Guest Editorial

Free/Libre Open Source Software (FLOSS)

Increasing Linux migration in governments and schools, free/libre open source software (FLOSS) development within hospitals, academia, SMEs and multinational ICT companies, and Linux uptake of individual users, all highlight that the FLOSS development and implementation is shaping our society in significant ways. The FLOSS development not only intrigues computer scientists to review processes and methods in software engineering, but also stimulates social scientists to look into the digital-mythical phenomenon of how distributed groups of individuals can work together, in an on-line environment usually without formal ties, to produce high-quality software. Over the past years, anthropologists, economist, lawyers, philosophers, and sociologists have tried to provide various explanations to the phenomenon of on-line social networking, distributed collaboration and knowledge creation and sharing (i.e., common-based peer production), which form a new political economy.

This political economy could be understood by the term 'weightless economy', coined by D. Coyle (1997), to describe the facts that the total weight of goods produced in the West was less around the 21st century than a century ago, and that the weight of every export dollar from USA was halved during the 1990s. In his philosophical investigation of this knowledge economy, Drahos (1996) proposes to call it an economy of 'abstract objects'. The knowledge being created and consumed here covers wide range of intangible forms of abstract objects, including written material, pieces of music or the recipe for penicillin. They can be sold and protected by intellectual property rights (such as copyright or patent law), or regulated as common property. The abstractness and intangibility of these objects refers to the fact that their existence in space and time does not follow Newtonian physics. Often their cost of reproduction and distribution approaches zero, but their effect on the real, material world are as concrete as that of other tangible objects. They incur real events when being processed, by humans or by any other entity.

Now, despite the fact that new technology, and digital technology in particular, has opened up the possibility for an entirely new weightless political economy, based on new kinds of abstract objects, the industry of abstract objects has to a large degree resisted change. They have been operating under the assumption that their products need to be wrapped up, black boxed, and distributed as good old fashioned Newtonian objects, as if the where apples or billiard balls. And in the cases where abstract and intangible objects has proved to be too flexible and fragile to package as immutable mobiles, the legal and governmental sector has come up with some solutions (Lessig, 2004). This has been most apparent in the entertainment industry, where large distributors persistently demonised file-sharing for their fear of fallen profits from selling CDs and DVDs (Lin & Beer, 2005). It is symptomatic to the battle of digital music that it was to be a large computer firm, Apple, not one of the major record companies, that first took commercial advantage of large scale and legal distribution of music on the Internet.

However, where the established industries of abstract objects have hold on to the old economy based on selling Newtonian tangible objects, the FLOSS movement has led the development and utilisation of a full spectre of technical, social and political possibilities that the new abstract software objects offer. One of the major factors that contribute to the success of FLOSS is some unconventional redesign of the copyright law, namely 'copyleft'. Copyleft licences provide each person possessing a copy of the work with the same freedoms as the author, including the freedoms to use and study the work, to copy and share the work with others, to modify the work, and to distribute modified and therefore derivative works. The licences also provide each licensee the duty to provide further receivers the same legal and practical possibility to share these freedoms. A widely used and originating copyleft license is the GNU General Public License (GPL). Releasing software under copyleft-like licences allows software source code to travel wider than that released as proprietary; software developed in this way are adapted to the locales through negotiations between standardised and situated practices, to become what de Laet and Mol term 'mutable mobiles' (2000). Together with the immense possibility of the Net and computing power to distribute FLOSS around the world, the mutability of FLOSS has opened a door to a radically new political economy, that is, a new way of producing, buying, consuming and selling intangible abstract objects, and a new way of regulating these relations through law, custom, and government.

The new political economy that various FLOSS communities embrace and explore is both global and local. Goods that are exchanged in this economy include not only software, but also agency, participation and control of new ways. Heterogeneity and multiplicity unavoidably emerge in such an environment. This special issue ensues Lin's (2005) call for a sociological perspective on FLOSS based on empirically grounded, ethnographic-oriented investigations into the diversity of socio-technical practices, articulations, definitions, and performances within FLOSS communities.

Whilst many have noticed the novelty in and of FLOSS, the major part of the existing body of literature on FLOSS remains deficient mainly because 1) the FLOSS development involves ongoing and highly dynamic activities and it is difficult to capture such evolving entities without adequate methodologies 2) practices and cultures around the FLOSS development is challenging existing ways of producing and interacting with knowledge and technologies in today's society, and such a socio-technical phenomenon requires the multidisciplinary methodologies of STS to deepen our understanding of mutual shaping of science, technology and society.

