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

**RESEARCH SOFTWARE NECESSITATES GOOD ENGINEERING AND CLEAR ORGANISATIONAL PROCESSES**

Software is ubiquitous in modern society; from our cell phones to our transportation, and from entertainment to industry. Research communities have created numerous software applications that are essential to scientific progress. A common theme is that considerations about the reliability of these applications, including how effectively they can be reused and their long-term sustainability, are critical aspects to keep track of.

Imagine for instance, a scenario where doctors and scientists are using software to analyze medical data to make their diagnosis (e.g. precision medicine). If the software isn't built with strong engineering principles and clear processes, it might give incorrect results. Just like a medical instrument needs to be reliable for accurate diagnoses, software used in healthcare must be trustworthy to ensure the safety and well-being of patients.

This necessary trust in research/community software longevity requires a transparent display of good engineering and clear organisational processes that enable the many varied roles working together to sustain software. To ensure research software curation, quality, preservation and adoption of best practices tailored to developers at all levels, from researchers who code to **Research Software Engineers (RSEs),** we need to adopt an approach that accounts for the varying complexity of research software and its development. The three-tier model for research software, namely, **analysis code, prototype tools and research software infrastructure**, aims to capture this complexity and can be used as a basis for research software excellence. Importantly, credit and recognition for both developers and software are essential components of our strategy to promote sustainable software practices.

**OUR VISION**

Coordinated by the Institute of Applied Biosciences (INAB) of the Centre for Research and Technology Hellas, (CERTH), the European **EVERSE** project aims to create a framework for research software and code excellence, collaboratively designed and championed by the research communities across the **five EOSC Science Clusters** (<https://science-clusters.eu/>) and **national Research Software Expertise Centres**, in pursuit of building a **European Network of Research Software Quality** and setting the foundations of a **future Virtual Institute for Research Software Excellence**. **EVERSE** starts in spring 2024 and will run for 36 months with 18 partners across 10 countries.

The University of Edinburgh is participating in EVERSE through EPCC (Prof. Neil Chue Hong, WP3 co-lead, Giacomo Peru and Dr Kirsty Pringle). Building on its leadership of the Software Sustainability Institute and work in FAIR-IMPACT on software metrics and metadata, the team at EPCC will focus on developing and implementing processes and tools that support the assessment and verification of code quality, based on established best practices and standards across scientific communities (WP3), as well as building a collaborative community for evaluating, verifying, and improving the quality of scientific software and code (WP1), and collecting and consolidating best practices and standards from across scientific communities on research software (WP2).

**RSQkit: AN OPEN KNOWLEDGE BASE OF BEST PRACTICE FOR RESEARCH SOFTWARE**

**EVERSE** will address challenges involving community curation, quality assessment, and best practices for research software. This collective knowledge will be captured in the **Research Software Quality toolkit (RSQkit)**, an open knowledge base to gather and curate expertise that will contribute to high-quality software and code across different disciplines. By embedding the RSQkit and services into the **EOSC Science Clusters**, **EVERSE** will demonstrate improvements in the quality of research software and maximise its reuse, leading to standardised software development practices and sustainable research software. Furthermore, **EVERSE** will drive recognition of software as well as support training and career progress for developers, from researchers who code to RSEs, raising their capacity to guarantee software quality. Doing this will also help researchers of research software engineering processes who are focussing on understanding quality measures for research software, and understanding adoption of practices through empirical software engineering approaches.

**CROSS FERTILISATION FOR A MENTALITY SHIFT**

**EVERSE**, as the project umbrella for developing this **European Network for Research Software Quality**, aims to cross-fertilise different research domains, act as a lobbying organisation, and raise awareness of software as a key enabler in research, with the overall ambition to accelerate research and innovation through improving the quality of research software and code. **EVERSE’s** ultimate ambition is to contribute towards a cultural change where research software is recognized as a first-class citizen of the scientific process, and the people contributing to it are credited for their efforts.

**THE VALUE OF EVERSE’s ACTIVITIES**

The target groups that will benefit from EVERSE are EOSC Science Clusters, Research Infrastructures, Research Performing Organisations (RPOs), research departments at Universities and RPOs, including computer science departments, research groups, individual researchers and RSEs, students, funding agencies and policy makers and science-aware public. The implementation of the project is expected to be accompanied by a significant multifaceted impact on a scientific, economic and societal level. In this respect, an impactful cultural and behavioural change in and among research communities will be instilled, including recognition of research software and the people who build and maintain it, and the quality standards relating to research software. Additionally, more efficient use of financial, computational and human resources due to higher quality will be possible, more sustainable research software. And, of course, more awareness of the benefits of Open Science, will be raised.

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For more details on the EVERSE project, please contact the Project Coordinator, Fotis Psomopoulos (fpsom@certh.gr). For more details on the University of Edinburgh’s role in EVERSE, please contact Prof. Neil Chue Hong (N.ChueHong@epcc.ed.ac.uk).