**Chapter XIII**

# The Social Production of Ethics in Debian and Free Software Communities:
## Anthropological Lessons for Vocational Ethics

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## ABSTRACT

*This chapter examines the way that participation in Free software projects increases commitments to information freedom among participants. With the Debian project as its core case study, it argues that in Free and Open Source software communities, ethics are reinforced through the sustained collaborative development of code and discussions and decisions around Free software licenses and project policy. In the final section, the chapter draws on the ethnographic analysis of ethical cultivation in Debian to describe a model of ethical volunteerism based on institutional independence, volunteer labor, and networks of trust that is applicable to a range of vocations.*

# INTRODUCTION

Free and Open Source software (F/OSS) development projects have been investigated from a number of perspectives with an emphasis on (1) F/OSS production techniques and legal codes, (2) developers' motivation to participate in projects, and (3) F/OSS' social and economic impact. We believe that one of the most novel dimensions to the networked and open production of code is its role as a socio-educational site for the cultivation of a more ethically dense practice of programming. In this way, we feel that F/OSS projects are institutions for ethical development through the practice and application of ethics in the same way that they are sites for the development of code. In our ethical examination of F/OSS developer communities, we move away from a typical account of "hacker ethics" toward a discussion of the rise and cultivation thereof. Participation in free software projects substantially deepens commitments to information freedom common among hackers. As a result, ethics are reinforced through the sustained collaborative development of code and, to a greater degree, through the discussions and decisions around free software licenses and project policy.

This piece utilizes an in-depth case study of the Debian project. Debian is one of the largest F/OSS projects, although it is also one that has received very little academic analysis to date. Debian is a non-commercial version of the GNU/Linux operating system maintained by over 900 volunteer developers who package[2] a wide variety of software applications. With the possible exception of the Free Software Foundation's (FSF) GNU project, Debian demonstrates the most overt commitment to the principles of free software as originally expressed by the FSF and the GNU General Public License (GPL) of any large F/OSS project. Debian developers have modified and extended these principles in their social contract and Debian Free Software Guidelines (DFSG).[3] While in some respects, Debian is unique in its explicit ethical codes, its uniqueness should not obscure its wider relevance. The type of moral cultivation that forms an important facet of the Debian social sphere is a component of many other F/OSS projects in less accentuated forms. Debian is ideal to analyze because it brings into clear relief the subtle yet significant processes of ethical socialization that occur in most F/OSS projects. Though we focus on the domain of F/OSS, this case study also serves as an example of the unique ways in which an ethical social order is built and sustained in the "immaterial" setting of the Internet.

We feel that an analysis of F/OSS communities' social lives is best served by a qualitative, ethnographic methodology. As a result, we have employed a "classic" anthropological model of participant-observation that combines audiotaped interviews with the examination of the "everyday" speech and discursive practices of Debian developers. This chapter is based on and references a number of sources, including text from Internet Relay Chat, mailing lists, published Debian documents, and Debian events and conferences. The chapter pulls from several years of data collection and fieldwork paired with survey data collected during interviews with

Debian developers from the U.S., Canada, Europe, and South America, including 45 audiotaped developer life histories and 12 email interviews. This ethnographic data is complimented by direct participation by one of the authors in each of these areas as a Debian developer, Debian applicant, and New Maintainer process application manager.

Through an application of our ethnographic knowledge of Debian and F/OSS, we posit a theoretical model of ethical volunteerism applicable to a wide range of vocations. We argue that institutional independence, volunteer labor, and networks of trust can act as key elements in facilitating moral development within occupational groups. With a deeper ethical practice, professionals can be more self-reflexive of their vocational values and, as a result, better situated to respond to external social, political, and economic forces. These responses, grounded in a more ethical form of labor, can provide an important foundation for political response and social change.

# THE SOCIAL LIFE OF ETHICS
## Approaching Ethics Socially

Western philosophy in the tradition of Kant approaches ethics as a realm of behavioral possibilities describing the ways that one ought to be behave given abstract, universal conditions.[4] This philosophy assumes that virtuous actions are determined by individuals through intellectual deliberation and adoption of ethical codes or laws. In contrast to this tradition, social theorists including M. M. Bakhtin[5] have rejected this model for the individualistic adoption of formal and universal rules and suggested that a "social life of ethics" is created and embodied in community-based social practice and lived experience.[6] For Bakhtin, socially conditioned life events and historical contexts frame ethical choices and give rise to social moral orders. Cultivation and adoption of ethical standards and behaviors arise and are under constant consideration, engagement, and reformulation through socialization, education, and lived experience. As a result, ethics are neither simply imposed by obligations determined through top-down structures nor individually chosen. Consistency of ethical form is achieved through the relative stability of social practices. However, there remains a possibility for transformation as "events" and their social context change over time. It is through this process of socially defined pedagogy and community-based self-fashioning that the sociological, historical, and economic context of ethics plays a far more decisive role than do static "codes" of conduct.

While the social cultivation of ethics in Free software communities is new academic terrain, a number of anthropological works on medicine and science have provided compelling studies of the way that individuals adopt values and make moral choices through embodied action influenced by institutions, technologies, and historically informed activities (Galison, 1997; Good, 1994; Gusterson, 1996;

Lurhmann, 2000; Rapp, 1999). In these studies, social experiences act to bolster or thwart ethical practice, shape the nature of ethical relationships between individuals, and frame a community's ethical orientation. We feel that this analysis is best served by de-emphasizing moral philosophy in favor of a short review of examples from sociological and anthropological literature that demonstrates both the way that ethics are adopted and the role that they play in shaping individual identity, behavior, and action.