Distinctive features of this special issue

This special issue is the first volume in academia dedicated to a qualitative inquiry on dynamics in the FLOSS development and implementation, even if it is not alone in this endeavour (see e.g., Coleman, 2004; Kelty, 2005). Such a qualitative inquiry challenges the universally vocal and normative way of depicting FLOSS culture and practices (e.g., a homogeneous gift-giving and volunteering culture). The special issue encourages a practice-based and holistic view to exploring multiple cultures and practices in developing, localising, appropriating, and customising FLOSS. It also addresses the

diversity in FLOSS communities through asking how seemingly global FLOSS cultures are translated into different contexts and locales. The importance of such an emphasis on how FLOSS technologies and practices diffract as they travel is nicely encapsulated by Haraway (1992) in her optic metaphor of white light that diffractes through a prism and becomes a rainbow. In light of this metaphor, a piece of FLOSS software is never really the same; when reproduced and shared, it is both the same (the standard) and something else in the mean time.

The issue is original in three distinct aspects:

1. Contributors to this issue have explored questions around FLOSS development and implementation from different theoretical backgrounds, notably actor-network theory, activity theory, symbolic interactionism and post structuralism. Through including such a variety of contributions, we treat 'FLOSS research' as a boundary object (Star & Griesemer, 1999), which forms a multi-disciplinary platform that allows researchers from different disciplines and backgrounds to study, interpret and make sense of the phenomenon around FLOSS development and implementation. More importantly, most of the theoretical frameworks in this issue are STS-informed so as to help us to situate the phenomenon of FLOSS within a broader frame of technology studies. In so doing, research into FLOSS not only learns from useful concepts developed in STS, but also contributes back to STS literature indicating how STS may benefit from the development of a better understanding of how peer-to-peer networks function, in an open and often distributed environment, to cultivate new technologies, cultures, and new political economies

2. Methods: Contributors have adopted a variety of qualitative methods to look at social and organisational dynamics. Over the past years, a lot of worldwide surveys have been conducted so 'as to understand how FLOSS communities and business models function. Although these surveys do explain part of a wider trend towards the broad adoption of and participation in FLOSS, these quantitative studies are disputable because they largely overlook the fact that motivations cannot be accurately quantified, measured and categorised, let alone the bias in terms of sample representativeness and predominantly pre-defined options of individual motivations. The papers included in this issue, guided by qualitative inquiry, have largely addressed these methodological concerns, despite the unavoidable weakness in qualitative research in general (e.g., small scale).

3. Dimensions: Several case studies presented in this issue have extended FLOSS development and implementation to international, political and societal levels and sites (e.g., Chan, this issue). Not only does FLOSS have an impact on software industry, its influence goes well beyond FLOSS communities. Additionally, we also get to learn some Europe-led FLOSS projects (e.g., Darking & Whitley, this issue; Zune et al., this issue) which are not the prevailed and widely quoted LAMP software bundle. As such, we, on the one hand, uphold some of the existing views, and on the other hand, challenge or complement them with new points.

Summaries of the contributions

One of the major factors that contribute to the success of FLOSS is some unconventional redesign of the copyright law, namely 'copyleft'[1]. Copyleft licences provide each person possessing a copy of the work with the same freedoms as the author, including the freedoms to use and study the work, to copy and share the work with others, to modify the work, and to distribute modified and therefore derivative works[2]. The licences also provide each licensee the duty to provide further receivers the same legal and practical possibility to share these freedoms. A widely used and originating copyleft license is the GNU General Public License (GPL). Releasing software under copyleft-like licences allows software source code to travel wider than that released as proprietary; software developed in this way are adapted to the locales through negotiations between standardised and situated practices, to become what de Laet and Mol term 'mutable mobiles' (2000). Together with the immense possibility of the Net and computing power to distribute FLOSS around the world, the mutability of FLOSS has opened a door to a radically new political economy, that is, a new way of producing, buying, consuming and selling intangible abstract objects, and a new way of regulating these relations through law, custom, and government.

The ability of FLOSS to diffract and mutate as it travels is inextricably tied to its quality as an intangible and abstract object. It is an object (or a constellation of particles) that includes many kinds of relations that we do not normally consider when thinking of physically tangible objects. These relations include copyleft-like licences as one of the properties of a FLOSS object, because this kind of licence requires human readable (and thus exchangeable) source code to be re/distributed together with the computer readable binary code. As such, users can unpack the black box of software technology and customise and reconfigure it based on their local needs. A copyleft-like licence, in this sense, is part of the glue that makes this abstract object stick together as some sort of entity (the sameness, though incremental changes happened), but these relations may also include absences (the differences, some radical innovation might occur), as suggested by Darking and Whitley in this issue.

