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THE DOMESTICATION OF OPEN SOURCE

Research-in-Progress

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Abstract

Open source is becoming domesticated through the advancement of organizational practices, foundation sponsorships, and communal standards. Over the past ten years, organizational participation with open source has become a viable business proposition, opening new paths for service management, innovation discovery, and product development. Traditionally, engagement with open source has recognized how organizations leverage resources from an open source community into new practice. Such recognition assumes stabilizing efforts located within organizations to address open source community complexities. However, recent trends have led organizations to advance durability into open source communities in efforts to stabilize practices within communities themselves. In essence, domesticating open source. In this research-in-progress we provide a theoretical frame of risk, agency, and technology-in-practice to understand open source domestication and reveal its roots, trajectories, and evolutionary nature.

Keywords: Open Source, Domestication, Risk, Agency

Introduction

Open source is becoming a viable part of organizational practices in the design of organizational IT artifacts (Kelty, 2013). Open source has morphed beyond the powerful, yet increasingly challenged ideology of individuals writing and sharing code in a public expression of freedom, into open source engaged as a for-profit venture. Open source software now includes Fortune 500 corporations that are leveraging, differentiating, and contributing for reasons of organizational value, resource availability, and community maintenance (Corbet et al., 2010). Within this new model of open source, stabilization and order become critical.

Open source is evolving to include practices of intellectual property protection, license vetting, and corporate code reviews, not the traditional tenets of free/libre open source software. Open source is evolving through an alignment with organizational practices, research and development engagements, and product release activities. This research-in-progress is neither a critique nor a criticism of how open source has evolved, impacted by organizational involvement. Instead, our focus is an analysis of the practices by which open source is becoming stabilized such that organization understand, approach, and engage open source as a credible value proposition. In our research, agency serves a theoretical point of entry from which to understand the domestication of open source (Orlikowski, 2000), revealing an ongoing stabilization of open source engagements.

Christopher Kelty (2013) introduced the term domesticated open source as cultural shift in the stabilized, business-oriented forms that open source is evolving into. Domesticated open source is revealed through a variety of growing structures and practices across corporations, foundations, and communities. These include organizational review boards used to vet open source licenses in the protection of intellectual property, foundation sponsored open source communities built around formerly proprietary technologies, and open source established standards used in the explication and representation of software licenses. Domestication reduces inherent risks in open source engagements by stabilizing key practices such that organizations can understand open source as a practical business proposition.

Amongst the many open source norms that could be investigated in the domestication of open source, software licenses provides an excellent point of entry through which we explore how open source is stabilized in serving as a viable organizational engagement (Stewart et al., 2006). Organizations cannot afford participation with open source if risks remain uncertain and communities too unpredictable. As open source becomes a domesticated part of organizational practice, we aim to understand the stabilizing practices structures at work in an effort to foster understanding and explanation in the oft risk-laden engagement between corporations and open source communities.

Open source stability can emerge from the communal instrumentality used to manage risk between competing forces and at its heart resides the conceptually simple, yet practically complex software license. Software licenses codify the rights and obligations associated with specific pieces of software, quite simply determining the ‘freeness’ of free and open source software. However, a deeper examination of software licenses reveals an important concept by which we can better understand the domestication of open source. Licenses represent more than just the ‘to-do’ list, they represent a source of normative, risk-related behavior from which new stabilizing practices can be advanced and propagated through open source communities, leading to the following research question:

How do norms of open source risk reveal stabilizing practices in the domestication of open source communities?

In this research-in-progress we explore the norms from which practice and structure form around various enactments of technology-in-practice (Orlikowski, 2000). We enlist engaged field study research (Van de Ven, 2007) as our methodological frame, specifically employing an extensive two-year investigation in understanding and participating in the domestication of open source. Through our study, we aim to reveal that the seemingly simple nature of open source software licensing risks serve as an important bellwether in the domestication of open source.

Practice, Structure, and Agency in the Domestication of Open Source

The domestication of open source requires a balance of organizational practices diffusing into open source while maintaining the ideals that make open source attractive in the first place. Organizations have been shown to participate in open source by aligning internal practices with open source resources for reasons of product development and organizational strategy (Fitzgerald, 2006; Lee and Cole, 2000), but organizational practices have started to find root within open source itself.

