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A FAIR Future for Engineering Sciences

Linking an RDM Community through a scientific journal

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Abstract. The emergence of FAIR data management (FDM) is being witnessed in more and more disciplines, including the engineering sciences. However, until recently, little academic credit has been given for the work that sound FDM practices in research publications require. Moreover, there has been a lack of space where the engineering sciences community could discuss and share experiences, ideas and advice about this topic. In academia, a suitable platform for such information exchange are journals. In this publication, the concept behind ing.grid, the newly established open access journal for FDM in engineering sciences, is presented, illuminating how these challenges can be addressed by providing a platform for the publication of manuscripts, research data, and software as well as by incorporating open peer review.

Keywords: FAIR Data Management, Engineering Sciences, Open Science, Open Peer Review

1. Introduction

Producing and sharing research data, developing practical tools for processing that data and curating it to ensure it is findable, accessible, interoperable, and reusable (FAIR) as part of sound scientific practice is becoming more and more common in the engineering sciences. Scientists, funding associations as well as publishers increasingly recognise their importance [1]. FAIR data management (FDM) approaches, however, require considerable amount of time and experience. Hence, it is necessary to foster exchange between engineering scientists and help establish an FDM community among them, as well as giving scientific credit for the efforts made to ensure FDM.

2. Building a Community around FAIR Data Management

Encouraging a dialogue about FDM in engineering sciences can bring various opportunities, such as creating a mutual comprehension of core concepts, incorporating tried-and-tested solutions from fellow scientists and learning new workflows or best practices.

The journal ing.grid, the first scientific journal dedicated to FDM in engineering sciences, fosters collaborating and addressing the issues related to data management in this discipline and beyond whilst providing scientific credit for FDM. Established by active engineering scientists and librarians itself, ing.grid creates an environment where the community is connected and encourages to share and discuss research findings in an open peer review prior to as well as after publication.

3. With Openness towards a Stronger Community

ing.grid operates in accordance with fundamental strategies of the Open Science movement: Open Access and Open Peer Review [2]. Especially while establishing a new subject of scholarly research, vibrant scientific discussion and an engaged community are vital. Through its open peer review, ing.grid offers a platform for this discussion, making it transparent [3], accessible and inviting for the entire community. This also motivates reviewers to submit professional and high quality comments [3].

ing.grid developed a unique open peer review process, shown in Figure 1, that is based on the following key points:

- The manuscript publishing process is transparent. For each publication, readers can view the submitted version of the manuscript as well as the entire review discussion on ing.grid's own preprint server. Peer review no longer takes place behind closed doors.
- The high quality of publications is ensured by single-anonymised peer review. Once a manuscript is submitted, editors invite experts in the respective field to contribute review comments on the preprint repository, which are flagged as such.
- Both the scientific and non-scientific community can also participate in the open peer review process by sharing their comments on the platform. This fosters scientific exchange and community building. Editors supervising the publication process of a submission are obliged to moderate the community and review comments to ensure that the ing.grid community is a harassment-free experience for everyone.