Let us illustrate this by telling some of the famous stories of FLOSS. At the beginning of the 1990s, computer kernels and operating systems were extremely complex systems that required thousands of man-years of work and mostly made and maintained by universities or large corporations. Yet Linus Torvalds sat down as a young student with the idea of making a working computer kernel (that later on became the Linux kernel). A couple of years later, another young man, Ian Murdock, took on the ambition of put together an entire operating system, Debian. He was ambitious enough to call it 'the universal operating system'. Debian now has more than 100 derived versions and is the only operating system to run on 11 computer architectures. The term 'universal' may be arguable, but the idea of universality has definitely been productive. Debian Linux now runs on millions of computers. Are these ideas, ambitions and potentialities a constituting part of FLOSS as abstract objects, together with their highly evolutionary capacity? Darking and Whitley argue that they are. Inspired by Law and Singleton's notions of 'fire' and 'fluid' objects, the two authors demonstrate a FLOSS-based e-business infrastructure,

Digital Business Ecosystem, as a fire and fluid hybrid object/entity.

Closely linked to the adaptability and fluidity of FLOSS objects are the many ways in which FLOSS projects are thought to be loosely coupled organisations. FLOSS-developers themselves have often described how their own communities lack of hierarchy and strict orders. They have compared their own organisations with bazaars (Raymond, 1999) or with ant hives (FreeCode, 2007[3]). These organisations have been contrasted with hierarchical kinds of 'scientific management' (Hannemyr, 1997) and with centrally planned 'cathedrals' (Raymond, 1999). Demil and Lecocq (2006) draw on similar notions when they propose 'the bazaar' as a generic governing structure, next to the market, the hierarchy, and the network. In this issue anthropologist Anita Say Chan 'retires the spokesperson' and shows how the network of Peruvian FLOSS activism gains strength *not* by the building of anything similar to an 'Obligatory Point of Passage' that speaks on behalf of others, but by the means and effects of multivocal heterogeneity.

Whilst we were nearly led to think all FLOSS communities self-organise themselves in chaos, other academic works emphasise more structured, guarded, and hierarchical organisation of FLOSS projects (e.g., O'Mahony and Ferraro, 2004; Stewart, 2005). Demazière, Horn and Zune provide a view on the complexities in the organisation of FLOSS projects without reducing them to one single ideal type. Drawing on their empirical study of the French web-publishing tool *Spip*, they show how different modes of regulation co-exist in one FLOSS project (a control regulation to centre the project, an autonomous regulation allowing heterogeneity, and a distributed community regulation allowing the making, unmaking, and remaking of shared rules and values). They conceptualise these modes of regulations by observing a variety of conflicts, interests and motivations, be it of commercial, technical or idealistic kinds, so as to write about these differences in ways that acknowledge them as empirical facts, sometimes as real conflicts, rather than discussing them as expressions of ideal types or universal patterns of 'motivations'.

Eric Raymond's *The Cathedral and the Bazaar* (1999), which provides an ethnographic account of how FLOSS is produced by an insider at the early stage of the FLOSS development, simplifies FLOSS developers' motivations as individualised and self-motivated. His view has driven many academics to consider motivations of participating in FLOSS projects in a dichotomous fashion: namely intrinsic and extrinsic motivations. His arguments have also been turned into written statements in various FLOSS surveys as pregiven options. Stephanie Freeman's paper fundamentally challenges this discourse. Based on her study of the OpenOffice.org project, particularly the sub-project of translating the Office software suite into various human languages and adding new language components (grammar checker, spell checker and thesauruses), Freeman takes inspiration from Activity Theory to examine how motivation is inseparable form its social and cultural origin, and its concrete material context. By mapping personal biographies of how and why people have come to translate parts of OpenOffice.org into their native tongues, Freeman shows that no standalone and static motivations can explain these cases, because their motivations are not pre-given before the actions, but are rather shaped by the personal trajectories, and vary with the changing outcomes of these actions. In following

a large project such as OpenOffice.org around the world, we again witness how FLOSS diffracts as it travels, and becomes a truly *glocalised* phenomenon. OpenOffice.org is part of Sun Microsystems' long-term fight against global software giant Microsoft. Conflicts between the two companies peaked in 1998 when Sun's CEO Scott McNealy accused Microsoft and Bill Gates of unrighteous monopoly in front of the US Congress[4]. However, unique localities, local quests for an income, or for the preservation of a minority language meet with the globalised war in the translation sub-project of OpenOffice.org.