The medical field is profoundly embedded in an extremely complex ethical terrain, as doctors routinely face difficult ethical situations. Doctors are expected to navigate these situations with the help of intensive training and a professed allegiance to the Hippocratic Oath. The Oath affirms the commitment doctors hold, both as individuals and as a vocational group, to do everything possible to heal and assuage the emotional and bodily suffering caused by disease. Morally saturated, the Oath unambiguously affirms the importance of linking care and compassion with skill and science in the management of illness.

Yet a number of analysts (Good, 1994; Lantos, 1997; Lurhmann, 2000; Scheper-Hughes and Lock, 1987) question the "moral competence" of American doctors. Claiming that medical school teaching has "a strong central element of institutionalized sadism," they argue that doctors' training hinders the "the art of medicine" by socializing students into an ethic of stoicism and detachment that ultimately leads to a deeply ambivalent patient-doctor relationship (Lantos, 1997, p. 77). Doctors' internship and residency periods cement this ethic, as overworked and poorly treated interns and residents see patients as "the source of physical exhaustion, danger, humiliation, and that doctors are superior and authoritative by virtue of their role" (Lurhmann, 2000, p. 91). Additionally, critics describe how many physicians come to perceive bodies as divorced from the personal and emotional traits that shape illness through an overemphasis on the biological and material dimensions of disease during training (Good, 1994; Lurhmann, 2000; Sheper-Hughes and Lock, 1987). The health care market erects even more "ethical barriers" by restricting the time doctors spend with patients and the types of services given. The Hippocratic Oath simply cannot undo years of training during which physicians are mistreated and overworked while the "person" drops from their patients bodies.

Gusterson's (1996) study of nuclear scientists at Berkeley's Lawrence Livermore Lab is a compelling ethnography of ethical contextualization and transformation. Gusterson demonstrates how politically liberal scientists, many of whom were uncomfortable with the existence of nuclear technologies before they were employed at Lawrence Livermore, became full-fledged and passionate supporters of nuclear weapons while working in the laboratory. These scientists came to see their work as meaningful and important contributions to the United States' nuclear defense program which, in turn, they came to see as essential to national defense and social welfare. Gusterson describes how scientists used collective joking and identification with machinery to eclipse and bypass some of the more morally uncomfortable issues surrounding nuclear weapons use and proliferation.

The experiences of doctors and nuclear physicists exemplify the way that ethical considerations can arise out of socialization, institutional conditions, technologies, class and ethnic backgrounds, and socio-economic forces. Though individuals ultimately hold ethical views and make moral choices, a wider set of factors shape the way that social actors come to hold and exercise ethics. In considering the ethics of "hacking," it is essential to leave behind the individualized view of ethics in favor of a more socially grounded analysis to examine the role that institutional conditions and social practices play in shaping ethics.

## Ethical Cultivation in F/OSS Projects

For many hackers, an explicit practice of ethics grows alongside direct participation in various hacker activities, such as attending conferences, reading interactive news websites, and attending local hacker meetings. While ethical social orders are the product and process of communities, they unfold dynamically according to individuals' life circumstances.  As a result, there are a diverse number of ways through which ethics are considered and fostered by different hacker groups. These are often defined by an institutional context (the university, the BBS, "the underground," F/OSS projects, the business sphere), a particular hacking community (gaming, phone phreaking, security hackers, the hacker underground, UNIX), and historical factors (the arrest of certain hackers, specific battles over intellectual property, new technologies, the development of Linux, etc.).

One such hacker community is the F/OSS community formed around the production of high quality software whose source code is "freely" accessible.[7] Through everyday informal acts that include software development, debate, informal discussion, joking, trust building among developers, and the experience of sharing and learning, Free software projects sustain a vibrant ethic of information freedom.[8]  The community is divided into many projects of varying sizes and has been lauded for bringing collaboration to new productive heights and introducing novel legal schemes to protect the free use, reuse, and distribution of knowledge. However, the importance of F/OSS projects as a site for the cultivation of ethics has been, up until this point, egregiously overlooked.

For F/OSS and for the Debian project in particular, these social and legal elements play an important role in contextualizing the cultivation of ethics. F/OSS developers' ethical and political aesthetic is defined in contrast to the predominant market-based styles of software production and intellectual property. F/OSS uses software licenses like the GNU GPL (the GPL is an example of what F/OSS developers call a "copyleft" license) to materially and symbolically reterritorialize knowledge and, as a result, eliminate the need to engage in illegal activity to gain total access to and control over source code or knowledge.

Copyleft licenses use law to make source code permanently accessible. As a result, no illegal act is necessary for those seeking to "hack on" a copylefted idea or piece of software. Richard Stallman, the father of and philosopher behind the Free

software movement and ideology, devised a license, the GNU GPL, and a political organization, the FSF, to confront the issue of restricted knowledge and to create the conditions for a transparent domain for the creation and distribution of computer software.[9] Through participation in this realm, hackers contrast their experience with closed and proprietary development with the social and legal context of F/OSS. This contrast, paired with the ethical practices internal to many projects, are the means by which social actors come to adopt clearly understood and well-formulated ethical stances in favor of transparency and openness. Participation in F/OSS projects like Debian contributes to the solidification of a pre-existent ethical commitment to information freedom.

## Ethical Cultivation in the Hacker Public Sphere

While F/OSS hackers are most easily associated with an individual project, like Debian, they participate in a hacker sphere that serves to substantiate freedom as a concept with moral relevance beyond technological issues. This public sphere exists in a number of online and offline channels and consistently provides a space for rational argument and discussion around a multitude of political and legal issues. It often involves discussions framed by news articles, legal cases, editorials, and community-generated commentary. This nascent public sphere can be traced back to the 1980s in (Bulletin Board Systems (BBSs), the hacker conference scene, Usenet groups, and mailing lists. The rise of large-scale free software projects like Debian, the growth of large hacker conferences like USENIX, Defcon, HAL, and HOPE, the use of blogging for personal editorialization, and the central role that interactive web news sites like Slashdot and Kuro5hin have provided hacker communities with conditions for a more inclusive and dynamic public sphere. In these forums, discussions about censorship, politics, technology, intellectual property, and the media help define certain social trends as ethically important to hackers and bring social concerns into the realm of hacking.

