An Empirical Look at the Problems of Open Source Adoption in Finnish Municipalities

Mikko Välimäki
Helsinki University of Technology
P.O.Box 9210, 02015 HUT, Finland
+358 50 598 0498
Mikko.Valimaki@hut.fi

Ville Oksanen
Helsinki Institute for Information Tech.
P.O.Box 9210, 02015 HUT, Finland
+358 50 598 0498
Ville.Oksanen@hiit.fi

Juha Laine
Helsinki University of Technology
P.O.Box 9210, 02015 HUT, Finland
+358 50 598 0498
Juha.Laine@hut.fi

ABSTRACT

This article starts by considering the global framework of current open source migration. We show that the fight against software piracy is most likely speeding up the adoption especially in the developing countries. The situation is somewhat different in those parts of the world, which have lower piracy rates. There, political lobbying seems to offer the major push for open source software. This brings us to study the actual open source software adoption in the Finland, which is both the home of Linux and also one of the most advances information societies with little piracy. The outcome is rather surprising – the Finnish government is currently ignoring open source. The results we have got from our a survey to all Finnish municipalities and from additional expanded interviews shows that there is currently high demand and growing interest for open source solutions within the Finnish municipalities but the government (by ignoring the issue) and the private sector (being mainly committed to proprietary solutions) are not able to fill the needs. We propose that the governments in the rich countries should in fact learn from developing countries and have a more proactive policy approach to open source software.

Categories and Subject Descriptors

K.4.1 [Public Policy Issues]: *Regulation, Intellectual property rights*

General Terms

Standardization, Legal Aspects

Keywords

Open source software, public policy, Finland, developing countries.

1. INTRODUCTION

Information technology revolution has not missed the municipalities. Instead, it has become one of the most important tools for increasing the overall efficiency of public sector. The effects are being seen in all areas from health care to education. Efficient organization is also a paramount as the municipalities are often struggling with very limited resources due to problems like aging of the population and social exclusion.

Therefore, it is not surprising that the municipalities are also increasingly consider open source as one possible component for their information technology strategy. Certain early cases with a high visibility in the IT-press have given without doubt momentum to the process. For example, the City of Munich got a lot of international attention after it announced its plans to migrate to Linux-operating system even if Microsoft was fighting fiercely against the decision.

We start this article by considering the global framework of current open source migration. We show that the fight against software piracy is most likely speeding up the adoption especially in the developing countries. The situation is somewhat different in develop areas such as Europe, where piracy rates are lower. There, the potential of cost savings from a lock-in to proprietary software are pushing the migration together with relatively strong political backing.

In the last part of this article we study how open source software is currently used in Finland, which is both the home of Linux and also one of the most advances information society. The outcome is rather unexpected – the Finnish government is currently ignoring open source. The results we have got from our a survey to all Finnish municipalities and from additional expanded interviews shows that there is currently high demand and growing interest for open source solutions within the Finnish municipalities but the government (by ignoring the issue) and the private sector (being mainly committed to proprietary solutions) are not able to fill the needs. We propose that the governments in the rich countries should in fact learn from developing countries and have a more proactive policy approach to open source software.

2. GLOBAL BACKGROUND

2.1 Piracy Problem

One of the major drivers for a wider adoption of Open Source at the global level is software piracy. As Business Software Alliance's (BSA) statistics illustrate (Figure 1.), unauthorized copying is very common all over the world.

In practice, commercial software is "free of charge" in most of the world regions and as a consequence Open Source loses one of its key selling point e.g. no license fees. The situation gets even worse as we look at the statistics at the individual countries (Table 1.)

There are no developed countries in the TOP-20. Also, the least developed countries of the world are missing from BSA's list altogether [18]. One possible explanation for this could be

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that very large part of the computers in those countries are either donated by charities with software pre-installed or used by foreign companies, which follow their global licensing policy i.e. buy their software.

