



Contribution ID: 18

Type: **Poster**

FACILE-RS: Automated Metadata Conversion and Software Publication Based on CodeMeta

Wednesday 26 February 2025 19:40 (20 minutes)

Research software development is a fundamental aspect of academic research, and it has now been acknowledged that the FAIR (Findable, Accessible, Interoperable, Reusable) principles, historically established to improve the reusability of research data, should also be applied to research software. However, specific aspects of Research Software like executability or evolution over time require these guidelines to be adapted, and the FAIR principles for Research Software (FAIR4RS) have been introduced in 2021.

An important aspect of FAIR research software is the ability to find and retrieve software and its metadata through standardized protocols, both by machines and humans. In this context, several metadata standards are used across the scientific community:

- The Citation File Format (CFF) is a human- and machine-readable format that indicates how to cite software.
- The DataCite Metadata Schema is one of the established standards for archiving.
- The CodeMeta standard is specifically tailored to research software and aims to standardize the exchange of software metadata across repositories and organizations.

All of these standards serve specific purposes, and several are required to cover the whole software lifecycle. However, maintaining multiple metadata files in different formats can be a significant burden for research software developers and an obstacle to the adoption of good software publication practices. In addition, as the content of the different metadata files is largely overlapping, maintaining these files manually can pose a risk to data consistency.

Another requirement for FAIR software is that every software release is published and assigned a persistent identifier. This can be tedious and prone to errors without an automated process.

To address these challenges, we have developed the Python package FACILE-RS (Findability and Accessibility through Continuous Integration with Less Effort for Research Software), which facilitates the archival and long-term preservation of research software repositories.

On the one hand, FACILE-RS simplifies the maintenance of software metadata by offering tools to generate metadata files in various formats, based on a single CodeMeta metadata file that is maintained manually. On the other hand, FACILE-RS provides scripts which automate the creation of software releases on GitLab, as well as on the persistent research data repositories Zenodo and RADAR.

FACILE-RS also provides a set of GitLab CI/CD (Continuous Integration/Continuous Delivery) pipelines to automate the processes of metadata conversion and software publication.

We believe the automated metadata conversion based on CodeMeta and the automated software release pipelines can help research software developers to make their publication workflows more efficient and can facilitate the adoption of good software publication practices by reducing the effort required to make research software FAIR.

I want to participate in the youngRSE prize

no

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Session Classification: Poster and Demo Session together with Reception

Track Classification: Data and Software Management: software metadata