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JOHAN LINÅKER, GEORG LINK, KEVIN LUMBARD

Sustaining Maintenance Labor for Healthy Open Source Software Projects through Human Infrastructure
- A Maintainer Perspective

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Open Source Software Health

- An Open Source Software project's capability to stay viable and maintained over time without interruption or weakening

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Open Source Software Health

- Productivity: There is an active development of the project
- Robustness: The development is open and spread out on several (independent) individuals
- Openness: Users of the project can influence and contribute to the development of the project

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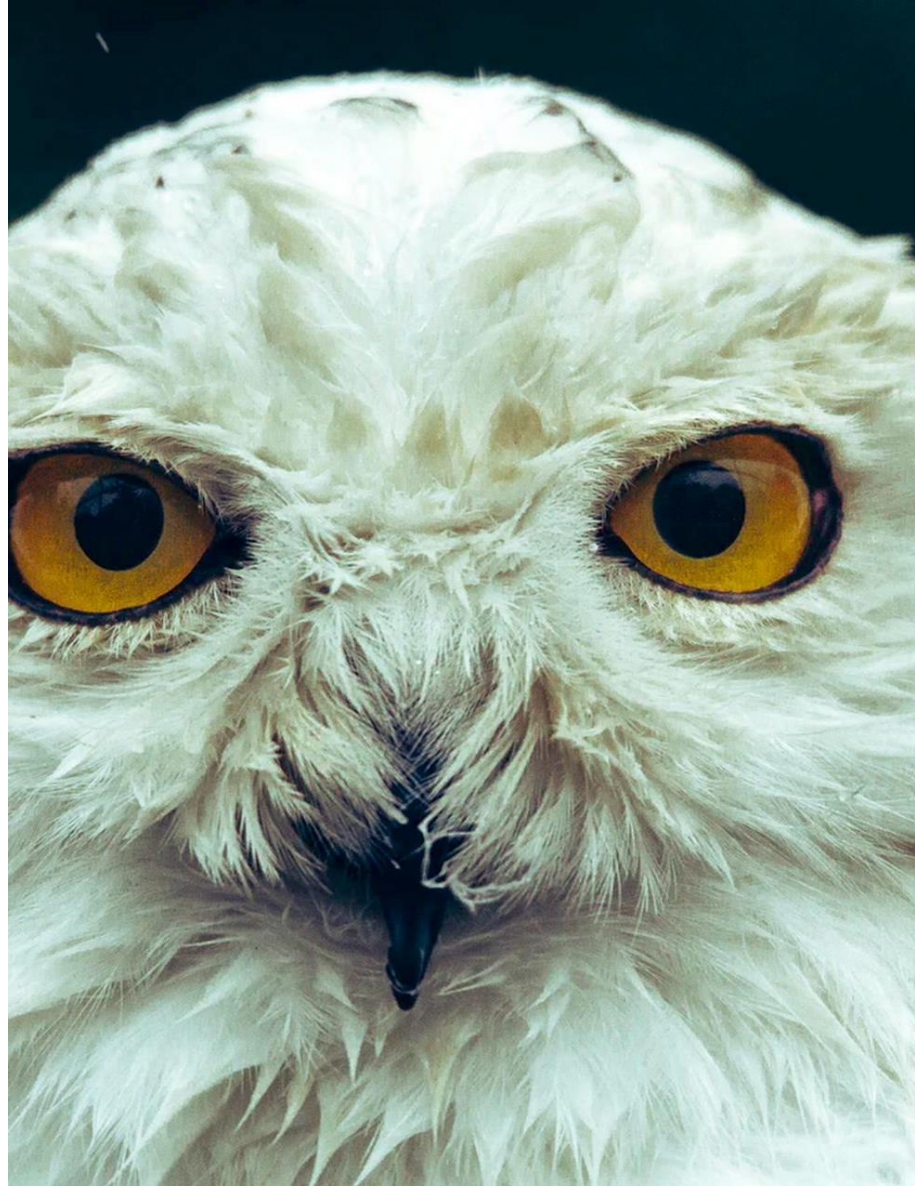
Linus’ law

- ”Given enough eyeballs, all bugs are shallow”
- Requires that enough eyeballs actually reaches the codebase
- Free-riding, for both good and bad



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The Tragedy of the commons

- Commonly exemplified through Hardin’s open pastures (Hardin, 1968)
- May be considered as a Common Pool Resource (CPR)
- A resource system that is non-exclusive, and subtractable (Ostrom, 1990)

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Brain-time as a Common Pool Resource

