The Guided Evolution of Open Source Communities

(Research in Progress)

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Abstract

Open source communities evolve. Often, communities are on their own in establishing best practices. Recent studies came to understand the relationship of open source communities with corporations. In these relationships, an increased involvement of open source foundations, like the Linux Foundation, was observed but not fully explored. Foundations appear to guide communities in their development and moderating the influence that comes from corporate involvement. However, the challenge lies in the changing nature of the community. I conjecture that organizations, foundations, and individual community members adjust their involvement with open source communities based on a set of health and sustainability factors. I propose to engage in qualitative fieldwork to answer the following questions: How are health and sustainability factors used to determine which communities are supported by the Linux Foundation? How do health and sustainability factors change as open source communities evolve? How are health and sustainability factors understood by different community stakeholders?

Keywords: Open Source Communities, Open Source Foundations, Evolution of Communities, Corporate Involvement.

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Open source communities evolve. Generally, they grow from infant communities of a few collaborative members sharing source code, to highly active communities, comprised of thousands of members developing source code that shapes the world we live in. However, evolution is not a linear process and depends on factors such as the quality of software and community service (Lee, Kim, & Gupta, 2009), the structural diversity of members (Méndez-Durón & García, 2009), and firm sponsorship (Spaeth, Krogh, & He, 2015). Often, a community is on its own to establish best practices and evolve other aspects. But recently, organizations have developed to guide open source communities through the evolutionary process:

"With ten years of experience managing open source projects and support services, The Linux Foundation can provide the back-office, technical infrastructure, and ecosystem development services to get [a] collaborative project off the ground quickly and efficiently and to maximize its success." (Collaborative Projects, 2015)

To guide the evolution of open source communities, the Linux Foundation offers support as a non-profit organization that draws on its experience in supporting one of the longest standing, largest, and most widely known open source communities, the Linux kernel community. Since 2008, the Linux Foundation has guided the evolution of over 20 open source communities, including Automotive Grade Linux, DroneCode, and the R statistical software community. The economic aspect is tremendous as The Linux Foundation estimates the total development costs for all its supported communities to be approximately $5 billion (Licquia & McPherson, 2015).

Similar to how parents determine and adjust their relationship with their child as they develop, I explore how the Linux Foundation determines and adjusts its relationships with its supported communities through various stages of evolution. I conjecture that adjustments are based on a set of health and sustainability factors inherent to each relationship. To explore this, I will first understand how the health and sustainability of open source communities is understood in the selection of communities to be supported by the Linux Foundation. Second, I will engage with select open source communities to explore how health and sustainability factors change as the communities themselves evolve, with and without the guidance of the Linux Foundation. Third, I will engage with the Linux Foundation and supported communities to determine how individuals, companies, and the Foundation understand health and sustainability factors in an effort to cope with its evolution. This is important, because knowing the health and sustainability of a community allows organizations to recognize and be prepared for upcoming challenges that may become manifest as communities evolve. In doing so, I answer the following questions:

- RQ 1: How are health and sustainability factors used to determine which communities are supported by the Linux Foundation?
- RQ 2: How do health and sustainability factors change as open source communities evolve?
- RQ 3: How are health and sustainability factors understood by different community stakeholders?

To answer these questions, I will engage in qualitative fieldwork (van Maanen, 1988) to work directly with select open source communities as supported by the Linux Foundation. Through my active participation, I will gain access to conduct interviews, thematically analyze

communal reports and communication (Boyatzis, 1998), and compile field-based reports of my findings (Kozinets, 2015).

Theoretical Background

The open source movement dates back to the 1980s with the core values including free access to source code and the rights to modify, repurpose, and share software (Christopher M. Kelty, 2008). Members of open source communities leverage these ideals to collaborate in software development projects, such as the Linux operating system (Raymond, 2000), the Apache web server (Fielding & Kaiser, 1997) and the Mozilla Firefox web browser (Khomh, Dhaliwal, Zou, & Adams, 2012). Open source communities themselves are comprised of voluntarily members who are involved in some way to fill a personal or organizational need (Hippel & Krogh, 2003).

The open source movement has evolved to counter misconceptions that free software is a hobbyist activity. Today, the open source movement includes direct organizational involvement from Fortune 500 companies including Hewlett Packard, Texas Instruments, and Google. In fact, engagement with open source is becoming a necessary part of many organizational software development practices as indicated by a recent survey by Black Duck Software (2015). Open source is a first option for organizational software development, as 66% of respondents say they consider open source before proprietary options in their software development projects. Additionally, 64% reported that they directly participate in open source communities and 88% expect to increase their contributions in the future (Black Duck Software, 2015).

This increased organizational engagement has implications for open source communities (Beecher, Capiluppi, & Boldyreff, 2009), namely that such engagements remain commensurate with organizational goals and practices (C. M. Kelty, 2013). Organizations choose open source

communities to engage with based on a variety of factors, often including the health and sustainability of a community (Ihara, Monden, & Matsumoto, 2014).

We know that organizations often have their own agendas to steer communities for strategic reasons (Dahlander & Wallin, 2006). We know that organizations use open source as a way to federate practices amongst oft-competitive members, driving innovation on shared technologies that can benefit all equally (Germonprez & Levy, 2015). We know that organizations partner with foundations (i.e. the Linux Foundation) to form, shape, and advance open source communities in ways that are beneficial to particular organizational agendas (Xie, 2008). This emerging, deep organizational engagement changes the ways that open source communities function (Naparat, Finnegan, & Cahalane, 2015). While many open source communities have a limited scope and small contributor bases, other communities have become a strategic part of organizational innovation streams and have evolved to include explicit leadership structures, allocation of resources, and connections with for-profit organizations (Fitzgerald, 2006). Of particular interest to my investigation, I explore how health and sustainability factors are understood specifically within open source communities that accommodate deep organizational involvement.

Method

First, I will engage with suitable open source communities. Ideally the communities will be undergoing clear changes including expanding member bases, changes in management, and changes in strategic direction. FOSSology represents such a community (FOSSology, 2016b). FOSSology has an active user base, has an active code base, and is in the process of joining the Linux Foundation (Linux Foundation, 2015). FOSSology is a community dedicated to providing tools for open source compliance in organizations. Since Hewlett Packard released FOSSology

as open source in 2007, numerous organizations have joined the open source community, with Siemens now being the lead contributor (FOSSology, 2016a). By taking part in FOSSology community activities, I will experience firsthand how the community operates and evolves through its transition into the Linux Foundation. While I become more involved with FOSSology and the Linux Foundation, I will continue to explore new communities that I can learn from in an effort to provide generalizable support to the research questions (Weick, 1989).

During my experience with FOSSology, I will gather data through engaged fieldwork over several months (van Maanen, 1988). As a contributing member in evolving open source communities, I can observe the evolution first hand, gaining access to members, community processes, and community decisions (Kozinets, 2015). Interviews with community members will be conducted online and over the telephone. Given a chance to meet in person, I will take the opportunity to conduct in-person interviews in an effort to not only collect additional data but also to also help build personal relationships with community members. To supplement the interviews, I will analyze communication archives of mailing lists, forums, or issue trackers to enrich the interview material. Further, I will keep field notes. I will qualitatively analyze these data sources to address the aforementioned research questions (Boyatzis, 1998).

Contributions

In this research, I advance our understanding of how open source communities and participating members come to know communal health and sustainability throughout community evolution. I demonstrate how the Linux Foundation adjusts its guidance of open source community evolution based on health and sustainability factors. In this, I will contribute to theoretical study of open source software as well as the practical study of communal preparation and mastery of challenges in open source community evolution.

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