Chapter V

Software Development and Coordination Tools in Open Source Communities

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Abstract

Open source communities bring together a dispersed collection of people, sometimes a large number of them, around the development of open source software. In the absence of enforceable formal structures, like those found in corporate settings, how are the activities of all these participants coordinated? From the outside looking in, it may seem that chaos and disorder rule. It is true that most decisions are made on an individual basis by the participants themselves. Nevertheless, work is coordinated successfully. We first discuss mechanisms that reduce the need for coordination—most notably by striving for modularity and elegance. We then turn to a number of mechanisms that provide coordination even under the difficult conditions that are present in open source communities. We conclude by outlining a number of potential steps for future research.

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Introduction

Open source software (OSS) communities are truly intriguing and fascinating phenomena. In OSS communities, the source code, which is the human-readable part of software, is treated as something that is open and that should be downloadable and modifiable to anyone who wishes to do so. The availability of the source code has enabled a practice of highly decentralized software development in which large numbers of people contribute time and effort. These large numbers of people are not confined to certain geographical places; on the contrary, they come from literally all continents. And yet despite the highly decentralized and geographically-dispersed development process, the software that is developed in some of the communities is of a high quality. The Apache and Linux software, for instance, are said to be of a high quality. These are just some of the characteristics that explain why so many people find OSS communities absolutely fascinating.

Unsurprisingly, OSS communities are heavily researched. Until now, much of the research efforts have focused on an analysis of the individual contributors in OSS communities. Typically, the focus is on the questions: Who are the contributors in OSS communities? and Why are people motivated to contribute their time and effort in OSS communities? Currently, we are beginning to find answers to both questions. An extensive survey performed by the University of Maastricht, for instance, has provided some answers to the first question. It showed that, although the development process is global, most participants are concentrated in the United States of America and various European countries like France, Germany, Italy, and the United Kingdom. People were found to have differing backgrounds, motives, and skills. At the same time, most people in the survey reported to spend less than 10 hours a week in OSS communities (Ghosh & Glott, 2002). Also, answers have been found on the second question. Lakhani and von Hippel (2003), for instance, have argued that the costs of participation in the communities are relatively low. The finding of low costs implies that a low level of benefits may already provide sufficient motive to contribute. Also, research has shown that people are motivated through a wide range of differing benefits. Some of these benefits are: learning and improving one’s programming skills (e.g., Hertel, Niedner, & Herrmann, 2003; von Hippel & von Krogh, 2003; Lakhani & Wolf, 2003); meeting a personal need with a software program that has a certain functionality (e.g., Edwards, 2001; Hars & Ou, 2002); and having fun (Lakhani & von Hippel, 2003; Torvalds & Diamond, 2001).

Although research on individual contributors is important, it is just one part of an explanation of what OSS communities are and how they “operate.” A topic that is just as essential, or maybe even moreso, is coordination. To coordinate means more than just to getting individuals motivated; it also means to arrange and order individuals’ efforts; it refers to labor division and to task specialization. In short, coordination refers to the core challenge of organizations (March & Simon, 1993).
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