Large hacker conferences and the widely read daily interactive news websites like Slashdot play particularly important roles in the constitution of a public sphere that allows for acute moral reflection in distinct and complementary ways. Interactive news sites are visited many times daily and help foster a constant interchange of information within F/OSS communities. Hacker conferences are infrequent but highly charged, allowing pleasure, politics, learning, and hacking to closely intermingle. More than in any other space, conferences allow hackers to see themselves as part of a wider moral, cultural, and increasingly political community. They explore the ways that their ethical goals extend beyond hacking, as conferences frame hacker ethics in relation to questions of freedom of speech, democracy, and scientific production during panels, talks, and informal conversations. At conferences, hackers often hear speeches by influential and charismatic political or cultural figures like Richard Stallman, Lawrence Lessig, or Jello Biafra, who overtly frame "hacker issues" as something with much larger political importance.

Online collaborations and interaction within a hacker public sphere constitutes a realm of "ethical doing" that establishes and furthers the value for information freedom. Developers might "practice ethics" by attempting to convince another F/OSS programmer to license his or her software under a DFSG-compliant license; others participate in a flame-war over the nature of transparency in the Debian project; others attend hacker conferences and informally discuss ethics; others write politically charged articles in local Linux publications. Even humor, such as the jokes over the existence of a "closed-door" cabal of leaders in Debian, contributes to the ethical consideration of transparency, openness, and universality. For most developers, these mundane acts combine over time to prompt ethical enlargement in a collective and informal fashion.

*Ethical Cultivation in Debian*

F/OSS developers' attitudes toward freedom, set in broad terms in the larger F/OSS community and reinforced through the broad hacker public sphere, are particularized and reinforced in the context of individual F/OSS projects. By analyzing the particularities of ethical cultivation within the Debian project, we can gain insight into the ways in which these ethical social orders are built. Our data shows that over the course of participating in the Debian project, developers move toward a more vigorous and overt ethical stance toward the uniqueness of their project and the importance of free software than when first joining. This stance is captured in the following quote:

*We are hard core about being free. Red Hat will bundle non-free. What Debian throws into the mix is that we are free and we are serious about being free. Certainly, you don't have to have such a devotion to it but the fact is that there is a group of people that are so dedicated to freedom and openness.*

While the nature of this position is clear, the source of this devotion is less obvious. Many assume that this passionate adherence to freedom and openness is an ethical belief that developers bring to the project. Many people assume Debian self-selects those who are already extremely committed to freedom. Although most Debian developers approach the project with at least a fundamental version of this position, it is through participation over time that this ethical skeleton is given flesh. What was originally limited to a functional, "engineering ethic" of producing high quality software is transformed into a wider moral position as sharing and openness become ethical ends in themselves.

In this way, a general ethical consciousness permeates the underlying spirit of the project and is promulgated by developers through everyday acts of sociability. Debian acts as a moral refinery that enlarges the ethical inclinations of many developers in substantial ways; developers learn about legal issues and the differences between F/OSS licenses, as well as Debian social and technical policy in the

process of their Debian work. Despite the variant ethical orientations that Debian developers hold prior to joining, participation usually contributes to the creation of a more explicit moral commitment to information freedom or substantially deepens existing commitments to freedom. For some, Debian's primarily engineering- and production-based ethic evolves to include other, non-technological issues related to freedom.

Prospective developers valuing information freedom are often attracted by Debian's reputation as the F/OSS project with the strongest and most explicit ethical commitment. This commitment is instantiated in Debian's Social Contract and in the DFSG and is implicit in mailing list and IRC (Internet Relay Chat) discussions. Other Debian developers are motivated more by pragmatic concerns including the desire to package a piece of software in Debian or the need to "give something back" to the Debian community whose software they use and enjoy. Despite these non-ethical orientations, and usually in combination with them, prospective Debian developers almost unanimously agree that open methods for software development produce better, higher quality software. Nonetheless, participation in Debian over time represents a form of ethical learning and socialization in which new values are adopted while others are refined and enlarged.

Developers' formal entry into Debian, The New Maintainer Process that is discussed in detail later in this chapter, marks a rite of passage into a project where ethics are made manifest through discussions, writings, and technical procedures. In this way, experiences that begin with the New Maintainer Process shape ethical sensibilities, influence the desire to continue participating, and form the basis for more overt forms of political engagement.

After entry into the project, ethical expansion continues through everyday acts that often include legal discussion on mailing lists and conversations on IRC. In interviews, many developers claim that although they were always committed to freedom, their knowledge of the legal issues surrounding software was bare until they began participating in Debian. Given the importance of licensing in the domain of F/OSS, and Debian in particular, it is not surprising that an ethical consciousness is instilled in Debian developers through the discussion of software licensing. This discussion is constant and complex; the debate engages with the fundamental meaning of software freedom and immerses it in a larger moral context. The following message from a mailing list demonstrates the way in which many developers equate and understand the role of free software as a meta-guarantor of freedom:

*Free software should create a sort of economy in which things are the way they would be if there were no copyrights at all. That's the intuition. In other words, when I write free software, I renounce the ability to control the behavior of the recipient as a condition of their [sic] making copies or modifying the software. The most obvious renunciation is that I don't get to demand money for copies. But I also don't get to demand that the person not be a racist; I don't get to demand that the person contribute to the Red Cross; I don't get to demand that the recipient contribute to*

*free software. I renounce that little bit of control over the other person which the copyright law gives me, and in that way, I enhance their [sic] freedom. I enhance it to what it would be without the copyright law. You might say that public domain is good enough. But free software is about creating an economy of such freedom.*

The Debian developer IRC chat channel, where a series of topics are set each day, is another space where hundreds of developers connect. While many topics relate to technical issues, political and legal issues are almost equally frequent. These political topics often follow the form of the following example: "Topic for#debian-devel is SSL Patented? - http://www.theinquirer.net/?article=8029." Many developers follow the "topic link of the day," which becomes a shared concern for Debian developers.

