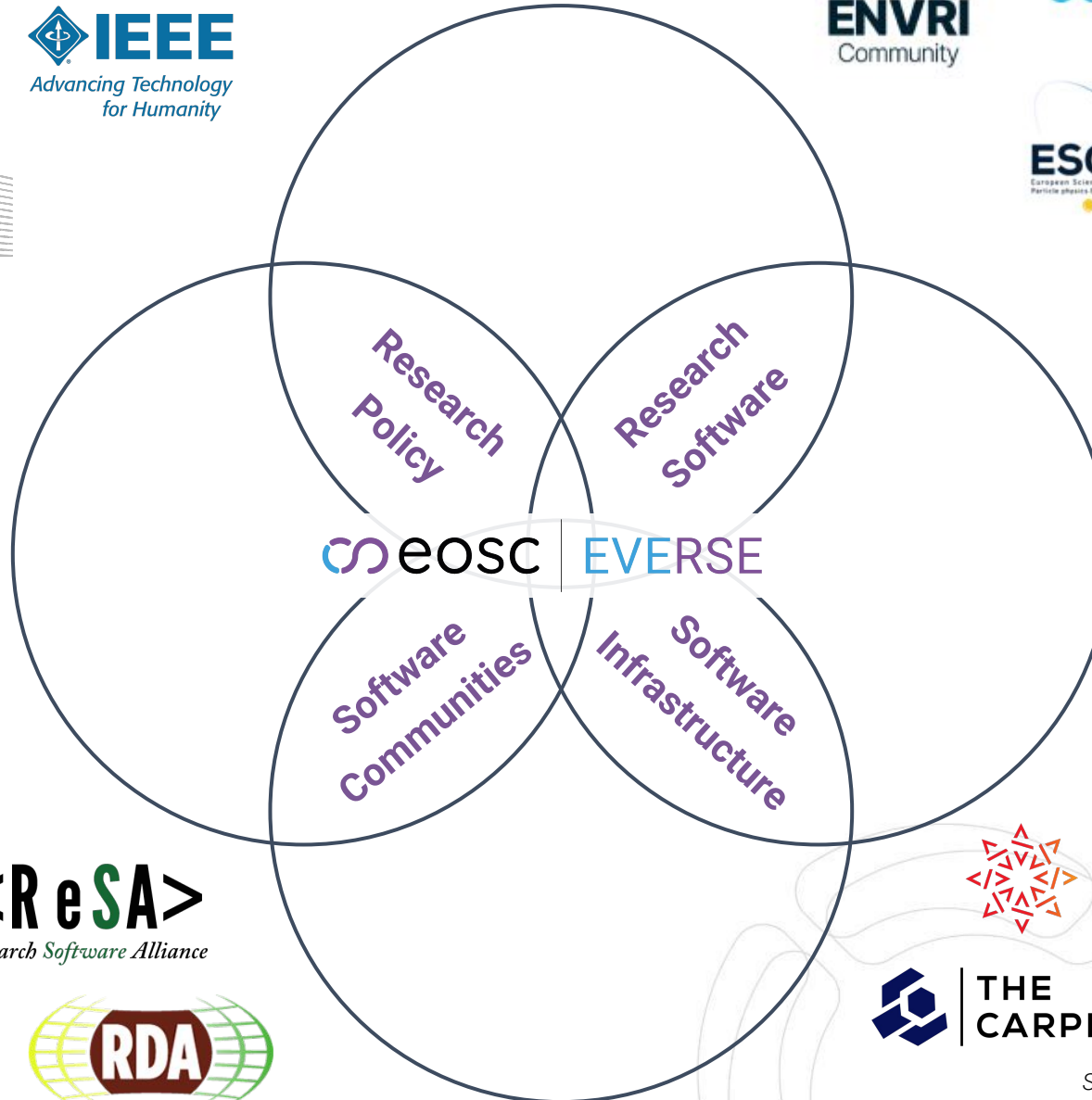
Not all research software has the same level of maturity

eosc | EVERSE



eosc

Leadership



Software



Software Sustainability Institute



Communities



Software Heritage



THE CARPENTRIES



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



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

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

Partners, associates, and affiliated entities



Pilots & Drivers



Environmental Sciences: *Integration of Science Cluster ENVRI through ENVRI-HUB*

- Integrate EVERSE framework into the ENVRI-HUB Knowledge base and Virtual Research Environment
- Apply to the development of the Essential Climate Variable computing program and cloud workflows



