



The EVERSE framework for research software quality assessment

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Research software is equally important as research data...





Outline

- What is "research software"?
- What is EVERSE (<u>European Virtual Institute</u> for <u>Research Software</u> <u>Excellence</u>)?
- What is research software quality?
- What will EVERSE offer?



What is research software?

An inclusive view

- All code and software artefacts that are used and produced in one or more stages of the research lifecycle;
- **Regardless** of the layer of the software stack;
- Software that was not necessarily developed to be part of research...



What is research software?

- Well-identified software that is part of the research discovery process,
- Require specialised domain knowledge,
- A contribution to science and research.



Software in the research lifecycle



Guy Courbebaisse, Bernd Flemisch, Kay Graf, Uwe Konrad, Jason Maassen, & Raphaēl Ritz. (2023). **Research Software Lifecycle.** Zenodo. <u>https://doi.org/10.5281/zenodo.8324828</u>

MODEC EVERSE

Research software in three tiers

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Research software infrastructure

It involves research software that captures more broadly accepted and used ideas, methods and models for use in research, and warrants close researcher involvement in their development.

Prototype tools

It refers to research software that demonstrates a new idea, method or model for use by others outside the project within which it originated, often as a substantive intellectual contribution in its own right and often in the form of a proof of concept.

Analysis code

It includes research software that captures computational research processes and methodology, and often occurs in the context of simulation, data generation, preparation, analysis and visualisation.

Foundational Software

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Partners, associates, and affiliated entities

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Pilots & Drivers



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

- Integrate EVERSE framework into the ENVRI-HUB Knowledgebase 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)
- A Common Tracking Software
- 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 multilanguage textual analysis pipeline of tools that use a combination of open source tools and own code to create an integrated SotA tool capable of deploying locally or as a service



Software quality: a taxonomy







COEOSC EVERSE EVERSE quality model (RSQKit reference framework) Group quality characterstics into four main dimensions



What will EVERSE offer?

Research software quality kit (RSQKit)

- Community "good enough" practices
- Research a software quality model
- Tools to measure the quality characteristics
- Support and training

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Research Software Quality Toolkit for Sciences

Research Software Quality Toolkit (RSQKit) lists curated best practices, tools and resources for improving the quality of research software



Apply EVERSE in ENVRI

ENVRI -HUB

- Catalog
- Knowledge base and Search engine
- Analytics Framework
- Training
- Interface to VRE
- Interface to underlying RI and Cloud



ENVRI-Hub NEXT



Thank you!

Contact: <u>z.zhao@uva.nl</u> ENVRI: <u>www.envri.eu</u>

EVERSE Network https://everse.software/network/

Post-training survey: https://forms.gle/kwTk5P57sfPUZ2X26



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