While most developers contribute infrequently to mailing list discussions, many follow the higher traffic lists that pertain to Debian development, legal issues, and policy. On these lists, developers frequently raise questions about licensing and intellectual property in a way exemplified by the following message.

*Perhaps we need to be thinking about alternative ways to uphold the "protection of the moral and material interests resulting from...scientific, literary or artistic production[s]"? Surely existing copyright, trademark, and patent regimes, to say nothing of "work-for-hire," "paracopyright," and "trade secret" concepts, are not the only ways to give Article 27 force and meaning. In other words, I don't think it necessarily follows from Article 27 that we must have a global oligarchic hegemony of media corporations dictating to us what we shall and shall not read, watch, perceive, write, and share with our fellow human being[s].*

For this developer and for many others, F/OSS development blurs into a moral reflection on intellectual property. While the ethical strength and orientation of developers varies among individuals, ethical deepening plays a consistent role in many of the everyday acts that constitute participation in the project.

Licensing discussions are quite amenable to ethical reflection. However, it is not just "talk" about licensing, intellectual property, and transparency that forms the basis of ethical cultivation in Debian. The social experience of sharing and learning is another area where ethics are honed. As developers learn, they develop dedication to the organization and to its method of open collaboration. As they volunteer their time and skills, many feel that they gain tremendously through participation. These gains include material benefits such as free technical tools and more abstract social benefits like the satisfaction of building a quality product, peer respect and admiration, new collaborative abilities, technical skills and knowledge, and a sense of belonging in the Debian community. One long-time participant expressed this feeling during an interview in the following way:

*I've learned about the intricacies and history and every detail of the Debian distribution, how its disparate components fit together, how its packaging system works. I've learned all sorts of little oddities of technical lore, and I've picked up a few programming languages and a lot of general programming knowledge. I've learned how to collaborate with folks spread out over the world and across time zones. I've learned how to argue effectively online, and I've learned that even though I tend to shy away from arguments, there are things that are worth arguing for. I've learned how to think about the large effects work can have on a project, and how to take responsibility for and plan out those effects before hand.*

Given the penchant for learning and knowledge in the hacker community, it is not surprising that many developers come to value Free software projects as educational spaces. They feel that meaningful learning is grounded in the type of openness and transparency exemplified by Debian. Though many hackers are able to learn a tremendous amount on their own, mailing lists and IRC provide a means for developers to tap into the collective knowledge of their community. The experience of learning and sharing technical and non-technical skills contributes to the strong allegiance to Debian held by many developers and plays a role in the cultivation of ethics. During interviews, many developers claim that they have learned at least as many technical skills through developing free software as in more formal learning environments. In this educational space, the stereotypical geek qualities of elitism and bravado give way to a desire to help others. The fundamental hacker pursuit of knowledge becomes an endeavor that is recognized as a fully non-technical social process.[10] Although we can conceptually separate hackers' moral drive from their "engineering ethic," the two drives intermingle and interact to bolster each other. The technical success of free software projects and the personal gains from participation jointly reinforce the hacker belief in openness and information sharing with relevance and applicability in other domains of social and political life.

## The Debian New Maintainer Process: Trust in Virtuality

The incredible explosion of online communities, a broad term referring to grounds ranging from MUDs and MOOs to IRC, blogging, online activist organizing, and F/OSS, has been voraciously met by various theories and analyses about the "authenticity," "realness," and "nature" of such communities. The overarching goal of these analyses has been to determine whether Internet-based social orders, forms of identity, political engagements, and other types of community building are "really real" given the lack of bodily interaction and material presence of things and objects; theorists ask whether moral orders, empathetic care, political engagements, and meaningful relationships can exist when bodies rarely meet and text is the primary mode of communication and interaction.

Opinion and research on this subject varies greatly, although three major positions have emerged over the last 10 years. One is the opinion that social life

on the Net reflects authentic forms of human identity, interaction, sociality, and political engagement (Doheny-Farina, 1996; Gulia & Wellman, 1999; Mitra, 2000; Negroponte, 1995; Rheingold, 1993). Supporters of this position believe that a real community is imagined to sustain emotional ties, be morally deep, or exhibit other forms of human closeness. Some of this work is Utopian in spirit and, in the opinion of skeptics, reflects a "need to authenticate," to "prove" that certain online spatial communities are meaningful and real. Some arguing this position go as far as claiming that online communities are more substantial than urban modern communities because they offer a form of emotional closeness and deep connections that are rare in modern urban settings (Rheingold, 1993).

In contrast is a more critical and, at times, even dystopian group that claims that online communities are socially thin and fake and can even act as a form of political misrecognition and domination. Some argue that without face-to-face interaction, true moral concern for others and communities, as a result, are impossible (Ostwald, 2000; Robins, 2000; Robins & Webster, 1999; Willson, 2000;). There are some in this group that argue that virtual spaces are too utterly synthetic and neutral to be authentic in a way that is not unique to cyberspace. They define virtual sociality as a manifestation of postmodern and hyper-capitalist polyesterization and compare it to extreme commodification and the proliferation of fake urban spaces best represented by Disneyworld and shopping malls (Otwald, 2000; Robins, 2000; Robins & Webster, 1999; Terranova, 1996).