Otherwise the statistics are quite understandable. The developing countries don't have a priority for copyright enforcement. The benefits are typically seen to go only to the multinational companies. Combined with the strong cultural tradition of copying, which can be found in certain parts of world – especially in Asia (e.g. [1]) – has resulted in the widespread violations of software copyright described in the statistics above.

2.2 Determined Migration from Piracy to Open Source in the Developing Countries

Table 1. Source: First Annual BSA And IDC Global Software Piracy Study (2003)

Country	China (1.)	Vietnam (2.)	Ukraine (3.)	Indonesia (4.)	Russia (5.)	Zimbabwe (6.)	Algeria (7.)	India (20.)
Piracy rate 2003	92%	92%	91 %	88%	87%	87%	84%	73%

However, the software sector is most likely going to change gradually towards lower piracy rates. The main reason for this is the increasing political pressure from the U.S., which is the biggest loser in the current situation. It has brought already some results. A typical example of concessions, which has resulted from this activity, are the wide range of steps to curb down the illegal copying by China:

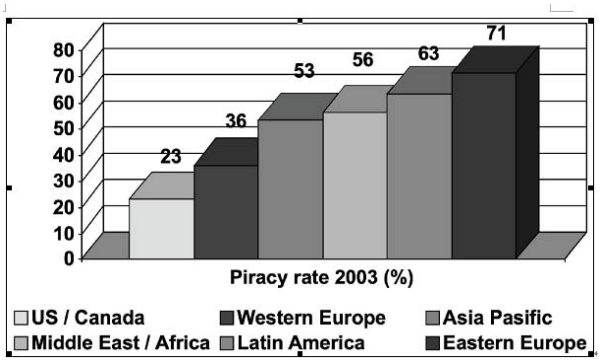


Figure 1 – Source: First Annual BSA And IDC Global Software Piracy Study (2003)

- Subject a greater range of intellectual property right violations to criminal investigation and criminal penalties including the import, export, storage and distribution of pirated and counterfeit products and copyright infringements in the Internet
- Conduct nation-wide enforcement actions against piracy and counterfeiting – stopping the production, sale and trade of infringing products, and punishing violators.
- Increase customs enforcement action against the import and export of infringing products and making it easier for rights-holders to secure effective enforcement at the border.
- Ratify and implement the World Intellectual Property Organization (WIPO) copyright treaties as soon as possible.
- Launch a national campaign to educate its citizens about the importance of IPR protection. The campaign will include press events, seminars and outreach through television and print media.
- Extend an existing ban on the use of pirated software in central government and provincial agencies to include local governments. [15]

For the purpose of this paper, the most interesting part is the promise to clean the government's IT-system from pirated software. The solution is not going to be purchasing more software from western companies but instead:

"Under draft regulations drawn up by the Ministry of Finance and the Ministry of Information Industry, companies wishing to sell software to government offices will have to either be certified as domestic enterprises or qualify as "preferred non-domestic" supplier" [2]

This means that China is using now the governmental clean up as a way to build up its own software industry. To qualify as a domestic enterprise, the copyright of products has to be assigned to a Chinese entity. That makes life very hard for the U.S companies even if they'd have fully Chinese branches. The rules also specifically take into consideration the nature of open source, which is accepted easier as a domestic product even if the copyright remains in foreign hands [2].

Somewhat similar progress can be found in other Asian countries. Vietnam, which is holding the second position in the Top 20-list above, has an ambitious plan for extending the use of open source in both public and private sector during 2004-2008. One of the indicated key motivating elements is yet again the hope to lower the piracy rate. The planned steps include:

- Implementing legal and policy foundations to support free software usage in the country
- Integrating free software into the formal educational curriculum
- Application of free software in government offices
- Experimental use of free software in the defence industry [21]

The developing countries are currently between "a rock and a hard place"; the cost of buying full licenses for proprietary software is typically far too high to be a realistic option for already heavily debt-ridden economies. [7] Equally, as a result of the U.S. policy with intellectual property rights, the cost of not buying the licenses is too expensive, too. As a consequence, if the countries want to continue to use information technology, endorsing open source is a very natural choice.