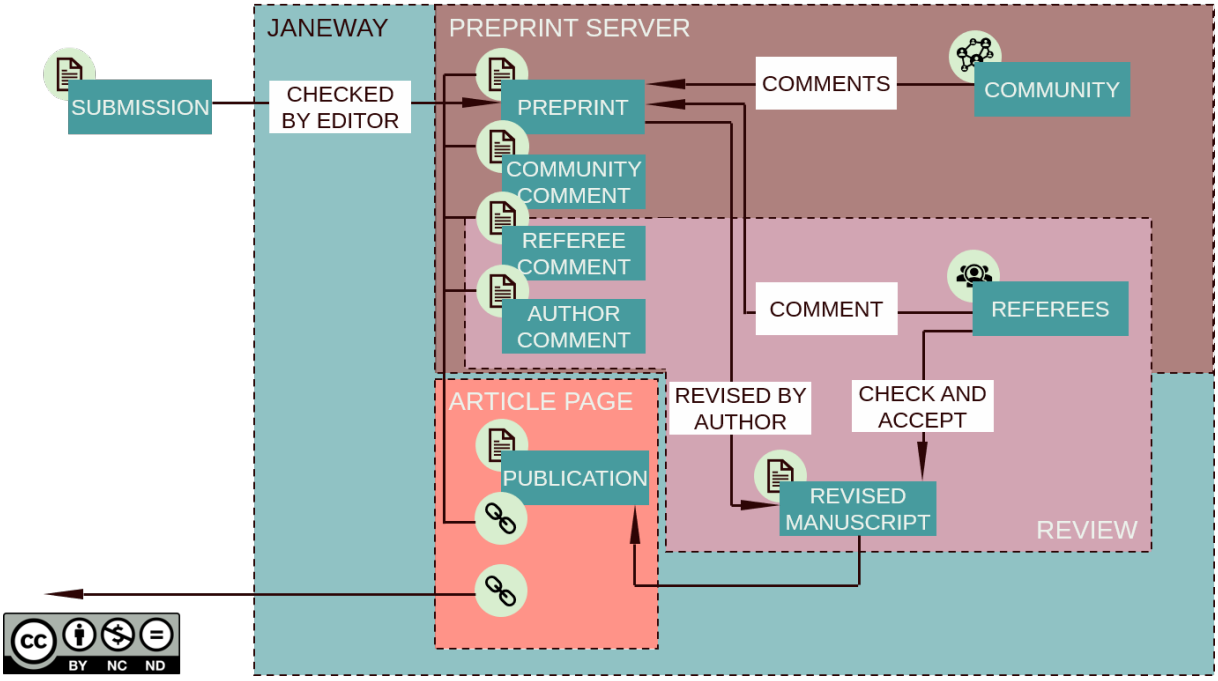

Figure 1. Open peer review process as implemented in ing.grid

Further promoting openness, ing.grid operates as a Diamond Open Access journal. Authors are not required to pay article processing charges, making it research-oriented rather than profit-oriented. All content is freely available to users and their institutions. The submissions are published under a CC-BY 4.0 license. This ensures that there are no barriers to joining the community.

4. Achieving FAIRness with a Journal

Most research activities in engineering sciences employ research data and research software. There is a trend towards making these FAIR [4, 5] and referencing them in the scientific publication. Some journals exist specifically for publishing research data [6] or research software [7]. To foster FAIRness, journals should provide infrastructure for connecting these three types of scientific output and for comprehensively linking them to one another.

ing.grid conceptualises all submissions as consisting of three components: manuscript, software and dataset. Depending on the submission type, one of the three is the primary component and the other two are supplementary material, Figure 2. ing.grid accepts three submission types: besides conventional research articles, it offers scientists the opportunity of having their software or dataset peer reviewed. While ing.grid only processes written text, it provides infrastructure to link the software and dataset repositories that are the subject of or supplementary material to its publications. This ensures the visibility of software and datasets, promoting their reuse.

Besides fostering FAIRness of research publications, ing.grid also considers itself to be a FAIR journal. It is Findable via its URL and will also be indexed in common journal databases in the future. As a Diamond Open Access journal, it is accessible. Interoperability is ensured through providing DOIs for the submissions of all types, and through accepting links to supplementary materials in other repositories. The concept behind ing.grid is also fully reusable as ing.grid is running on the open source platform Janeway.

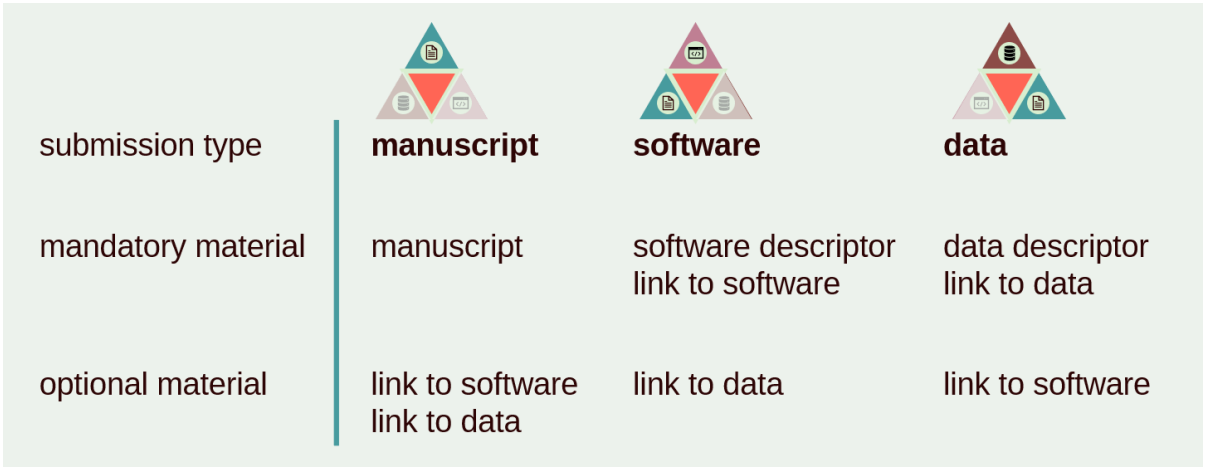

Figure 2. Three submission types accepted by ing.grid: manuscripts, software descriptors and data descriptors along with mandatory and optional material (links to data and/or software).

5. Conclusion

To foster community engagement around FDM in engineering sciences, the journal ing.grid was founded. Strongly based on principles of Open Science and employing open peer review, ing.grid helps achieve FAIRness of scientific publications while being a FAIR journal itself.

ing.grid is a service developed by NFDI4ing that can be used within the whole NFDI and beyond. New initiatives such as the Data Literacy Alliance (DALIA) [8] can use the service as a platform for publishing scientific results while the concept of a scholar-led open access journal for FDM can be adopted also by other scientific disciplines.

As a journal, ing.grid bears responsibility for building an open science environment and increasing FAIRness [4] in Engineering Sciences. This way, ing.grid can ensure a FAIR future for scholarly communications [9].

Data availability statement

This submission is not based on data.

Author contributions

Izadora Silva Pimenta – Conceptualization, Visualization, Writing (original draft, review & editing)

Kevin T. Logan – Conceptualization, Visualization, Project Administration, Writing (original draft, review & editing)

Michaela Leštáková – Conceptualization, Visualization, Project Administration, Writing (original draft, review & editing)

Peter F. Pelz – Conceptualization, Funding acquisition, Project Administration, Supervision

Competing interests

The authors declare that they have no competing interests.

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