Open source provides organizations opportunities to leverage communal resources and innovation streams (Feller et al., 2008). Within these engagements, open source is assumed to be an established environment, aligning with internal organizational practices, without requiring burdensome stabilizing activities by organizations. Figure 1 provides a simplified example of an organization engaging an open source community in the design and development of software services.

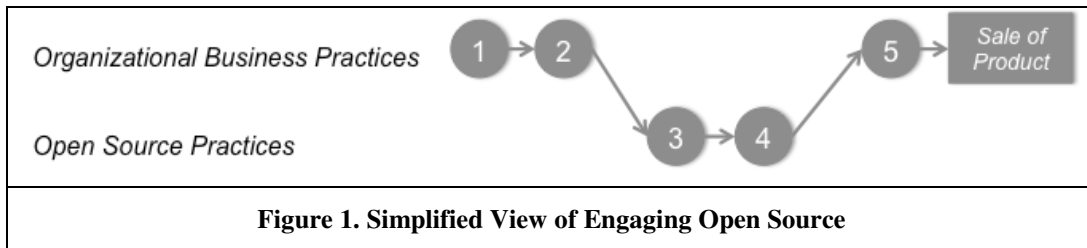


Figure 1. Simplified View of Engaging Open Source

The simplified figure illustrates an organization engaging open source in steps three and four in the development of a product for sale. In domestication of open source, steps three and four (open source practices) must be stable for organizations to opt into such a design approach. If the steps are not stable (i.e. low community involvement, overly restrictive license obligations, poor code maintenance), engagement may be impractical and simply handled internally in an organization (Setia et al., 2012). The domestication of open source stabilizes steps three and four such that an organization can realize a level of satisfaction that such engagements are not only beneficial in the short-term but also stable in long-term, product-focused engagements.

Figure 1 can become increasingly complicated as multiple organizations seek to leverage steps three and four as illustrated in Figure 2.

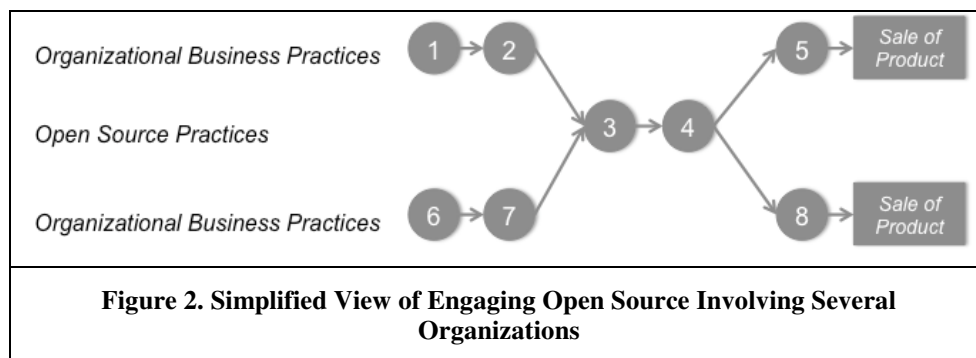
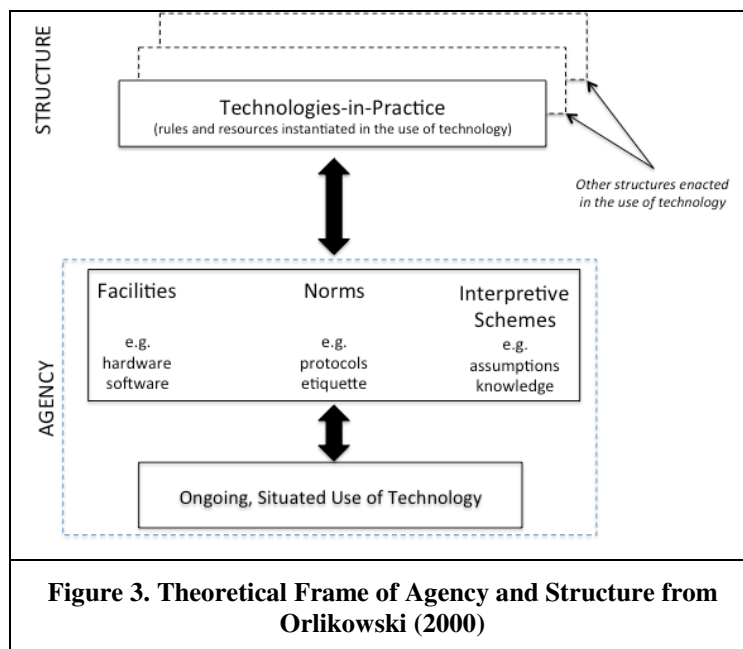