The proprietary software industry is already countering this threat. The companies have launched projects like The Initiative for Software Choice (ISC), which lobbies the governments to acquire software based on "merits, not through categorical preferences"[9]. ISC's main focus is currently on South America, the recent hotbed of the Free Software movement (e.g. Brazil is known currently in certain very strongly pro IPR-circles as "The Afganistan of IPRs"). For example, ISC's web site has currently seven consult reports on

the software industry (in Argentina, Chile, Columbia, Costa Rica, Mexico, Peru and Venezuela). These reports suggest basically the same thing for every country i.e. the best way to support the local economy is:

"A comprehensive policy approach, tackling general IT capital stimulation and targeted to commercial software industry promotion, is the most economically beneficial." [16]

China's actions have drawn also ISC's ire. It protests the ideas of setting different standards for local and foreign companies and categorical favouring of free software. The organization suggest that:

"…China amend the proposed Rules to embrace the global norms of openness, transparency, technology neutrality and non-discrimination and to exclude preferences for any specific type of development or licensing model, creating instead a policy that reflects software procurement based on objective criteria including performance, suitability, interoperability, and the best-value product." [10]

3. EUROPEAN UNION'S PRO OPEN SOURCE POLICIES

Unlike in developing countries, piracy is not that major concern in European Union. The strong IPR-enforcement rules make licensing violations basically more expensive than staying legal. This means that the governments sees the real costs of using proprietary software in their budgets. This should help making open source as very competitive alternative and there has been indeed a lot of interest in open source. Still, the interest has not yet been turning into widespread migrations.

The problem in the EU is that the governments are often locked-in to their proprietary systems which raises significantly the costs of moving to alternatives. To counter this problem, EU has started to endorse open standards, which are defined by three factors:

- The standard is adopted and will be maintained by a not-for-profit organization, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties (consensus or majority decision etc.).
- The standard has been published and the standard specification document is available either freely or at a nominal charge. It must be permissible to all to copy, distribute and use it for no fee or at a nominal fee.
- The intellectual property - i.e. patents possibly present - of (parts of) the standard is made irrevocably available on a royalty free basis. [8]

The "royalty free"-criteria for patents is critical for open source products because licensing patents is often not possible due to restrictions found from the open source licenses like GNU public license (GPL). The policy goes even further in its support for open source software (OSS), though:

"..OSS products are, by their nature, publicly available specifications, and the availability of their source code promotes open, democratic debate around the specifications, making them both more robust and interoperable. As such, OSS corresponds to the objectives of this Framework and should be assessed and considered favourably alongside proprietary alternatives."[8]

Not surprisingly, the supporters of proprietary software have not watched this development passive. Business Software Alliance (BSA) attacked promptly the proposal and suggested that the patent licensing policy should be changed to:

"(3) Any patent rights necessary to implement open standards are made available by those developing the specification to all implementers on reasonable and non-discriminatory (RAND) terms (either with or without payment of a reasonable royalty or fee);" [14]

BSA also had strikingly similar critique for favoring open source software as ISC had against China's suggested procurement rules:

"BSA would also respectfully recommend that the EIF replace its current statements regarding OSS (specifically, the last bullet on page 8) with a statement encouraging the adoption and implementation of software procurement policies that are neutral with respect to technologies, development platforms and licensing models. Procurement policies that are based on reasonable, objective criteria, such as interoperability, security, and value for money, are not only consistent with the goal of interoperability, but also maximize competition, innovation, and consumer choice."[14]

European Union has been supporting open source also in other ways. For example, the 5th framework program (1998-2002) in research and development had in total 29 different open source projects ranging from developing applications to e-learning, healthcare, security and middleware to socio-economic study on open source usage [11]. The 6th framework program supports even more i.e. approximately 40 open source projects at the moment. [5] Two of these projects deal directly with open source in the public sector: FLOSSpols - Free/Libre/Open Source Software: Policy Support [6] and COSPA - Consortium for Open Source in the Public Administration. [4]