Life Sciences: *Integration of Science Cluster EOSC-Life through ELIXIR*

- Make RO-Crate actionable by incorporating the five safes concept into WfExS for secure and federated workflow orchestration
- Use of community-led standards for materialising research software packaged using container technologies and mobilising encrypted data whenever needed



Astronomy and particle physics: *Integration of Science Cluster ESCAPE through the Dark Matter Test Science Project*

- ML for scientific data compression (standalone code, python)
- Choose an ATLAS trigger algorithm as an option for the collaboration



Proton and neutron science: *Integration of Science Cluster PaNOSC through LEAPS/LENS*

Transition software to high performance computing (HPC) and heterogeneous computing architectures

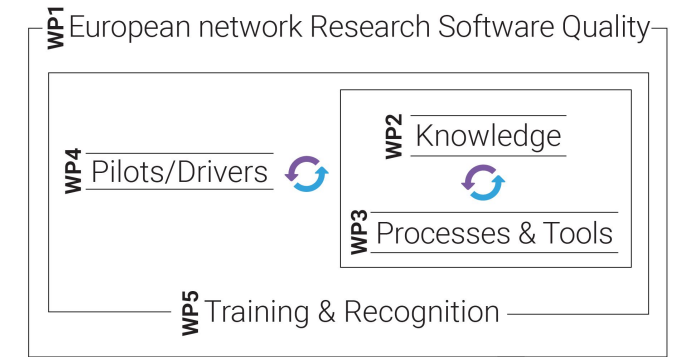


Social sciences: *Integration of Science Cluster SSHOC*

Develop a multi language textual analysis pipeline of tools that use a combination of open source tools and own code

Project objectives

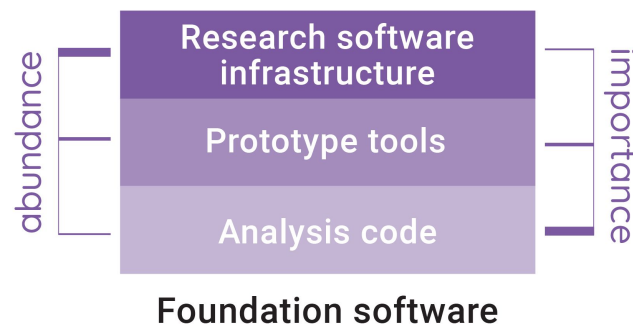
- ✓ Provide a **framework** that will ensure appropriate **recognition, reward, and career development** for researchers and RSEs
- ✓ **Leverage existing tools and resources** to support the evaluation, verification and improvement of research software and code quality, based on **existing practices and standards**
- ✓ Establish a **sustainable and collaborative ecosystem of stakeholders** across the research communities associated with the five **EOSC Science Clusters**
- ✓ Build a **collaborative, community-led structure** for evaluating, verifying, and improving the quality of research software and code,



Establishing a Community

How to contribute to, and engage with EVERSE

- Network (Goals, Vision, Participation doc)
- RSQkit (<https://everse.software/RSQKit/>)
- Reference framework
- Training
- Recognition



