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Thinking Infrastructurally about Open Source Software: Maintenance, Legal Technologies, and Institutional Design

KEY FINDINGS

Open source software in/as digital infrastructure can contribute to public good and public benefit and may promote publicness and fairness in digital infrastructure production, access, use, and maintenance. Advancing these normative commitments requires careful consideration of the need for accessible information, social action, regulatory intervention, and novel legal or institutional design.

Insights from "infrastructure studies" provide a valuable lens for understanding digital infrastructures. We analyze open source software as an integration of the *technical* (eg the ways in which open-source code is engineered and maintained), the *social* (eg the communities formed around particular projects and values, the terms of digital labor, demographies of dominance and non-inclusion, interactions between humans and with machines), and the *organizational* (eg formal institutions, but also cross-cutting regulations, financing, and governance) and the *entanglements* of these technical, social, and organizational dimensions.

We bring into this infrastructure studies approach the somewhat overlooked perspective of *law* as a significant aspect of the technical, social, and organizational dimensions of digital infrastructures. Our approach to law and global governance situates digital infrastructures in their transnational and variable public/private contexts, thereby stretching the technical, social, and organizational frames. Fundamental value conflicts, as well as legal regimes of technology transfer restrictions, censorship, data localization, and severe gradients of social justice all bear on production, access, use, and maintenance of open source software.

The open source software ecosystem has been undergoing major shifts. Traditional volunteer-driven non-commercial open source software projects are still relevant but "free and public code" is increasingly created and maintained by employees in large tech companies that rely on and deploy open source software. We argue that addressing open source software maintenance problems must confront the fundamental differences between highly commercial

settings and interests, public institutional settings, and the variety of decentralized grass-roots contexts of open source software production, access, use, and maintenance.

Our research project analyzes the need for adjustments in open source software governance to account for its infrastructural importance and to maintain its orientation towards public interest. Standard open source software licensing tends to favor innovation over maintenance and security (eg by effectively shielding developers from liability for software failures even if they may cause digital infrastructure breakdowns). The Open Source Initiative and the Free Software Foundation are the de facto regulators of what counts as “open” and “free” software, respectively, and tend to oppose any changes to established licenses that would restrict developer (“user”) freedom. Yet, some, especially newer-generation developers seem willing to entertain licenses that restrict developer freedom in pursuit of other societal objectives such as human rights (eg workers’ rights under the Anti-966 license).

There is no general solution to address the governance challenges surrounding open source software due to the highly variable and context-dependent circumstances in which software is being developed, deployed, and maintained. But there are a number of ways in which digital infrastructure creation, operation, and maintenance can be improved by leveraging “legal technologies” in specific contexts. Governments should insist on maintenance commitments in their procurement contracts with software suppliers. Some open source software projects may be able to leverage their trademark to raise revenue for maintenance needs. Existing legal technologies and attendant practices ought to be reevaluated in light of open source software’s infrastructural importance.

Our project explores the need for new organizations or novel organizational forms to support the transnational maintenance of digital infrastructure in the public interest (eg for development, inclusion, or educational purposes). Existing initiatives (such as the Linux Foundation’s Core Infrastructure Initiative) are deeply entangled with commercial interests. Instead of relying almost exclusively on private sector initiatives or on nationally circumscribed governmental support, we propose building governance systems for digital infrastructures that reflect the interests and diverse views of the (locally and transnationally dispersed) publics that rely on digital infrastructures’ affordability, resilience, and versatility. This approach may require a deliberate scaling-down to re-align legal-political publics and infrastructural publics – thereby rendering digital infrastructures more sustainable, maintainable, and governable.

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