The European Commission's Enterprise and Industry Directorate General has created Open Source Observatory under the Interoperable Delivery of European eGovernment Services to public Administrations, Business and Citizens (IDABC - http://europa.eu.int/idabc/en/chapter/452). The Observatory aims to produce information on the best practices on OSS in public sector. They argue that open source is important for public sector because:

"..Open source software presents an opportunity to encourage the uptake of cost-effective IT solutions. It facilitates the sharing of applications between public sector organisations and thus promotes the spread of good practice. The eEurope action plan has introduced the term application templates to describe this capability, and releasing applications used by governments in the EU as open source software will allow other public bodies to modernise more quickly.

Finally, open source software has a number of characteristics that lend it particularly well to the needs of the public sector. Aside from the low costs of replication and the possibilities it offers for continuous improvement and adaptations to local needs, open source software also presents a way of ensuring adherence to open standards and thus to improving interoperability and equal access to public sector information and services. Open source software often impresses through its reliability and security, and it can increase transparency and accountability."

Also the European Parliament has been active in open source software promotion. The latest example of this can be found from the software patent directive spectacle, in which the parliament has been trying to limit the patentability of software based on the demands from open source software community. Most likely the earliest reference fro European parliament can be found from Echelon Report, which uses security as an argument for OSS:

"..The Commission and Member States are called upon to promote software projects whose source text is made public (open-source software), as this is the only way of guaranteeing that no backdoors are built into programmes. The Commission is called upon to lay down a standard for the level of security of e-mail software packages, placing those packages whose source code has not been made public in the least reliable category.." [17]

4. CASE FINNISH MUNICIPALITIES – STRUGGLE TOWARDS OPEN SOURCE BEHIND THE POLITICAL RHETORIC

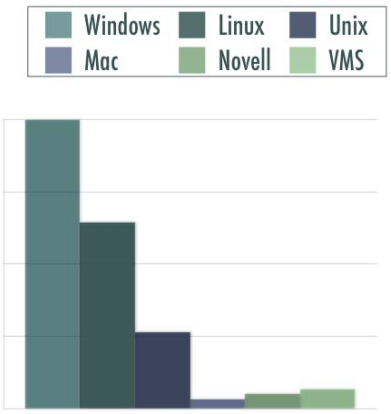
4.1 The Home of Linux without an Open Source Policy

The Finnish Government does not currently have any defined policy for open source. For example, the government has created a very large information society program, which is being developed further by information society council and its subcommittees. The program defines the official position of the Finnish government for all the aspect of information society. However, the term "avoin lähdekoodi" ("open source" in Finnish) and its variants are not mentioned even once in the program [20]. Similarly, the first follow-up report does not mention open source at all [12]. The information society council has also commissioned a survey how the six biggest cities are cooperating in questions pertaining information society – and it does not mention even once the possibility of using open source to facilitate the cooperation. [13] The government is currently reorganizing its IT-structure. Again, the document, which describes the plan (52 pages), does not mention open source – even once. [19]

This is somewhat striking considering that the first versions of famous open source software such as Linux and MySQL were both developed in Finland and that even Nokia is often promoting open source. Additionally, this kind of absolute ignorance from government is also odd considering that the area is getting substantial attention at the EU-level. Unfortunately, the detailed reasons why this has happened has to be left for the further studies.

4.2 Municipalities and the Problem of Missing Open Source Supply

The Finnish municipalities don't have any formal cooperation in the IT-sector in Finland. The IT-managers have an association, which has members from around 20 most active municipalities and which is used for information coordination and information exchange. As a consequence nobody at the individual municipalities really knows how widely open source is actually used and what kind of factors are on the one hand pushing for the migration and on the other hand hindering the



Windows	Linux	Unix	Apple	Novell	VMS
100%	65%	27%	3.5%	5%	7%

Figure 2. The operating systems in municipalities

usage. To correct the situation, we made a two-phased study on the current open source usage in the Finnish municipalities. The first part was a large-scale web survey and the second part five interviews with IT-managers in selected municipalities.