Connections and Collaborations

Immediate collaborations



related projects



projects that can benefit from/contribute to EVERSE

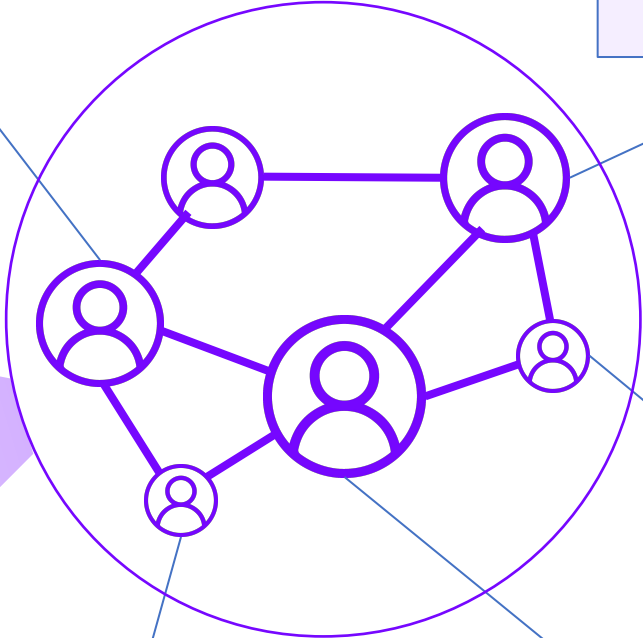


Our Ambition

EVERSE has submitted a formal EoI in establishing a **thematic Node** under the **EOSC Federation**

Thematic community nodes

National nodes



Other data infrastructure nodes

European e-infrastructures

Reference EOSC EU Node



Thank you!

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**Funded by
the European Union**

This project has received funding from the European Union's Horizon Europe Programme under GA 101129744 – EVERSE – HORIZON-INFRA-2023-EOSC-01-02

Additional slides



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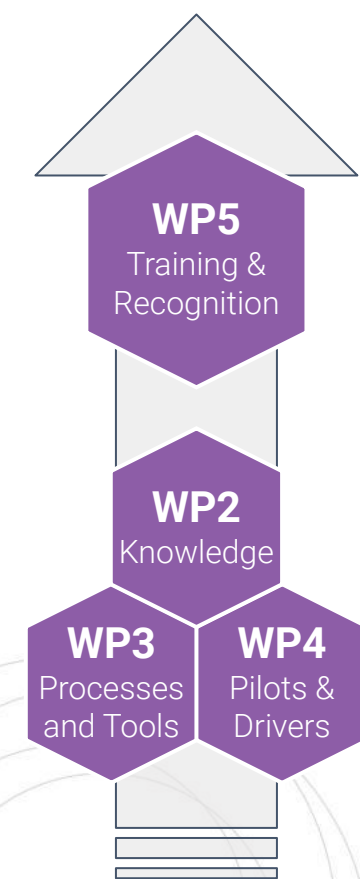
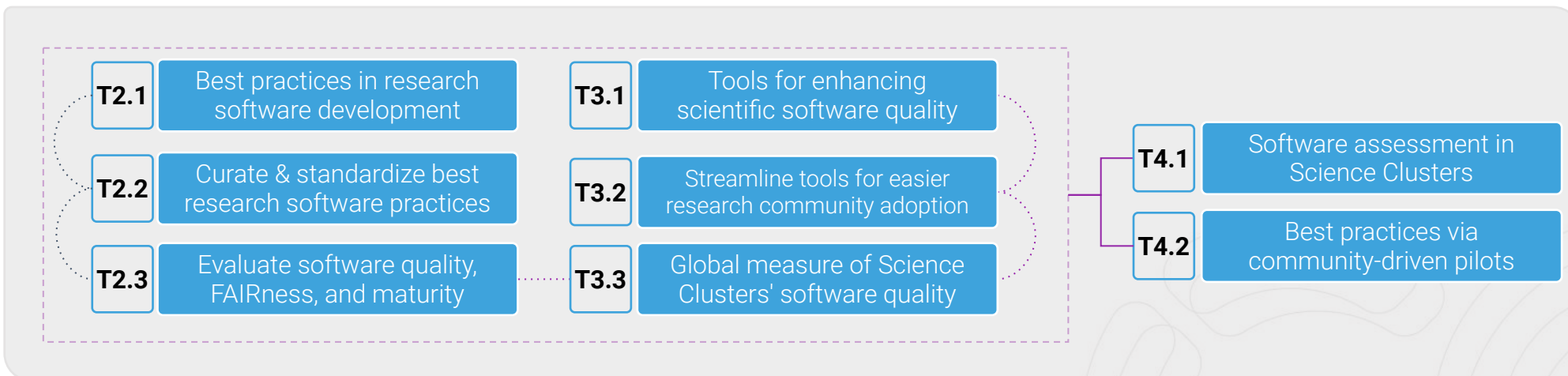
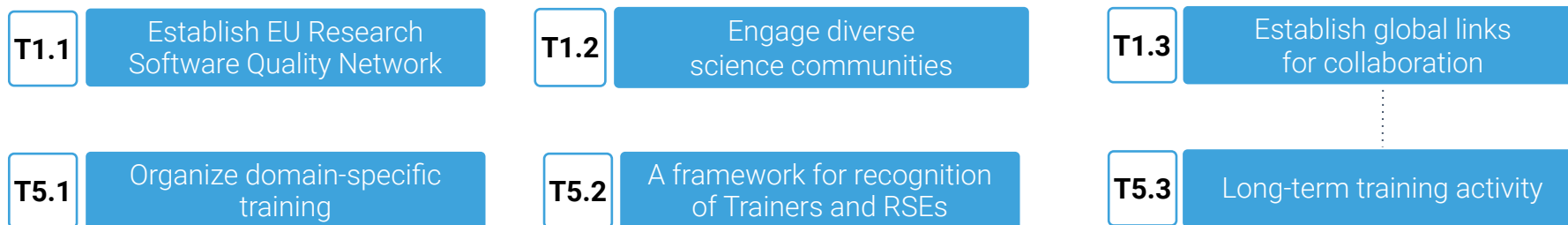
Key impacts and deliverables