Though these two sets of opposing positions differ dramatically in their description of online communities, both share certain key assumptions. They are concerned with what the authentic nature of community is (or should be) and are informed by a very primordialist sense of community in which a universal self psychology is assumed. A third position offers an alternative to such bi-polar treatments of online communities. Less concerned with what a community "ought to be," this literature calls for and offers a more refined analysis of the ways that sociality, politics, and community are sustained virtually (Danet, 2001; Fisher, 1999; Hakken, 1999; Hand & Sandywell, 2002; Kirshenblatt-Gimblett, 1996; Slater, 2002). Noting that the Internet is not a unitary space for interaction and politics (Hand & Sandywell, 2002; Miller & Slater, 2000), calling attention to historical conditions and the unit of analysis (Fisher, 1999; Hakken, 1999) and highlighting the ways that micro-sociological forms of interaction build materiality, relationships, and forms of play (Danet, 2001; Kirshenblatt-Gimblett, 1996; Miller & Slater, 2000; Slater, 2002), these studies provide a more compelling way to approach the subject of social interaction in virtual spaces. Authors arguing this position throw out the quest "to authenticate" (to prove the realness of interactions) and focus on how social orders are built and sustained and the ways that virtual and non-virtual interactions act in concert to produce unique forms of social expression and life.

Our research into the primarily virtual communities of Debian and F/OSS supports this final position. Comparing the reality of "virtual" ethical orders to offline orders is irrelevant in the context of our analysis. To gain insight into ethical

cultivation in F/OSS, we must focus on the way that values are built and sustained through different social and technological practices within Debian and the hacker public sphere. One of the most relevant dimensions of the "collective" nature of ethical cultivation in F/OSS projects is the manner in which "embodied" ethical learning and the rise of social values occur in largely disembodied virtual spaces. As a prerequisite to the cultivations of ethics within any community, trust plays an essential role in Debian and in F/OSS more generally. Set in virtual space, the cultivation of trust must assume new forms and an increased importance.

A micro-sociological analysis of Debian's New Maintainer (NM) Process provides additional insight into the way that Debian attempts to facilitate trust building in "virtuality" and the way that trust helps facilitate the meaningful cultivation of ethics within the project. In our examination of the system, we focus on the creation of cryptographic trust and the role that explicit ethical engagement with the Social Contract and DFSG plays in the NM procedure. We highlight the way that virtual trust building retains connections to non-virtual interactions and the way that technical and social aspects of development intertwine to create socially productive forms of trust. Trust building in Debian demonstrates the flexible and innovative ways that social practices unfold in what are mostly virtual domains of practice.

When the Debian project was young, it was a close-knit community where most project members were familiar and interacted with a majority of other active members. As a result of this constant interaction, trust grew that enabled verification of identity, integration into Debian's ethical community, consistent familiarity with Debian project policy, and standardized technical competence. Prospective members needed only to informally demonstrate their technical competence and to claim knowledge and adherence to the project's social contract and policy before being admitted to the project. Socialization occurred organically and inter-developer trust was built almost wholly through personal and group-wide interactions.

During Debian's growth in size from about one hundred developers to nearly one thousand, the project found itself in a crisis. New members were admitted at rates faster than the project's ad hoc social systems could integrate them, and the group grew to a point where close interaction among many members was no longer possible. In reaction, Debian halted the acceptance of new maintainers until the project could develop a system to build trust—cryptographically, ethically, and technically—in a systemic and reliable manner.

The procedure developed was Debian's New Maintainer (NM) Process that aims to consistently facilitate and build trust in a virtual space among a very large group of developers from around the world. Sustaining trust among this large, culturally and linguistically diverse group poses unique challenges that the NM process is designed to remedy. The NM process creates a standard that all developers must meet - Richard Stallman, a Debian NM applicant, is held to the same standard as developers younger than the Free Software Movement. NM is structured not only as a test, but as a process for learning, mentoring, and integration into the project where prospective developers work closely with at least one older, "trusted" project

member. While we emphasize some of the ethical and social elements of NM, it is important to note that it is just as much a method of displaying technical proficiency and a process of technical mentoring.

Before prospective developers even apply, they are first asked to identify the contributions they plan to make to the project. They are encouraged to demonstrate their commitment to Debian, to express why they want to join, and to display some level of technical proficiency. For most developers, this involves making a package and, because only existing developers can integrate a piece of software into the larger GNU/Linux distribution, they need to find an existing developer to "sponsor" their work. New maintainers work closely with their sponsors, who check their work for common errors and take partial responsibility for the new maintainer. This step is important because, in addition to technical skills, the new volunteer begins integrating into the social sphere of the project. Prospective developers are encouraged to join mailing lists and IRC channels that provide the medium for technical communication and an important piece of the Debian public sphere.

An NM's sponsor often acts as the new developer's advocate when the maintainer applies for membership in the project. Advocates are existing developers who vouch for new developers and their history of and potential for contributions to the community. After advocation comes the assignment of an application manager, an existing Debian developer, who handles the rest of the new maintainer process acting in a complex role that is mentor, teacher, examiner, and evaluator. The NM process that follows consists of three major steps. The three stages attempt to ascertain and confirm the new maintainer's identity, knowledge of and position on free software philosophy, and their technical expertise and knowledge. In terms of the social cultivation of trust and ethics, the first two steps are particularly significant within the Debian community.

The act of proving identity is accomplished through a complex hybridization of social and technical mechanisms involving cryptographic trust-building with Pretty Good Privacy (PGP) or, in Debian's case, its free software clone, the GNU Privacy Guard (GPG). This step is designed around the fact that each developer has control over a carefully controlled and fully unique cryptographic key attached to its owner's name and email address. These keys are used to generate "signatures" that can be used to verify that a particular message, text, or piece of software originated with the possessor of a particular key. When key owners meet in person, they prove their identity to each other by exchanging pieces of government-issued picture identification and identifying information about the key they use. Having traded this information, developers later place their unique cryptographic "signature" on each other keys to verify the fact that the developer signing has connected the key being signed with the name on the key with the individual in possession. In the first step of the new maintainer process, prospective developers use this cryptographic method to "prove" their identity to their application manager; to accomplish this, they must obtain the cryptographic signature of at least one existing developer.

