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July 21, 2016   by Sarah Gooding

Ford Foundation Publishes Non-Technical White Paper on Open Source Software and the Challenges of Sustaining Digital Infrastructure

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Last week the Ford Foundation [published a white paper](#) titled "Roads and Bridges: The Unseen Labor Behind Our Digital Infrastructure." The foundation, established in 1936 by Edsel Ford, president of the Ford Motor Company, is currently working to challenge inequality and advance human welfare. This new document in the foundation's library, written by Nadia Eghbal, addresses the challenges of sustaining our digital infrastructure:

> *Everybody relies on shared code to write software, including Fortune 500 companies, government, major software companies and startups. In a world driven by technology, we are putting increased demand on those who maintain our digital infrastructure. Yet because these communities are not highly visible, the rest of the world has been slow to notice.*
>
> *Just like physical infrastructure, digital infrastructure needs regular upkeep and maintenance. But financial support for digital infrastructure is much harder to come by.*

Eghbal, an amateur software developer who previously worked in venture capital, drew from her experience using open source code when preparing the 143-page report. She also interviewed many leaders and contributors in various open source software communities.

"After I left my job in venture capital last year, I set off to explore the paradox I couldn't stop thinking about: that there were valuable software tools that couldn't be supported by commercial models, and that they lacked any form of institutional support," she said.

The unique thing about this extraordinary contribution from the Ford Foundation is that Eghbal wrote the document to help consumers and companies understand the toll open source software takes on its contributors and offers strategies for how they can be supportive of the world's shared digital infrastructure. It bridges a critical gap in understanding between the

open source software development community and the people who use the software every day.

"Most of us take opening a software application for granted, the way we take turning on the lights for granted," Eghbal said. "We don't think about the human capital necessary to make that happen."

Eghbal compares the physical infrastructure of the transportation industry to that of the digital world. She contends that the decentralized nature of digital infrastructure makes it more difficult to maintain as a public good. Since the progress is driven by citizens working together, and not by any official governing body, it requires consumers and companies to be supportive of how software communities work if we hope to achieve long-term sustainability of the open source projects we depend on.

Eghbal introduces consumers to common ways that open source projects find financial support but also highlights how many widely used projects can fall through the cracks. The document opens with the example of OpenSSL and the Heartbleed vulnerability which was exposed in 2014.

"A 2015 study by the Federal University of Minas Gerais in Brazil looked at 133 of the most actively used projects hosted on GitHub, across programming languages, and found that 64%, or nearly two-thirds, relied upon just one or two developers to survive," Eghbal said. "Although there may be a long tail of casual or infrequent contributors, for many projects, the major responsibilities of project management fall on just a few people."

In offering a brief history of open source software, Eghbal cites WordPress as a prime example (on page 34) of software that is flexible to customize thanks to the freedom its creators gave the project when licensing it under the GPL. Nevertheless, our community shares many of the struggles identified in the document, as maintainers of some of our most important development tools often cannot find financial support that will enable them to keep working on these projects.

The white paper covers many important topics that help non-technical consumers understand the critical need to support the creators of our digital infrastructure. A few example chapters include:

- How not charging for software transformed society
- Why digital infrastructure support problems are accelerating
- Open source's complicated relationship with money
- Business models for digital infrastructure
- Institutional efforts to support digital infrastructure

Eghbal advocates treating digital infrastructure as a necessary public good and working with existing software communities. She calls for a more holistic approach to project support, beyond just code and money.

Many of the topics in this white paper are completely new ideas for software consumers but Eghbal's explanations make them easy for anyone to understand. She includes basic explanations for software terms like frameworks, libraries, and languages, and explains why certain types of open source projects have a more difficult time finding a means of financial support.

I highly recommend reading this document, whether you are an open source project maintainer, a company decision maker who contracts software development, or a consumer. The white paper doesn't just explore the challenges but also offers constructive ways that people of all walks of life can work together to support our digital infrastructure. You can download the PDF for free from the Ford Foundation.

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