- “Brain-time” and maintenance effort is subtractable
- Maintainers are humans, not robots
  - Burnout, changed family or working conditions
- Companies must adapt to stay competitive
  - Refactorization, new products, changed business model

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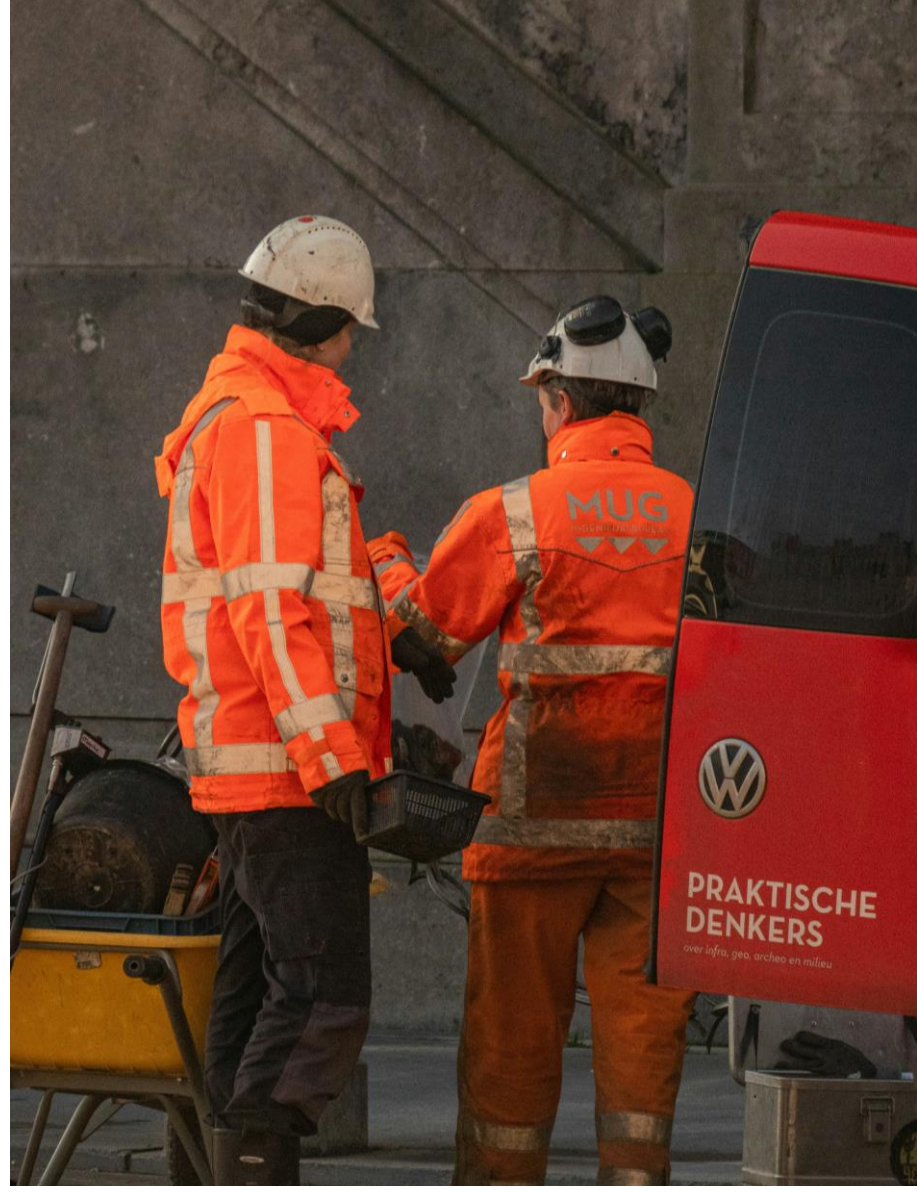
Maintenance labor

- The human activity invested by these individuals into the development and maintenance of these OSS projects
- Can originate from and added by
  - the maintainers (i.e., Maintainer Labor) of the OSS projects, or
  - from the contributors (i.e., Contributor Labor) within the community.



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Human Infrastructure

- The arrangements of organizations and actors within an OSS community that must be brought into alignment, e.g., through governance, processes, and culture, for the OSS project to be viably maintained

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Research question

- From a maintainer’s perspective, how can human infrastructure help to secure sustainable availability of maintenance labor from maintainers and contributors for an OSS project to stay healthy?

