

Sharing research software - the whys, the wheres, the hows

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Hugh Shanahan

Department of Computer Science

Royal Holloway, University of London

Hugh.Shanahan@rhul.ac.uk

ORCID 0000-0003-1374-6015



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Summary

Why? - share your research software?

Where? - is there guidance on this?

How? - to develop and share research software

First.... a caveat

The landscape here is changing rapidly.

Researchers, publishers, funders are all playing catch up.

Tools / platforms will evolve (though principles remain).

Definition of Research Software

Gruenpeter et al. DOI 10.5281/zenodo.5504016 (2021)

“source code files, algorithms, scripts, computational workflows and executables that were created during the research process or for a research purpose. Software components (e.g., operating systems, libraries, dependencies, packages, scripts, etc.) that are used for research but were not created during or with a clear research intent should be considered software in research and not research software. This differentiation may vary between disciplines.”



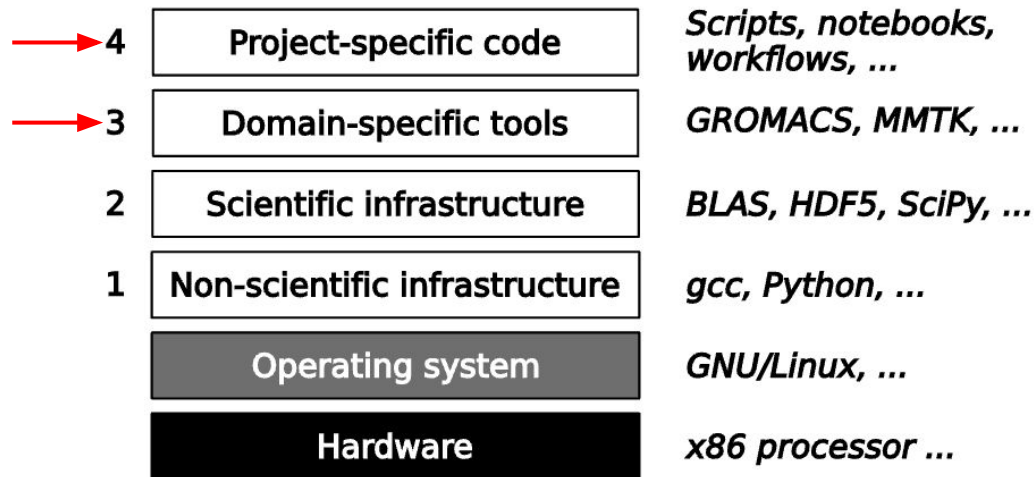
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What we mean by Research Software

K. Hinsen, “Dealing with software collapse”, Computing in Science & Engineering, DOI 10.1109/MCSE.2019.2900945 (2019)

See Gruenpeter et al. DOI 10.5281/zenodo.5504016 (2021)

For definitions.



Why - Sharing Research Software

Software, like data, is now essential for the research process.

Research software alliance review DOI: [10.5281/zenodo.3884311](https://doi.org/10.5281/zenodo.3884311)

- 2018 OECD survey - 25% of research produces new code
- UK Research Software Survey (2014) - 1,000 randomly sampled researchers; 90% acknowledged software, 70% couldn't do their research
- Ecosystem of technologies for social science research (2020) - much commercial software available, but innovative software coming from academia



Why - Sharing Research Software

- Computationally reproducible.
- Improve the software.
- *Learnable*.



Software -> “first class research object”

- As important as a journal paper



Where is there guidance on this?

<https://fair-software.eu/> - Five recommendations for FAIR software

<https://scicodes.net/> - Consortium of scientific software registries and repositories

<https://doi.org/10.15497/RDA00068> - FAIR4RS, FAIR principles for research software

<https://force11.org/info/software-citation-principles-published-2016> - How to cite software

<https://codemeta.github.io/> - metadata for software

DOI 10.5281/zenodo.5003989 - ARDC guide for making software citable

<https://www.rd-alliance.org/groups/software-source-code-ig> - RDA Software source code IG

How to develop and share research software

1. Use version control software

- Examples
 - a. git, svn, mercurial....
- Advantages
 - Keeps track of what changes you/your team/your collaborators make to your software (and documents).
 - Can run locally.



2. Use hosting services for software development

- Examples
 - github.com
 - bitbucket.org
 - gitlab.com (set up you own instance)
- Extension of local version control systems.
- Share your software.
- Make backups automatically
- Additional tools - Github Co-pilot



3. Choose a licence for your software

Clarifies requirements you make of others using your software.

- Open source licences provide “as is” clause.
- Github provides drop down selection.

<https://choosealicense.com/> provides a nice walk through on how to select a licence.



4. Deposit major releases (or just your release) onto a software repository

Hosting services can have issues with

- Findability (No metadata, no PID)
- Accessiblity (occasional blockage to researchers due to specific sanction)
- Sustainability (dependant on opaque business model)

Repositories can address this

Zenodo, Figshare, Software Heritage Archive... - see <https://scicodes.net/>

https://emilio-berti.github.io/idiv-git-introduction/21-github_zenodo/index.html - tutorial on mirroring releases on github to Zenodo



5. Cite other researchers software

Treat software like a first class research object.

Reference it in the bibliography (not a footnote or in the text).

Use the PID if it is provided.

Follow FORCE-11 guidelines on citing.

Encourage journals in your research community to follow these principles.

Think about developing a Research Output Management Plan (rather than DMP).

Thank you!
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