- 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.

Technical Overview



WP1: Network

- Establish the **EVERSE Network of Research Software Quality** (T1.1)
 - A meeting point for a Community of Practice for software quality
 - Open to individuals and organisations internationally
 - Will be an EOSC Expert Group on software
 - Help to shape best practices and get help and advice from like minded partners
 - Will host seminars, webinars and other events to promote and recognise software quality
 - The network is forming now, so we are very interested to work with any *early adopters*
- Reaching out to **Science Communities** (T1.2)
 - Showing the benefits of the EVERSE network and matching specific domain needs
 - Organisation of events such as hackathons to promote best practice and network involvement
- Links to **European, international organisations and industry** (T1.3)
 - Benefit from and reinforce existing policies and practice regarding software quality
 - Align and co-develop shared solutions and host common events

Global engagement

Designing a multinational Research Software event

- EVERSE and the Science for Africa Foundation agreed to have a joint event during the project's lifetime
- Now joined by the Research Software Alliance (ReSA) and the Research Software and Systems Engineers (RSSE) of Africa/Talarify
- Two-step event:
 - 1. Satellite event at an African RSE conference: workshop on assessing existing expertises as well as needs for researchers who codes, while EVERSE intergrates them into Network and offers resources
 - 2. 1-2 day event with a set of session dedicated to talks, trainings, online resources and teaching content; ideally recurring
- Aim is to merge both RSE movements, help and learn from each other

Draft event document here:

https://docs.google.com/document/d/1frliFFhV4P0NX6s1IE5_2DfdKY6eadd9P7LIf7yLHcQ/edit

WP2: Best practices

Community-led best practices for developing high-quality research software

Each research community has its own techniques for computing-based research. Work package 2 works towards assessing all these approaches and developing common grounds for best practices applicable to all developers. The Research Software Quality kit will be a knowledge hub that collects existing expertise while ensuring improvement.