Figure 2. Simplified View of Engaging Open Source Involving Several Organizations

The domestication of open source extends knowing engagement as one organization and one open source community to knowing open source as a multi-organizational activity where open source can be influenced and leveraged into unique organizational practices. With the domestication of open source, the entirety of Figure 2 must be understood from diffusing multi-organizational practices into open source (i.e. steps 2 and 7 into 3), stabilizing open source practices (i.e. steps 3 and 4), and finally leveraging open source into differentiated organizational structures (i.e. steps 5 and 6).

To understand the domestication of open source, we seek to understand how engagements manifest (1) through a multi-organizational diffusion of organizational practices in the structuration of communal facilities, norms, and interpretive schemes amongst community members, and (2) how these practices produce structure in the localized and unique technologies-in-practice (Orlikowski, 2000). We seek to understand the agency that accommodates the practices of organizations to structure open source in unique ways. While organizations can internally advance structures of open source, agency is directly informed from the broad participant structures engaged in domesticated open source environments (Orlikowski, 2000).

Figure 3 provides a theoretical from which to understand open source domestication. Facilities are the available communal artifacts, norms are evidenced communal standards, and interpretive schemes are the participant assumptions of what the community provides. Technologies-in-practice are the emergent organizational practices derived from underlying facilities, norms, and interpretive schemes (Orlikowski, 2000).



If the facilities are ill defined to fit organizational need, the norms incommensurate with organizational style, or the interpretive schemes divergent between communal participants, the organizational practices from which open source structures emerge may reflect these inconsistencies (Moser et al., 2013). Our thesis is that knowing the agency (the facilities, norms, and interpretive schemes with an community) helps reveals how organizational practices diffuse into open source as part of the its evolving domestication.

Risk in Open Source Domestication

The growing forms of open source allows knowing open source as a stable part of doing business (Kelty, 2013). Open source reifies what is being broadly understood as free software but now bears the markings of clear and direct organizational participation, accommodating the diffusion of organizational practices from code management to intellectual property protection. Advancements in knowing organizational participation with open source have revealed many norms that constitute its broad landscape including leverage, differentiation, and risk. However, we lack the theoretical and practical knowledge that reveals

how these norms become stabilized and instrumental in the domestication of open source (Crowston et al., 2012; Kelty, 2013).

To reveal the evolution of open source, knowing open source in a non-domesticated form helps inform its evolution into a domesticated form. As forms of open source often stem from the same roots and carry similar ideals forward, new forms of open source can be considered in the light of more traditional forms. For example, communication structures have been shown to be a critical factor in the success of open source advancements within the KDE community (Hemetsberger and Reinhardt, 2004). Communication structures were revealed and understood within the bounded context of communal ideals impacting member participation and project success. Yet, how are communication structures evidenced and understood in domesticated open source environments? Are the communication structures different from more egalitarian open source communities? Are communication structures realized differently in lieu of organizational influence? These questions are reasonable to consider as common concerns between forms of open source, serving as a points of entry for better knowing one mode of open source as informed from the other.

In our research, the agency-informed norms of open source (see Figure 3) serve as our point of entry to understand the domestication of open source. In particular, we explore the norms of open source licensing compliance risk and how it is influenced by organizational practices (other norms could include compliance, differentiation, or governance). In a traditional form, open source compliance risk is manifest as organizations weigh the benefits and consequences of engaging open source software (Yalta and Lucchetti, 2008; Daniel et al., 2011), as participants manage obligations set forth by open source communities (McGhee, 2007), and as communities sustain development models that can be leveraged by others (Kogut and Metiu, 2001; Ringle, 2004). Additionally, we question how the stabilization of open compliance risk impacts, and stabilizes the facilities and interpretive schemes evident in open source communities.