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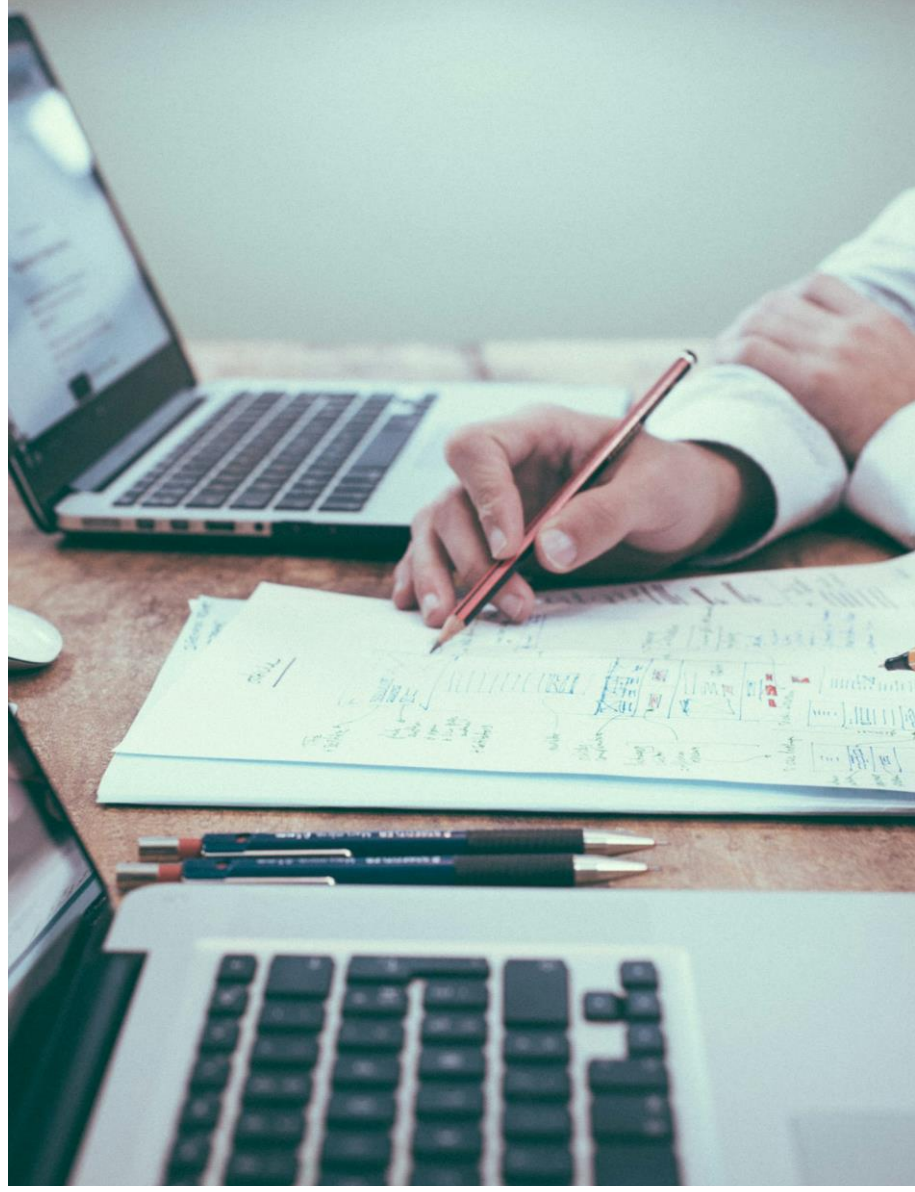
Research approach

- Qualitative interview survey with 10 maintainers from nine well-adopted projects (seven with two or less maintainers)
- Questionnaire design through visual assurance case
- Data analysis through iterative open, axial, and selective coding



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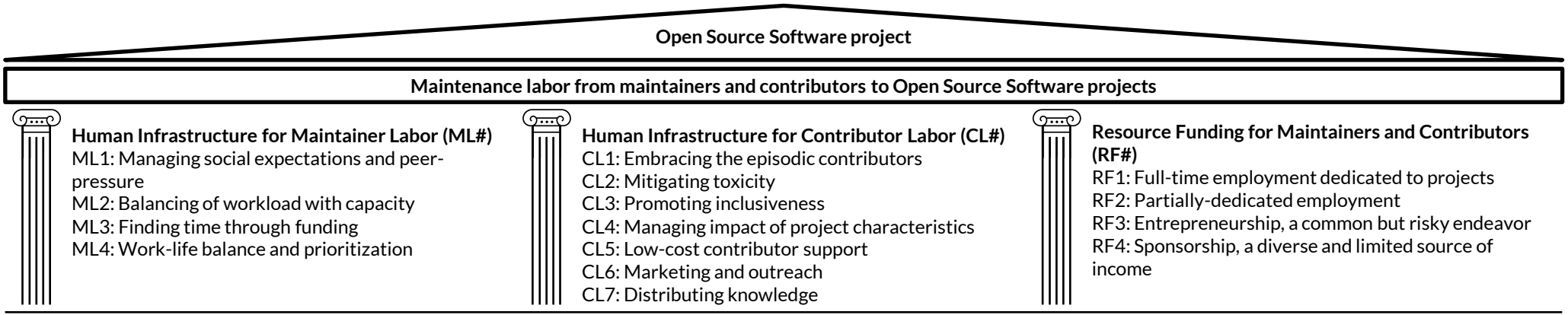
Human Infrastructure Design aspects



