Scalable governance structures for open source projects

Context

Free and Open Source Software projects (FOSS) form a critical substrate of digital infrastructure. Those software components are often developed by small groups of contributors on a voluntary basis. These teams are vulnerable to dropout (Russo Latona et al., 2024) and often struggle with onboarding new contributors (Mendez et al., 2018). This is in part due to the amount of expertise required to maintain such software, but also the lack of emphasis put on enabling new contributors to take responsibility for the software.

Project abandonment and disagreements in teams often lead to forks,[1] which reduces the readability of the ecosystem. The social precarity of those groups is sometimes even exploited by malicious actors to gain privileged access to a code base and introduce security vulnerabilities in it (Anghel, 2025).

More mature or institutionalized FOSS projects often adopt intentional governance models, by documenting how members can join and leave the project, how decisions are taken or how conflicts of interest are handled, for instance.

However, the vast majority of FOSS projects do not formalize their governance, perhaps due to a lack of resources or awareness of their benefits. Instead, they largely rely on permission models and onboarding procedures inherited by the forge[2] platforms they use.

Objectives

We want to better understand how governance influences long-term project sustainability in open source projects. This consists in:

- analyzing the existing use of governance models in FOSS projects,
- studying how the governance mechanisms implemented by software forges are used by teams.

We also want to ease the adoption of scalable governance models in FOSS projects, by:

- curating a directory of governance models designed for reuse, similarly to "Choose A License"[3]
- designing and implementing tooling to support the daily use of such models, integrated either in forge platforms or as external tools.

Challenges

The health of an open source project is measured on the long term, which makes it difficult to evaluate the impact of governance-related interventions.

The human reality of FOSS projects vary greatly, as it depends on the application domain, the type of software artifact that it produces and the profiles of contributors involved in the project. Governance mechanisms fit for purpose in one project might not be workable in another one. Governance templates must therefore be tailored to a specific category of project to be useful.

Surveying FOSS contributors or interviewing them is difficult as they are often subject to survey fatigue (Baltes & Diehl, 2016). Their online attention is sought after.

Making changes to a forge platform to improve the governance dynamics of the projects they host is difficult as it requires reaching an agreement with its team about the design and implementing it to a satisfactory quality.

---

[1] a fork is a copy of the software published under a new name, steered by a distinct group of people

[2] a forge is an online platform where developers collaborate to develop software, discussing the changes they want to make and publishing releases.

[3] https://choosealicense.com/

Approach

We want to conduct two lines of research in parallel. The first one consists in observing governance dynamics in FOSS projects, using various methods (see below). Simultaneously, we intend to create resources (such as governance templates) and tooling (automation to support governance models) and seek feedback from practitioners about those resources.

Originality

Existing studies of governance models for FOSS are often concerned with mature projects (Brasseur, 2023). We focus instead on the much larger ecosystem of small FOSS projects. We plan to extend on an existing collection of governance documents of GitHub projects (Yan et al., 2023) by including projects hosted on other forge platforms, thanks to the Software Heritage archive.[4]

The design of dedicated governance tooling for forge platforms is also a novel contribution, as these platforms do little to facilitate on- and off-boarding of team members, beyond offering relatively limited community dynamics dashboards.

Methods

We will mine software repositories using the Software Heritage archive and combine the documents with the FOSS Governance Collection (Brasseur, 2023). We will cluster the extracted documents to identify reuse of models across projects. This will help us identify popular models, which could potentially be promoted as governance templates. We will also analyze the contents of those documents, listing the governance aspects that they cover (such as roles, decision procedures), the mechanisms used (such as elections, fixed-term positions or meeting minutes) and comparing those to the models established by management theory.

We will interview contributors to FOSS projects to understand the de facto governance of their community, comparing it to any documented processes. For instance, we will ask participants which privileges they have and how those have been granted to them. This will take the form of semi-structured interviews led online, with participants recruited in conferences and social media.

Adopting the methodological approach of action research (Kemmis et al., 2014), we will design governance features for forge platforms (such as Forgejo[5]) to improve the team dynamics of FOSS projects, with or without formal governance models. This will be based on an ongoing dialogue with the team behind the platform to improve the features incrementally.