4.3 Survey

The web survey was conducted from November to December 2004. The invitation to participate in the survey was sent by email to all Finnish municipalities (432). The email-addresses were collected from the municipalities' web pages. The principal contact persons were IT-managers or those with a similar title. If such a person could not be found, a general address for the register office was used.

We received 127 answers out of which 111 were usable for further analysis. 41 of the answers came from general addresses and 86 from personal addresses. The median population of the answered municipalities were 6200 and average 14155. If these numbers are compared to municipality averages, we can conclude that the answered municipalities were slightly larger than the municipalities in general (5000 and 11000). Next, we summarize some of the most relevant findings.

The median IT-budget was 150 000 Euros and average 1.1 million Euros. The median number of IT-employees was 1 and average 5.6. The municipalities had outsourced their IT-services only seldom (2.13 on scale 1-4) and IT-infrastructure even less (1.95 on scale 1-4). Only nine municipalities had fully out-sourced the services and five the infrastructure.

The question about operating system (Figure 2.) did not specify the level of usage. Therefore, the relatively high percentage of Linux does not mean that it is widely used inside the municipalities, as the later data will show.

The question about general open source usage got similar results. 23 municipalities claimed that they are not using at all open source at the moment (none of these municipalities claimed that they are using Linux). Out of these municipalities, only three was currently planning to start using open source software in the future.

Table 4. "On what sector the open source products are used in your municipality"

	Not in use	Testing	Widely used
IT-infrastructure	35%	29%	35%
Central management	43%	24%	33%
Education	30%	42%	28%
Social services	62%	16%	22%
Health care	77%	15%	8%
Zoning etc.	73%	15%	11%

The most wide used category of open source was "Internet services – server side" with 44 communities using it mixed with proprietary software and additional 8 using only open source. Also "application servers" (34 and 2) "dabase software" (34 and 0) and "Internet Services – client side" (30 and 3). The least used software category for open source software was "Account software" with 67 municipalities using only proprietary software and 12 using mixed environment.

The biggest reasons for open source software usage were "price" (4.11 on the scale 1-5) and "Total Cost of Ownership" (3.84). "Security" (3.73) and "easy license management" (3.68) were also important. The least important factors were "The availability of source code" (2.62) and "the possibility to make changes" (2.54). It should be noted that "compatibility at application level" (3.80) and "compatibility at system level" (3.70) were seen important but here the persons were not necessary consider them as an plus but instead as a generally speaking important factor (the interviews verified this conclusion).

The question about specific programs (Table 4) did not bring any big surprises. However, we still wonder for what most of the municipalities are using Linux considering how little the most common applications i.e. Apache, MySQL and Open Office, are used (perhaps desktop use).

The question about different sectors and open source software got also expected answers. Linux is typically used in infrastructure and in general server duties found from the central management. The migration to Open Office explains the experimenting in education (as seen in Table 3, 46% of municipalities are testing it).

38% of municipalities had not used open source as a way to get cheaper offers from the proprietary software vendors. 39% were planning to do so and 16 % had already done so. 6% could not say.

The biggest obstacles for open source were "non-compatible software" (4.09 on the scale 1-5) and "non-compatible operating systems" (3.87). The next factors were "lack of experience" (3.66), "lack of services" (3.58). The least important factors were "legal risks" (2.70), "problems related to licenses" (2.39) and "Open source is not safe because the source code is available" (2.11).