As nearly every hacker within Debian has a key signed by at least one existing developer, and as many developers have keys signed by numerous others, nearly all maintainers are connected by what they call a cryptographic "web of trust." In the manner of the famous "six degrees of separation" model, Debian can use cryptographic algorithms to prove that—while it is now clearly impossible for every developer to have met each other developer—every developer can have met a developer, that has met a developer, that has met a developer, etc., until every developer is connected. Of the 963 keys in Debian official "keyring," 857 can trace a connection to every other developer through an average of less than five other developers; no key is more than an average of nine links away from any other key. Debian's administrative software depends heavily on these keys to identify users for the purposes of integrating software into the distribution, for controlling access to machines, for allowing access to a database with sensitive information on developers, and for restricting publication to announce-only email lists.

The development of this web of trust in the NM Process plays an essential role in Debian. A story illustrates this point: When it became clear that a developer who occupies an important technical position was unconnected to Debian's web of trust, a large number of developers expressed alarmed concern and anger on a Debian mailing list. Developers' strong and uniform reactions demonstrated the essential nature of these infrequent face-to-face interactions. Within three days, three nearby developers had driven to meet the individual in question and had succeeded in bringing him into the cryptographic web.

Integration into Debian's web of trust is an essential first step in new maintainers' integration into the Debian project. However, because this method of proving identity requires face-to-face networking with existing members of the project, it helps to foster the close-knit community feeling that the NM Process attempts to replicate or replace. These key-signing meetings, usually long social meetings over drinks or coffee and often with a number of Debian hackers, allow new maintainers to discuss Debian, its policies, its software, and its philosophies with other developers in a face-to-face manner and with a strong community feeling. This process connects and leads into the second, and often the most rigorous, part of the NM Process—philosophy.

During the "philosophy" step of the NM Process, application managers ask prospective developers a series of questions on Debian and Free Software philosophy. While general knowledge of the definition and philosophy related to F/OSS is essential, the questions usually revolve around Debian's Social Contract and the DFSG. New maintainers are asked a series of questions, which often vary substantially between application managers, to demonstrate their familiarity with the texts of these documents, their ability to apply and synthesize the concepts encapsulated within them, and to articulate their commitment and agreement. While each NM must agree to the social contract, the philosophy test is not used to ensure that all developers approach free software identically, but rather to ensure that all Debian developers are knowledgeable of, interested in, and committed to Free software

discourse. Open-ended questions often turn into longer email conversations between application managers and NMs. While dynamic and heterogeneous, the process ensures both a common familiarity with ethical issues in F/OSS development and a consistent level of commitment to a set of ethical beliefs. The process aims to create consistency in developers' critical ability to dialog around a common philosophy, as opposed to prompting the individual adoption of a prescribed approach to Debian's moral code.

Many developers claim that writing answers to the philosophy section of their New Maintainer application was one of the first times that they coherently and explicitly compiled their ethical beliefs on software development. The act of externalizing ethics made some consider the wider social issues of freedom related to transparency, openness, and democracy. Although some developers focus on the moral implications of "freedom" in relation to technical questions, other developers use their NM application as an opportunity to enlarge the moral scope of questions of freedom. This is evidenced by the following excerpt from a New Maintainer application essay submitted by a prospective Debian developer:

*The Social Contract and the DFSG represent a very unique idea. In this day and age where society (at least in the U.S. and some other first-world countries) encourages individualism and tries to divide the people and control them, it is very refreshing to read the Debian Social Contract. Proprietary software made by commercial software companies/developers is exactly that, commercial. Those companies/developers are only about profit or advancing their agenda and will do what they need to in order to maximize that. Often this conflicts with doing the right thing for the user and here are some examples.*

In this short excerpt, it is clear that this developer reflects on the differences of moral code contained within the Debian Social Contract and those that are developed in society, as well as the differences between proprietary and Free software development. In contrast with other realms of hacker social life, including the corporate sphere, Debian's NM process represents an important nexus for the expression of ethics.

In the final step of the New Maintainer Process, applicants must demonstrate that they have the technical wherewithal to be trusted with the ability to integrate software into the Debian archive and to represent Debian to the world. This test is often filled with the presentation of a clean, policy-compliant, and bug-free example of the type of work the applicant aims to do within Debian (e.g., a package), although this is increasingly complemented by a series of technical questions.

In these ways, NM fulfills a community-forming function by establishing a common denominator of social, philosophical, and technical principles and by introducing the prospective member to the Debian hacker sphere and initiating the NM into Debian's critical dialog culture. Additionally, the process does not merely

decide who can be trusted and who cannot.  Rather, it establishes trust with the prospective Debian maintainer and integrates them in a social network of peers.

The significance of the F/OSS project as a site for ethical cultivation is not just that ethics "exist" but how they are made visible and accessible to wider groups of people. Ethics, much like other forms of cultural values, emerge through socialization and practice and are also shaped by socio-economic forces and considerations. Lived experience motivates action; spaces are needed to transform ethical inclinations into social realities. Free software demonstrates the importance and strength of cultivating ethics through everyday acts that constitute a sort of ethical habitus and prompts us to ask how ethical cultivation might be developed in other domains of professional or subcultural activity.

Understanding the internal dynamics of how to achieve ethical cultivation allows for more clear and realistic thinking on the creation of sustained ethical practices among other vocational groups where ethical actions have an immense social and political impact - like medicine and science. What F/OSS offers is not just new models for collaboration and novel ways to protect knowledge but a model for independent and volunteer associations in which ethics can be given fuller consideration among members of a vocational group.