Compliance risk is a commercial, technical, and judicial consideration (Lindman et al., 2011), requiring a clear alignment of organizational practices and communal ideals. It requires consideration how people and practices, organizations and laws, and ideologies and discourses exist (Kelty, 2013). Open source compliance risk entails both organizational and communal obligations, as participants engage community responsibilities often originating from software licenses (Al Marzouq et al., 2005), having nuanced and idiosyncratic forms that must be attended to by organizations participating in open source.

Currently, organizations are largely responsible for stabilizing compliance risk through internal practices. However, there has been a recent move toward the identification and evidencing of open source compliance risk into open source communities, alleviating (not eliminating) organizational requirements of this practice. In 2010, a first draft of the Software Package Data Exchange (SPDX) was articulated to 'evidence software pedigree and authenticity,' with software licensing and compliance risk at its heart. In our research, we use compliance risk as a normative frame from which to understand the diffusion of organizational practices into open source, stabilizing open source communities. Additionally, we directly engage the SPDX community to understand how open compliance risk informs and is informed by the facilities and the interpretive schemes of the community in the ongoing domestication of open source (Orlikowski, 2000; Kelty, 2013) as presented next.

Methodology: Field Study

The SPDX work group aims to "develop and promote adoption of a specification to enable any party in a software supply chain, from the original author to the final end user, to accurately communicate the licensing information for any piece of copyrightable material." With a methodological eye on open source compliance risk, we take part in an active, engaged, and up-close view of how agency helps understand the domestication of open source (Van de Ven, 2007).

We spent the past two years, integrating ourselves into the SPDX community with the explicit goals of 1) understanding open source compliance risk in the domestication of open source and 2) giving back to the community as active and engaged participants. Our belief was that learning how domestication occurred required more than just an external view, collecting only interview or survey data from community members. Learning also included knowing what is required to raise the efforts of the community, to

struggle with the community on strategic decisions, and question the trajectory of where the community has been and where it is going (van Maanen, 1998). From our field research, we identified lexical frames that sensitized us to the culture of open source domestication, including building the necessary language to effectively root our findings in extant literature, as well as participating in the practices that constitute open source domestication. We specifically engaged organizations and communities to sensitize research team members to the practices of open source domestication, serving as an important experience to orient us in understanding and explaining evolution that constitutes open source domestication (Kelty, 2013).

In these efforts, the primary author ran an open source lab that is directly engaged with several open source projects engaged in open compliance. The research team has been involved in the SPDX working group for the past two years, presented our work at three of the working group meetings, and presented at the Linux Collaboration Summit and LinuxCon North America regarding our work with open source compliance. We have developed three open source tools related to the domestication of open compliance, including one that is currently being deployed in another Linux Foundation open source project (The Yocto Project). We have conducted and transcribed over 20 semi-structured interviews with SPDX members, and maintained research notes on side conversations with SPDX members. Research team members also have hosted three organizations at our institution, and have visited an additional two organizations associated with SPDX. Our methodological approach focuses on learning by doing, being a reliable member of the community, and seeing the domestication of open source from an internal and up-close perspective (van Maanen, 1998; Van de Ven, 2007). Our field study has placed our team internal to the SPDX community in an effort to best understand the norms of open source compliance risk, the facilities that are being developed, and the various interpretive schemes that are brought to bear in the formation of agency within the SPDX community.

Conclusions and Implications

Knowing compliance risk within open source engagements represents practical, business-driven solutions to develop an understanding of open source domestication. Open source compliance risk has value in both organizational and communal settings, and should be understood as a shared process for open source project management. We aim to reveal a richer understanding of the facilities, norms, and interpretive schemes that organizations engage in when participating with open source communities in joint IT projects. We also aim to reveal the feedback cycles by which organizations apply this agency to advance organizational projects in the structuration of technology-in-practice (Orlikowski, 2000).

In developing such insights, we can reveal the forms under which domestication is occurring and how it is being leveraged to benefit all participants. The domestication of open source can benefit organizations as they seek to leverage communities in efforts to increase design and development capacities and communities seek to leverage corporations for improved sources of innovation and distribution. Numerous avenues remain open in the investigation of open source domestication through the critique of practice, structure, and agency. These can include the expression of communal rules and obligations, the ways that coherent forms of participation are understood within a community, and the way work arrangements are enacted organizations diffuse their practices more into a broad array of social endeavors (Reckwitz, 2002).

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