The curated best practices are gathered across four pillars: technical quality, FAIR principles, Openness and Software Sustainability. They are used to find a common framework and act as measurables for indicators of software quality. Woven into the RSQkit, these practices will be incorporated into the future Virtual Institute driven by WP1.

CURRENT ACTION: conducting **survey** among communities => **landscaping** of best practices (T2.1)

UPCOMING: **consolidate/curate** best practices in RSQkit

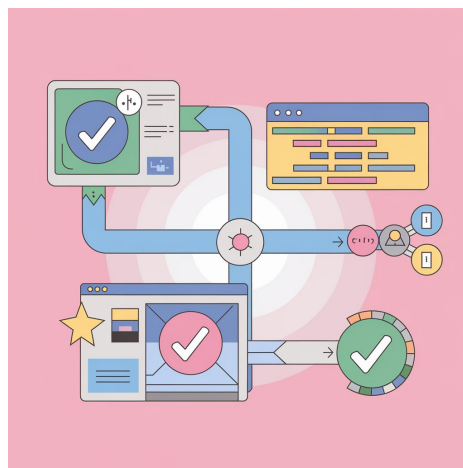
WP3: Tools and services for software quality and FAIRness

O3.1 (on-going): To establish a **technology watch** identifying and **gathering tools and services** targeting scientific software, code, and workflows **quality and FAIRness**

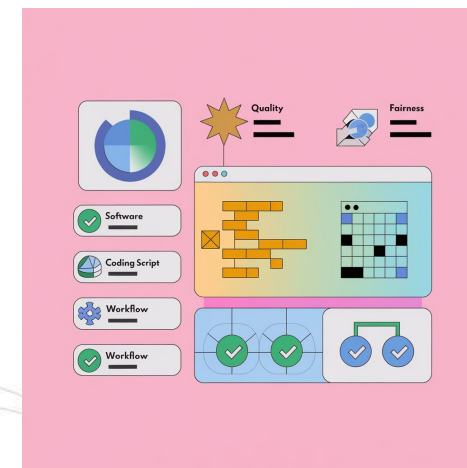
O3.2 (2nd phase): To assist the Science Clusters in **measuring and improving** software, code, and workflows **quality and FAIRness globally** by combining existing tools and services into common frameworks



Technology Watch for tools and services for software quality



Integrated pipelines to measure and improve software quality



Dashboards to measure globally the software quality and its evolution

WP4: EOSC Science Cluster Pilots and Driver projects

- Structuring and refining the software assessment process through the Science Clusters
 - Develop and implement a process to evaluate scientific software quality (WP2/WP3)
 - Generate reports on software quality
 - Create reports on the adoption of EVERSE output
- Integration and showcase of good practices through the community driven pilots
 - ENVRI through ENVRI-HUB: Essential Climate Variable computing program and cloud workflows
 - EOSC-Life through ELIXIR: Make RO-Crate actionable by incorporating the five safes concept into WfExS for secured and federated workflow orchestration
 - ESCAPE through the Dark Matter Test Science Project: multiple software packages
 - PaNOSC through LEAPS/LENS: transitioning software to high performance computing (HPC) and heterogeneous computing architectures
 - SSHOC: multilanguage textual analysis pipeline

WP5: Capacity Building and Recognition

- Collect, curate and enhance training resources
 - Align training material with best practices in the science clusters
 - Conduct a landscape analysis of existing material and fill the gaps as needed
 - Make training resources available via tools developed by EVERSE partners (e.g. [TeSS](#)) and connect those to the RSQKit
- Build a framework for recognition of trainers and RSEs
 - Start from tools developed within EVERSE (e.g. [Bip!Scholar](#), [Apicuron](#)) and extend as needed
 - Align with [EOOSC “Research careers, recognition and credit” task force](#)
- Establish long-term training activities
 - Incorporate training into existing curricula and make those available (e.g. via a “monthly discovery series”)
 - Develop a network of trainers and establish a process to keep them engaged
 - Provide feedback to universities and schools on needed training for research software engineering