# ETHICS AND THE CRISIS IN SCIENCE AND MEDICINE, NEW MODELS FOR VOCATIONAL ASSOCIATION

In a piece that asks whether F/OSS is like science, Chris Kelty (2001) concludes that F/OSS "is in fact part of science — and increasingly an essential part of it." In fact, as scientific knowledge and processes are increasingly affected by commercialization and privatization, Kelty implies that F/OSS may be more "scientific" than much of contemporary science.[11] We understand the second half of his article's title, "Free Science," as more than a description; it is an impassioned plea to sustain the standards, mores, and practices that guarantee openness and accessibility in science. Kelty warns that information sharing is essential, but not "intrinsic," to science and that it must be cultivated through a combination of social, literary, and moral techniques that include the open publication of work, conference participation, and active collaboration. Kelty (2001) concludes: "Openness can not be assumed, it must be asserted in order to be assured."

Like Science, the "art of medicine" has been affected by adverse institutional and economic conditions. As discussed earlier in this essay, the medical profession is marked by the problematic nature of socialization in modern medical training. This is compounded by expensive and controversial courting of physicians by pharmaceutical industry representatives. The enforcement of drug patents, especially in countries where average individual yearly salaries can not cover even a month

of many pharmaceutical treatments, are particularly disconcerting. In the case of patents and drug costs, human lives are ultimately at stake; on the whole, physicians have been quiet on these issues.

Many doctors and scientists are alarmed in feeling that their professions have moved toward privatization and clinical stoicism with few vocal objections; the Hippocratic Oath in medicine and the traditions of openness and sharing in science are designed to protect against such shifts. In response, several scientists and doctors have attempted to raise awareness and response in their communities.[12] This response, however, has been limited and piecemeal. We believe that this silence signals the need for more active avenues of ethical socialization internal to medicine and science that form an ethical basis for engagement in collective responses to important political issues in their fields.

We can not attempt to offer a prescription for assuring openness in science and creating a more ethically active medical practice. We are aware of the number and complexity of considerations that must be taken into account in an exhaustive discussion of the democratization and ethicalization of science and medicine.[13] However, we feel that F/OSS' avenues for ethical socialization act as a model that provides one important step toward more ethically dense scientific and medical practices.

As scientists' opportunities to engage in "closed" forms of academic, corporate, and governmental science increase, and as medical and scientific production are increasingly affected by market pressures, it is increasingly important that scientists, doctors, and the full range of professions related to science and medicine are afforded opportunities to participate in vocational and volunteer spaces at least partially independent of academic, governmental, and corporate ties.[14] Meaningful change in a vocational field cannot be prescribed from the top-down or outside-in but must be instigated by the field's practitioners. It is the practitioners who are most familiar with the moral, political, and social issues relevant to their practices and with the ways that their activities might affect the societies in which they are situated. Their vocational knowledge, guided by an ethical vision, can form the basis for a more substantial political response.

F/OSS demonstrates how institutional independence, volunteer labor, and the cultivation of trust act as three fundamental pillars in the facilitation of ethically active vocations. In F/OSS, institutional independence is often framed in terms of "freedom"; while inherently ambiguous, its role is tremendously productive. In the scope of Free software licenses, "freedom" refers to individual rights as a producer, user, and distributor of software. In discussions among developers, the term morphs dynamically into a broad, but rich, social concept. During ethnographic interviews, Debian developers describe a rich diversity of approaches to freedom, yet, for most, freedom means that individuals should be able to create and learn without significant technical or legal barriers.

Ultimately, Free software is "free" because it allows hackers to creatively innovate and collectively create. It achieves a form of productive freedom that is

rooted in conventions, values, techniques, and methods constituted around the act of writing code. Programmers in F/OSS projects have the freedom to collectively determine technical imperatives, styles of development, modes for the inclusion of members, ethical mores, and codes of behavior.  Institutional independence allows for the collective body of social actors to decide what the nature of a certain activity should be and to practice the ethical codes and norms that are best suited to achieve the goals of such activity.

While absolute institutional independence is difficult, many F/OSS projects exhibit a high degree of productive independence for the internal cultivation of technical and ethical codes.[15] Additionally, the contrasting experience of working in both proprietary and F/OSS settings creates a space for a critical awareness of technical and ethical standards, the ways they function, and their relationship to social forces. With this critical awareness, F/OSS practitioners hold a clear sense of how social, economic, and legal conditions alter their vocation, understand how their own work might affect others, and feel strongly about what should or could be done as a result. It is only with critical reflection that a socially situated response to dynamic socio-economic and institutional conditions is garnered.

Associational independence already exists in organizations like the American Medical Association and other scientific and vocational groups. However, active, sustained volunteer work is rarely a feature of membership. This type of independence without labor dilutes the potential for active ethical practice among vocational practitioners. It is *labor* that realizes vocational goals — whether it is caring for the sick, making software, or building bridges — and it is *labor* that forms the basis for both the cultivation of standards and the corresponding ethical codes that uphold such activities. As we have argued in this chapter, action is motivated by lived experience and supportive spaces are essential to cultivate the social practice of ethical life. F/OSS demonstrates how the volunteer nature of certain vocational associations help to ensure independence, while labor allows for a more sustained ethical practice to emerge.

In addition, trust between participants is essential to realize the forms of collaborative labor needed to foster the application of ethical values; trust is dialectically reinforced through sharing, working, and learning.  Even in F/OSS projects with clearly defined leaders, many decisions are made through a collective enterprise arising through a slow process of debate and discussion over mailing lists and IRC. Trust builds respect, understanding, and affinity in groups, which allows collaboration to flourish and makes consent in diverse groups possible. Trust turns fierce discussion and debate into a potential consensus-based decision-making process. This consensus facilitates groups' productive freedom to collaboratively determine the nature and content of their activities and underlying ethics.