The last question was "Name three companies, which sell open source services and open source software. Interestingly, most of the municipalities could barely name even one. The most well-known companies were SOT (11 mentions – the company publishes a Finnish Linux distribution) and Open Office Finland / Kongo Group (15). Both of these companies are very small (less than 50 employees) and operate in practice only in Finland. The third company was VM-Data (10), a larger Scandinavian company. Global players didn't fare well despite their heavy advertising campaigns. IBM was mentioned four times and Novell two times. This indicates that software vendors are not targeting municipalities in Finland. There seems to be an evident gap between the interest and demand for open source from the side of municipalities and the actual supply of open source from the companies.

4.4 Interviews

The second phase of the study was done by interviewing five IT-managers from one small (less than 5000 inhabitants), two mid-size (less than 50 000) and two large cities (more than 100 000) The main goals for this part were:

Table 3. "How widely are the following open source software being used in your municipality"

	Not in use	Testing	Widely used
Linux	11%	24%	65%
Open Office	36%	46%	18%
Mozilla/Firefox	51%	43%	6%
MySQL	53%	19%	27%
PostgreSQL	88%	11%	1%
Squid	82%	10%	8%
Apache	49%	19%	31%

1. Deepen and verify the results from the survey and find out possible problems with the questions;
2. Getting better understanding how the decision making happens in real life; and
3. Finding the questions, which were not asked in the survey but which are never the less relevant for open source usage.

The key findings were:

- The survey itself was relatively fine. The biggest complains were about the out-sourcing question, which was not defined clearly enough. For example, the municipalities buy most of their software off-the-self. Should this be considered as out-sourced software production?
- The question about benefits of open source should have been more precise that it really asks for benefits, not generally speaking important factors.
- The survey results were in line with the interviews. All the municipalities were using Linux, which was mostly used in infrastructure. Educational sector was seen as a good place to test Open Office because "students are not business critical users".

- The price helps early adaptation but in larger projects the licensing cost are minor factor unless th goal is to produce desktop applications.
- The biggest obstacle was not in the end interoperability but instead the Finnish software vendors, which were not offering open source solutions. All the interviewed persons agreed that nobody is currently marketing open source for municipalities. Three of the IT-managers also suspected that none of their vendors have requited know-how on open source to do so.
- Two of the cities had adapted an existing open source product to their use and contributed the changes back to the project.
- The decision process was unique in all in interviewed municipalities. In the smallest town the IT-manager was also the only employee and he was making most the decisions alone. In the biggest city the decision process included strategic planning and programs made in the city council level and a separate unit for planning purposes only. Two of the cities has out-sourced most of their IT-sector and in those cases the companies providing the out-sourced services made most of the practical decisions (e.g. what platform to use).
- The co-operation between the municipalities is currently very small because the Finnish procurement law makes it hard to arrange combined projects. Additionally, the very different IT-strategies cause typically problems because the chosen solutions do not fit to more than few municipalities.

5. CONCLUSION: SHOULD FINLAND LEARN FROM DEVELOPING COUNTRIES?

We have seen that the realities between the global, regional and local levels of open source adoption are very different. Open source is used in the global level to fight against excessive reliance on multinational software companies and to tackle the problems of software piracy. On the regional level, the European Union is increasingly supporting in its policy rhetoric open source as a practical tool to create solutions, which support exceptionally well open standards and thus general accessibility and in the democratic information society.

Interestingly enough, these global and regional developments have not necessarily caused any policy changes in individual European member states. The Finnish government as our example is still ignoring open source. On other hand, the municipalities are increasingly using open source to cut their IT-budget but their actual demand is not being met by software vendors, which seem to follow the “official” governmental line to avoid noticing open source.

We believe the Finnish government should be more proactive in its open source policy and follow the international developments in more detail. The government has an important function in signaling to software vendors what sort of standards and software are being needed in the public sector. Thus, we propose that the governments in the rich countries at large should in fact learn from the developing countries. More detailed and active open source policies for the different parts of the public sector can help in filling the current gaps in the software supply and demand. Both the local software companies and the public sector can potentially benefit.

6. ACKNOWLEDGMENTS

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