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Perspectives on Free and Open Source Software

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What is the status of the Free and Open Source Software (F/OSS) revolution? Has the creation of software that can be freely used, modified, and redistributed transformed industry and society, as some predicted, or is this transformation still a work in progress? Perspectives on Free and Open Source Software brings together leading analysts and researchers to address this question, examining specific aspects of F/OSS in a way that is both scientifically rigorous and highly relevant to real-life managerial and technical concerns.

The book analyzes a number of key topics: the motivation behind F/OSS — why highly skilled software developers devote large amounts of time to the creation of "free" products and services; the objective, empirically grounded evaluation of software — necessary to counter what one chapter author calls the "steamroller" of F/OSS hype; the software engineering processes and tools used in specific projects, including Apache, GNOME, and Mozilla; the economic and business models that reflect the changing relationships between users and firms, technical communities and firms, and between competitors; and legal, cultural, and social issues, including one contribution that suggests parallels between "open code" and "open society" and another that points to the need for understanding the movement's social causes and consequences.

"This important and wide-ranging collection illuminates the social, economic, technical, and legal processes propelling the fantastic growth of free and open source software." — Mitchell Kapur, President and Chair, Open Source Applications Foundation

"The most comprehensive and objective book on free and open source software and the open source development process I have yet encountered. This book contains a fabulous collection of previously unpublished articles by top researchers and practitioners who are close to the phenomenon. The authors approach the topic from multiple perspectives: individual motivation, software engineering, development practices, business and economics, the law, and society. Individual articles are scientifically rigorous, yet free of jargon and accessible to non-specialists. But most of all, they are fascinating! Anyone who is striving to understand—or is simply curious about—the many dimensions of free and open source software should read this book." — Carliss Y. Baldwin, William L. White Professor of Business Administration, Harvard Business School, coauthor of *Design Rules: The Power of Modularity*

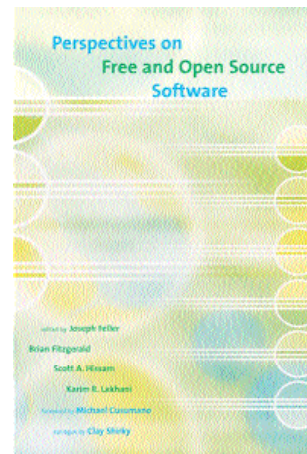
"An excellent international and interdisciplinary repository of the latest research and thinking on free and open software movements and practices. With this intellectual miracle, the editors and contributors pave the way to a new open science paradigm." — Claudio Ciborra, London School of Economics and IULM, Milan, author of *The Labyrinths of Information*

"From fringe movement to multibillion-dollar market, free software shows how new modes of production and distribution will change technology, and transform society, in the 21st century. This book contains the words of those who made it happen, those who study why it happened, and those who ineffectively resisted the most surprising social movement of our time. An indispensable introduction to the how and why of the free software revolution." — Eben Moglen, Professor of Law, Columbia University, and Founder, Free Software Foundation

"Perspectives on Free and Open Source Software is the most comprehensive collection of writings on open source software that I have seen. The authors tackle the difficult questions that surround its success, from what motivates developers to write software for free to how companies can incorporate the best of the open source model into their environments." — Martin Fink, Vice President, Linux, Hewlett-Packard

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edited by

Joseph Feller, Brian Fitzgerald, Scott A. Hissam, and Karim R. Lakhani

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F/OSS Project Leaders and Developers

- What are the major motivations for the developers in your project?
- Is your project culture such that it can accommodate developers with different motivations to participate? Or does your project risk crowding out developers by having a culture that supports only a single motivation to participate?
- How can you manage both paid and volunteer contributors?
- On what basis do you welcome new members and how can you integrate them into your community?
- How can you best manage the “economy of talent” within your project? How can you settle disagreements and disputes? How can you avoid (destructive) churn?
- How can you manage software complexity? Integration? Testing?
- How can you break the “security symmetry” created by F/OSS?
- How are communication and collaboration facilitated in your project?
- How are changes from the F/OSS community accommodated?
- Can you automate day-to-day activities? What tools do you need to use?
- How can you leverage user innovation? How do you enable your users to contribute to the project?
- Is your project part of a commercial business model/value web? Where does your project fit in?