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Maintainer resources

- Managing social expectations and peer-pressure
- Balancing of workload with capacity
- Finding time through funding
- Work-life balance and prioritization

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Contributor resources

- Embracing the episodic contributors
- Low-cost contributor support
- Distributing knowledge
- Mitigating toxicity
- Promoting inclusiveness
- Marketing and outreach
- Managing impact of project characteristics

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Resource funding

- Full-time employment dedicated to projects
- Partially-dedicated employment
- Entrepreneurship, a common but risky endeavor
- Sponsorship, a diverse and limited source of income

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Maintenance labor as a Common Pool Resource

- Maintenance labor, both from the maintainer and contributor side are depletable resources
- Contrasting against volunteer energy as discussed by Atkisson and Bushouse (2024)
- Sustaining the availability of labor or energy from either source requires sometimes distinct or overlapping human infrastructure support

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Balancing the influx of labor from both sides

- Too high amounts of contributor labor may create too large of an overhead for maintainers, resulting in increased stress and pressure.
- Onboarding process needed to empower newcomers to make better contributions, requiring less attention from the maintainers.

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Enabling maintainers to focus more on projects

- Non-code contributions, such as helping out with support, community management, and marketing are specifically highlighted as important contributions.
- Resource Funding is seen as a means of enabling maintainers and contributors to create a healthy work-life-balance, while also improving the project health.

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Limitations and future work

- Exploratory and qualitative survey
- Limited number of interviewees and OSS projects
- Potential for generalizing results further across a wider sample
- Consideration to distinct types of projects, e.g., related to project characteristics

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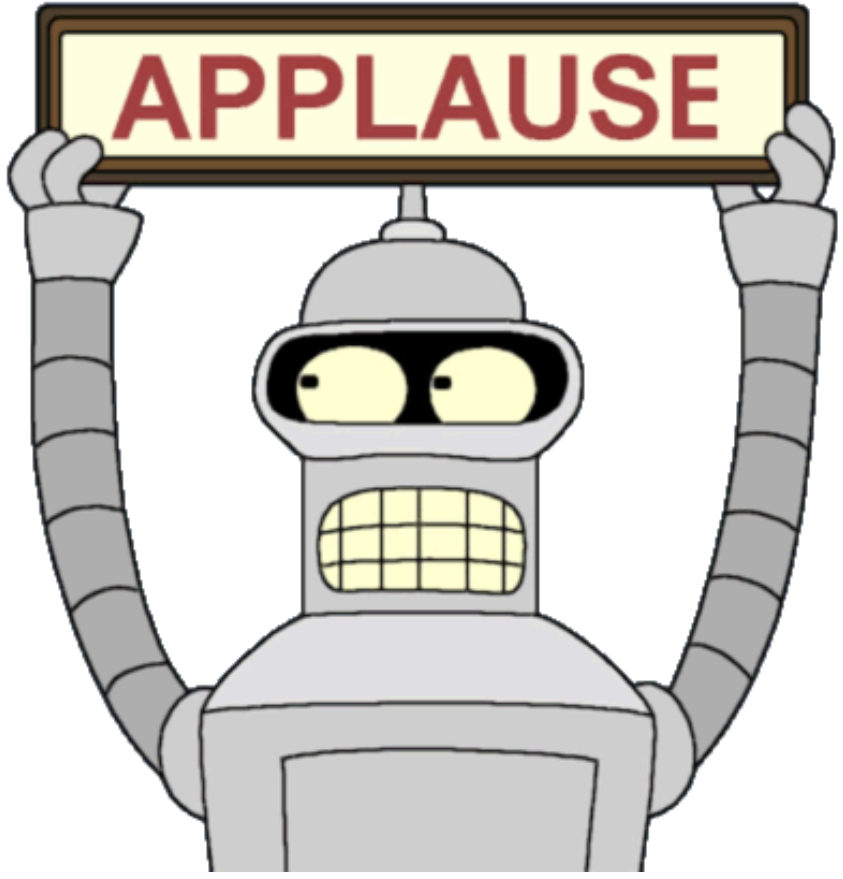

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