F/OSS projects provide innovative examples of long-distance collaborations that have used the Internet to create a common space for the cultivation of ethics.  The "location" of F/OSS volunteer associations within the technologies of the Internet

makes sense among a vocational and cultural group whose life-world is intertwined with these technologies. While communication technologies important in F/OSS development facilitate long-distance labor, coordination, and identity building, they might be deployed differently to achieve other goals by other volunteer associations that may be more effectively situated in physical space.

In the wake of the widespread success of F/OSS software in recent years, F/OSS communities have garnered significant attention from groups outside the software development community. Researchers, activists, and corporations have been seduced by the wide applicability of F/OSS development methods, organizational models, collaborative models and licensing schemes to non-technical domains of activity. At the same time, F/OSS is confounding to many because classical economic models struggle with the complex and atypical nature of F/OSS' social practices, exchanges, and values. These same processes, when approached as a social practice, can reveal some of the diverse and culturally situated ways that humans collectively organize, create, share, and give.

It is in this spirit that we approach F/OSS as a domain of practice, the hacker public sphere and Debian as sites within this domain, and the establishment of trust through Debian's New Maintainer Process as a micro-sociological example of the mechanics of ethical cultivation in virtual F/OSS communities. It is in this way that we find insight into ethical cultivation as another important model of F/OSS activity applicable to the world beyond software.

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# ENDNOTES

[1]   Research for this chapter was made possible by a Social Science Research Council grant for the study of Philanthropy and the Nonprofit Sector and a National Science Foundation Grant (Award #0217470).

[2]   Packaging is the systematic compartmentalization, customization, and standardization of existing software. Packaging forms the bulk of most Debian volunteers' work for the project.

[3]   Debian's social contract and the DFSG are available online at http://www.debian.org/social_contract.

[4]   This philosophical orientation has a long history in Western thought evident in such writers as Pascal and Descartes and is an approach that enjoys continued popularity in contemporary philosophical works on ethics and politics. John Rawls' theories of a just state in *A Theory of Justice* (1971) and Peter Singer's descriptions of a utilitarian, universalist stance towards life, death, and disability exemplify the continued salience of the treatment of ethics as abstract, deontological concepts created through individual choice and the imposition of codes of conduct.

[5]   Various works of the Russian literary theorist Bakhtin engage with the question of ethics. Two of the most relevant are *Toward a Philosophy of the Act* (1993) and *Rabelais and His World* (1984). *Toward a Philosophy of the Act* deals explicitly with the question of morality and is written as a response to Kant's formulation of the categorical imperative. Avoiding absolutist or relativist views of ethics, Bakhtin argues that responsibility forms the particular situations that call for an ethical response. In *Rabelais and His World* Bakhtin situates the aesthetics and ethics of popular culture within particular historical periods, places, and events. In discussing medieval feasts, fairs, and markets, Bakhtin describes how medieval folk culture embodied and fostered certain genres of the grotesque and laughter that served to render visible, through inversion and parody, official and political ideologies and liberated people from other forms of moral condemnation.

6   There is a long tradition in Western social theory and philosophy, from Aristotle to Marx, Weber to Durkheim, and Bourdieu to Foucault, that has emphasized the way in which norms and values are cultivated through embodied social action within institutions and practice. We single out Bakhtin because he explicitly argues against the Kantian tradition in *The Philosophy of the Act*. His dialogical model of social creation is one in which social forms arise out of response, not rules, and is well suited to our analysis of F/OSS.

7   Many F/OSS hackers remind their users that they mean free as in "free speech" (libre), although often as in "free beer" (gratis) as well.

8   The concept of freedom within F/OSS communities takes on a broad, inclusive, and nuanced quality whose nature and history falls outside the scope of this chapter.

9   The copyleft and other such licenses have been integral for the free and open source production of software. However, many other social and technical conditions were necessary to really open up a vibrant space for the networked long distance and open collaboration of code. See Moody (2001) and Wayner (2000), among others, for accounts of the different factors that contributed to the constitution of this field of legal and technical production.

10   Granted, how one goes about learning from others is a highly stylized practice. There are culturally correct and incorrect ways by which one learns from other developers on mailing lists and IRC. We mention it to note that learning and sharing is uniquely deployed in hacker circles.

11   See Dickson (1998) and Mirowski and Esther-Mijarm (2002) on the trend toward increased commercialization in science. For a comprehensive bibliographic list of empirical studies that examine how commercialization and sustained industry involvement have shifted the practices of science and medicine see *Integrity in Science's* selected bibliography at http://www.cspinet.org/integrity/bibliography.html.

12   For example, No Free Lunch: http://www.nofreelunch.org, Doctors without Borders, Integrity in Science: http://www.cspinet.org/integrity/, Center for Science in the Public Interest: http://www.cspinet.org/ are all organizations who aim to shift the current ethical direction of their vocation. With the exception of Doctors without Borders, these organizations don't combine forms of active vocational labor with their politics.

13   See the last chapter in Dickson (1998) on some recommendations on how to democratize science in America. Though written in the 1980s, many of his insights are still relevant.

14   We are not claiming that F/OSS is fully independent from industry involvement or the government. Academic institutions such as Berkeley and MIT have historically played crucial roles in the development of key F/OSS applications; the Internet, where most development occurs, would not be possible without government funding and private research and development; many free

software developers have high paying jobs that give them the financial luxury to volunteer time; and corporations like I.B.M and Hewlett Packard have contributed significant funds to F/OSS projects. Despite these and many other connections (which we do not want to mystify as insignificant), it is arguable that F/OSS projects do have a degree of independence from the institutions and social structures that give them different forms of underlying technical and financial support.  If HP files for bankruptcy, Debian will still exist as a project.

[15]   Different F/OSS projects have different types of ties and relationships with governmental, corporate, and academic institutions that shape the degree and kind of independence. For example, many of the top kernel developers are employed by technology companies, and thus the Linux kernel exhibits a different type of relationship to the corporate sphere than that of other projects like Debian in which a much smaller percentage of its developers work on Debian for corporations.