Anticipated results

Compared to other project documents such as codes of conduct, we expect governance documents to be less standardized and to often fail to document important aspects of the project structure. From the interviews, we also expect to identify inconsistencies between those documents and the reality.

Given the long time required to implement governance changes and observe their impact, the learnings from our action research will primarily come from community feedback on the design of our forge features and on the governance templates. We will solicit this feedback in a wide range of venues (conferences, online forums, industry bodies, fiscal sponsors, funders of FOSS projects). We anticipate that the features centered around contributor outreach and retention will attract the most interest.

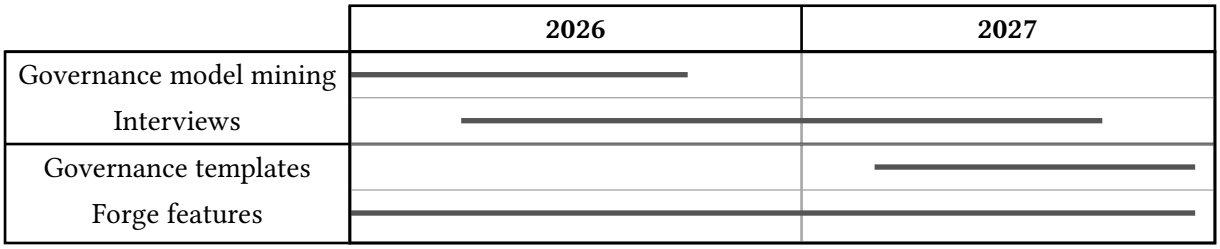
Project organization

We intend to conduct two main activities in parallel over the duration of the 2-year position. The first one is the analysis of existing governance dynamics, first by mining governance models in FOSS

[4] https://www.softwareheritage.org/

[5] Forgejo is the software behind Codeberg, an open source competitor to GitHub that is growing in popularity.

repositories, second via interviews. In parallel, we will work on the curation of a library of governance templates and improvements to a forge platform (likely Forgejo, as the project has responded positively to our ideas so far). Presentations at FOSS conferences and social media will be used to gather feedback on our proposals from practitioners.



Adequacy with the objectives of PEPR eNSEMBLE and PC4

Our project studies the interplay between the dynamics of a large community (the FOSS movement) and the forge platforms which shape it. This approach is rooted in two observations: on the one hand, that the design of online platforms has a considerable influence on the social dynamics of the communities they host. On the other, that community governance cannot just be enforced by technical systems and is rooted in a culture (Schneider, 2025). Hence our attempt to improve the health of FOSS teams by encouraging them to adopt more explicit governance principles and supporting them with lightweight tooling.

Bibliography

Anghel, M.-R. (2025). *Malicious Infiltration in Open Source Projects and Methods of Prevention.*

Baltes, S., & Diehl, S. (2016). Worse Than Spam: Issues In Sampling Software Developers. *Proceedings of the 10th ACM/IEEE International Symposium on Empirical Software Engineering and Measurement, ESEM 2016, Ciudad Real, Spain, September 8-9, 2016*, 1–6. https://doi.org/10.1145/2961111.2962628

Brasseur, V. M. (2023,). *FOSS Governance Collection.*

Kemmis, S., McTaggart, R., & Rhonda, N. (2014). *The Action Research Planner*. Springer.

Mendez, C., Padala, H. S., Steine-Hanson, Z., Hilderbrand, C., Horvath, A., Hill, C., Simpson, L., Patil, N., Sarma, A., & Burnett, M. (2018). Open Source Barriers to Entry, Revisited: A Sociotechnical Perspective. *Proceedings of the 40th International Conference on Software Engineering*, 1004–1015. https://doi.org/10.1145/3180155.3180241

Russo Latona, G., Gote, C., Zingg, C., Casiraghi, G., Verginer, L., & Schweitzer, F. (2024). Shock! Quantifying the Impact of Core Developers' Dropout on the Productivity of OSS Projects. *Companion Proceedings of the ACM on Web Conference 2024*, 706–709. https://doi.org/10.1145/3589335.3651559

Schneider, N. (2025). *Governable Spaces*. University of California Press.

Yan, Y., Frey, S., Zhang, A., Filkov, V., & Yin, L. (2023, April). *GitHub OSS Governance File Dataset* (Issue arXiv:2304.00460). arXiv. https://doi.org/10.48550/arXiv.2304.00460