

# Concurrent requirements for sustainable software (re-)development

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Sustainability in research software development and use has been paid a fair deal of attention to in recent years (cf. for instance Lamprecht et al. 2020, Hasselbring et al. 2020, Chue Hong et al. 2022, and various working and interest groups <sup>1</sup> and recommendations <sup>2</sup>). Without doubt the gathering of best practices, adherence to and reflection on them leads to a more conscious handling of resources and potential sustainability risks. Approaches to score the sustainability state and potential of research software in the Digital Humanities (e.g. Henny-Krahmer/Stadler 2022; based on criteria from Anzt et al. 2022; software badges like OpenSSF <sup>3</sup> and fair-software <sup>4</sup>) are useful to paint a picture of individual software products from the sustainability point of view. In practice, however, organizational, institutional, and personal circumstances directly or indirectly challenge theoretical best practices, so ways have to be found to deal with the existing restrictions.

This poster addresses the tension between theory and practice of research software development by contrasting sustainability requirements and practical necessities. The practice is related to the research project Edirom Online Reloaded <sup>5</sup>, in which the legacy software Edirom Online <sup>6</sup> is re-developed for making it more usable with present technology (e.g. modern browsers, touch devices) and also as sustainable as possible. Edirom Online is an open-source software for digital scholarly editions of musical works. Further goals of the re-development project are to establish

a base for future development of the software and to strengthen the existing community.

One of the main challenges Edirom Online faces is its dependence on existing libraries. The legacy system, which is developed since 2004, is heavily based on the open-source framework ExtJS <sup>7</sup> that is released under a GPL license. The currently used version is 4.2 from 2013 and the latest GPL version of the library is from 2020. Future versions of ExtJS will not be released under a FOSS license anymore. The solution for Edirom Online now is to decrease dependencies and use as much plain JavaScript as possible or libraries, which could be forked and further developed by Edirom Online developers themselves, ideally they are also based entirely on plain JavaScript and standard web technologies <sup>8</sup> with as little dependency as possible.

Another important and widely recognized criterion for sustainable software development is good documentation. Sustainable software has to include detailed documentation about classes, attributes, and methods, functionality, usage, and setup. However, this also comes with its problems. For instance it affects the speed of software development. In Edirom Online development, automation is used to find a way around this. AI tools are getting more advanced rapidly, and one can use those tools to enhance software development. In the Edirom Online Reloaded project, the assistance of GitHub Copilot is used for coding and writing documentation. This, in return, allows to focus more on other tasks.

Documentation and establishment of community standards for good collaboration and communication practices are prerequisites for enhancing the sustainability of a software project. Setting up templates for issues with a software (e.g. bugs, features) and formulating comprehensible contributing guidelines are a means to implement a good communication culture between developers. Furthermore, good timing, robust testing and clear release processes are needed. The Edirom Online Reloaded project aims at introducing a clear release policy for Edirom Online with release-based milestones in the Edirom Online GitHub project <sup>9</sup> and balances regular releases and the stability of the software.

In summary, the poster contrasts selected sustainability aspects and best practices with practical challenges that an aged software solution brings along. It invites discussions about best practices and real practices among digital humanities software projects.

## Fußnoten

1. For instance AG DH-RSE: <https://dh-rse.github.io/>; de-RSE: <https://de-rse.org/>; SSI: <https://www.software.ac.uk/>; ReSA: <https://www.researchsoft.org/>
2. For instance: Leitfaden für die nachhaltige Entwicklung und Nutzung von Forschungssoftware: <https://nfdi4culture.de/go/E3332>; Empfehlungen zur Implementierung von Leit- und Richtlinien zum Umgang mit Forschungssoftware an den Helmholtz-Zentren:

Positionspapier: <https://doi.org/10.2312/os.helmholtz.008>; Guide for Reproducible Research: <http://web.archive.org/web/20240629174606/https://book.the-turing-way.org/reproducible-research/reproducible-research>

3. Open Source Security Foundation: <https://openssf.org/>
4. FAIR Software Recommendations: <https://fair-software.nl/>
5. Edirom Online Reloaded: <https://www.uni-paderborn.de/en/project/1332>
6. Edirom Online on GitHub: <https://github.com/Edirom/Edirom-Online>
7. ExtJS: <https://www.sencha.com/products/extjs/>
8. Web components: [https://developer.mozilla.org/en-US/docs/Web/API/Web\\_components](https://developer.mozilla.org/en-US/docs/Web/API/Web_components)
9. Edirom Online GitHub Milestones: <https://github.com/Edirom/Edirom-Online/milestones>

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