Managers and Business Professionals

- How can nonfinancial incentives be utilized within your firm’s software projects to motivate internal developers?
- How can you spark the essence of creativity among your software developers?
- How do you build an open community of sharing and peer review within your firm?
- How does your firm interact with the wider F/OSS community? What things do you need to be aware of so that you do not drive out F/OSS developers?
- How do you leverage the increasing numbers of F/OSS developers for the benefit of your firm?
- What criteria are important in your evaluation of F/OSS products? How does your procurement process need to change to adjust to F/OSS?
- How do your implementation and change management processes need to change to adjust to F/OSS?

- In what way do your existing processes (or tools) have to adapt to support F/OSS development?
- What criteria do you need to choose a F/OSS license? Or, if you are attempting to emulate the F/OSS process without using F/OSS licensing structures, what challenges do you anticipate?
- What can your firm learn about collaboration and agility from F/OSS project organizations? What can they learn from you? (Remember, you can contribute knowledge, not just code, to the F/OSS community.)
- What business model(s) is your firm engaged in? What role do F/OSS products play in your value offer? F/OSS processes? F/OSS communities?
- How can F/OSS play a role in your firm's "corporate citizenship"?

Researchers and Analysts

- Does the F/OSS phenomenon shed new light on how creativity works in knowledge workers?
- What is it about programming that evokes a creativity response in software developers? Can this be achieved in nonsoftware environments?
- What are noneconomic incentives to innovate in complex product industries?
- How portable are F/OSS motivations and practices to other domains of economic activity and social organizations?
- How can F/OSS processes be utilized in proprietary settings, and vice versa?
- How can F/OSS tools be utilized in proprietary settings, and vice versa?
- What are the weakness of the F/OSS process and toolkit? How can these be addressed?
- What are the strengths of the F/OSS process and toolkit? How can these be leveraged?
- Do the dynamics of F/OSS create new opportunities for research (new methods for data gathering and analysis)? If so, what are the ethics involved?
- Does the F/OSS phenomenon force us to rethink the nature of innovation?
- Does the F/OSS phenomenon force us to rethink the nature of work?
- Does the F/OSS phenomenon force us to rethink the nature of knowledge sharing? Of intangible/intellectual assets?
- Is F/OSS overly reliant on a countercultural identity? How does "success" change the F/OSS process?
- What are the relationships between F/OSS and other forms of creativity and knowledge creation?

- Does F/OSS provide new modes of organizing and collaborating? What are they?
- How does F/OSS actually help address the “digital divide” and the needs of the information society?

Notes

1. <http://www.gnu.org/philosophy/free-sw.html>.
2. <http://www.opensource.org/docs/definition.php>.
3. See Feller and Fitzgerald (2002) for a fuller discussion of this. Several of the chapters in this book also address the issue, directly or indirectly.
4. You'll find all three terms (and every possible combination) used by the various authors who wrote the chapters in this book—we let people choose their own labels, rather than normalizing the book with unintentional side effects.
5. Most of the publicly available references in the bibliography of this book can be found in multiple citation management formats (EndNote, Bibtex, and so on) at <http://opensource.ucc.ie>. Additionally, full-text versions of many of the papers cited are also available in the research repository at <http://opensource.mit.edu>. We hope that these two resources will be very valuable to our readers.
6. Fear, Uncertainty, and Doubt.
7. Other definitions of software engineering include these same concepts, but go on to include economic aspects (for example, “on time” and “on budget”) as well as team management aspects (SEI 2003).
8. Chapter 10 is an edited reprint of Mockus, A., Fielding, R., and Herbsleb, J.D. (2002), “Two Case Studies of Open Source Software Development: Apache and Mozilla,” *ACM Transactions on Software Engineering and Methodology*, 11:3, pp. 309–346.
9. The contents of chapter 18 were originally presented by Lawrence Lessig as a keynote address on “Free Software—a Model for Society?” on June 1, 2000, in Tutzing, Germany.