

The Visible and Invisible Work of Maintaining Free/Open-Source Software

Research Question

In community-based free/open-source software (FOSS) projects, what is the visible and invisible work of maintaining trusted, functioning software infrastructure --- especially as projects grow and transition from volunteer-based to various sustainability models?

Methodology

In an interdisciplinary collaboration, our team interviewed dozens of FOSS maintainers about their experiences. We also analyzed GitHub issues and pull requests with natural language processing to analyze interactions.

Key findings

- FOSS maintainers don't just maintain code, they also maintain a community:
- The role of a maintainer involves many tasks beyond traditional software maintenance: developing new features, resolving conflicts, recruiting, mentoring, managing funding, managing expectations, and coordinating with other projects.
- Much work is done outside of public code repositories. The in/visibility of different roles and tasks can vary, but new features often get far more visibility than other tasks.
- In collaboration platforms, contributors' and maintainers' communication styles can significantly impact contributor retention.
- Burnout can be prevalent and multifaceted. Burnout can arise from work/life balance issues, a lack of support & recognition, and disillusionment with well-resourced user institutions that don't give back.

More information

tinyurl.com/maintainfoss

Recommendations



For individuals: celebrate your own and each other's work; practice self-care; know and communicate your capacities and limits; ask for resources and help; be okay stepping down or not finishing everything you promised; be gracious and generous when interacting with others.



For projects: be explicit about who is doing what and how much work roles take, especially for tasks done outside of code repositories; regularly re-evaluate if roles should be redrawn; talk about mental health with each other; have processes for maintainers to rotate out or step down; be okay saying "no" to requests; celebrate other projects' work; collectively fundraise from user institutions.



For user institutions: understand how demands impact maintainers; don't be a free-rider; contribute back in ways the project needs, not just what you need; help with 'boring' tasks; minimize the work needed to get and spend donations; give unrestricted funds.

Broader impacts and issues

The rewards and burdens of maintenance can reinforce existing inequalities, such as who is asked to do less visible work, who gets funded or featured, and who has more free time to contribute. Highly visible roles can also be burdensome, especially when projects scale.

There are strong parallels to organizing & activism, particularly for movements that have grown rapidly, have complex relationships with corporate & institutional stakeholders, involve a range of in/visible work, and have high burnout.

This project is a collaboration of Stuart Geiger, Lilly Irani, Dorothy Howard (UC San Diego), Alexandra Paxton (UConn), Nelle Varoquaux (CNRS) and Chris Holdgraf (UC Berkeley). We thank everyone who shared their stories with us.