It is becoming clear to many that FLOSS is not only a technical phenomenon, but also a public and political issue. Increasingly, this awareness ties FLOSS together with public democracy and open standards. Most of the software built nowadays are for web-based infrastructures. Implementing standard in these infrastructures are important if we would like to have smooth human-computer or human-human communication (for example, sharing documents online). Developing and adopting FLOSS is a way of keeping technical standards open. Let us take the story of the story of OpenOffice.org and Sun Microsystems as another example. In 1998, during the US congressional hearing on the Microsoft monopoly, Sun's Scott McNealy illustrated the infrastructural importance of software when comparing the Microsoft monopoly with owning a language. He commented:

> "The only technology I'd rather own than Windows would be English", McNealy said. "All of those who use English would have to pay me a couple hundred dollars a year just for the right to speak English. And then I can charge you upgrades when I add new alphabet characters like 'n' and 't'. It would be a wonderful business."[5]

Yesterday, which was December the 19th 2007, the Norwegian Government announced that the use of open standards for publication on the web will be obligatory to all public institutions from 2009.[6] The three approved standards are HTML, PDF and ODF. The latter is the 'Open Document Format', the format that Sun has designed for OpenOffice.org, which is now an ISO-certified format. The announcement from the Norwegian Government is the latest one in a series of similar decisions around the world that are in favour of FLOSS and/or their conjoining open standards, on the grounds that diversity and plurality would be encouraged and that the general public would be protected from being locked-in by global monopolies.

In speaking of large-scale political economy of standards, Anita Say Chan's paper takes us to Peru around the turn of the millennium, and to one of the first major political battles over FLOSS software in public administrative sector. In the fight over a law proposal to make the use of FLOSS mandatory in the Peruvian public administration, the readers are introduced to a large variety of actors, voices and interests. We meet congressman Villanueva, who advocated the new law in the Peruvian congress, a variety of software activists inside as well as outside of Peru, and the US ambassador in Peru and the familiar face of Bill Gates and his Microsoft empire. Chan takes us through a flat network of actors and documents where everything said and done are always localised and temporal events — here and now — but where we also move in a political space which is as much global as local, and where the same events may turn out to be either success-

es or failures depending on how they are translated.

Conclusion

Research into FLOSS is important because many new and emerging information and communication technologies are highly related to FLOSS (e.g., blogs, wiki) and many cultural practices and activities in our digital era (e.g., blogging, googling, surfing the net, social networking, contributing to wikipedia) are highly visible in the FLOSS development, if not originating from the FLOSS development. Understanding the FLOSS development and FLOSS communities thus become one of the imposing issues in understand wider digital culture.

Driven by qualitative enquiries, we believe that this issue provides different perspectives, demystifies several stereotypes and misunderstandings about FLOSS and sheds light on many emerging and changing cultural and socio-technical practices in the digital society and knowledge driven economies. It addresses the diversity in FLOSS communities through asking how seemingly global FLOSS culture is translated (un)successfully into different contexts and locales. The findings collected through qualitative methods suggest that actors and actants (or artefacts as some wish) in FLOSS development and implementation are highly mobile and difficult to settle.

What we would like to see in the near future is our findings being responded through policy-making. We would also like to see more interdisciplinary research combining multiple methods to advance our ability to capture patterns (if there are any) in the dynamics of the FLOSS development (and similar phenomenon) in a more systematic and consistent way. That said, we would like to tackle the limitation of research of adopting only qualitative methods. This is not to abandon qualitative methodology — definitely not. Apart from celebrating the potentials of FLOSS, we suggest not to ignore challenges brought to societies and economies by FLOSS. While an open and democratic innovation environment allows information to flow more fluently, questions about power relationships and structures in such a milieu, roles and identities of minority developers and users in the FLOSS development are still awaited to be examined in more detail. There remains a strong need to focus on the social embeddedness of the FLOSS technologies apart from their technical performativity.

Notes

1 It is worth noting that copyleft is referred as a distinguishing feature of some free software licences, and many free software licences are not copyleft licences because they do not require the licensee to distribute derivative works under the same licence. As such, copyleft even became a controversial issue in the debate between the Open Source Initiative and the Free Software Foundation.
2 http://www.gnu.org/philosophy/free-sw.html
3 FreeCode is a Norwegian company that sell FLOSS services, and that flag its strong ethical commitment to the redistribution of power that FLOSS software enables. See http://www.freecode.no/index.html?lang=1&alt=usefull
4 http://www.cnn.com/TECH/computing/9803/03/gates.full/
5 http://www.cnn.com/TECH/computing/9803/03/gates.full/
6 See (in Norwegian) http://www.regjeringen.no/nb/dep/fad/pressesenter/pressemeldinger/2007/Apne-dokumentstandarder-blir-obligatoris.html?id=494810

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Yu-Wei Lin
Lars Risan