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in collaboration with Juha Rekola and Timo Mielonen

Free as in Education

Significance of the Free/Libre and Open Source Software for Developing Countries

Cover photos: Rauli Virtanen

ISBN 951-724-432-0

Hakapaino Oy
Helsinki 2003

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OneWorld Finland and KEPA
Helsinki, Finland
2002–2003

Introduction

During the last couple of years the use of Free/Libre Open Source Software (FLOSS) has gathered momentum, which has surprised its proponents and opponents alike. Looking at the figures, it would not be an exaggeration to say that the Internet is powered by FLOSS.[1] (See. David Wheeler - Why OSS/FS?)

Given such a huge spread in the use of FLOSS and its very significant economic impact, the questions arising from the perspective of development aid and sustainable development are: Does FLOSS offer developing countries any significant alternative in addressing crucial problems, such as the alleviation of poverty, the democratization of society, the reduction of illiteracy, conflict reduction, access to knowledge, dealing with natural calamities and other emergencies, etc.? Does FLOSS have the potential to help bridge the digital divide?

In our view, the answers to most of the above questions is a definite *YES*, but without attributing some magic wand status to any technology, especially Information and Communications Technologies (ICT), including FLOSS.

The solutions to the problems facing developing countries are very complex, and ICT and FLOSS can at best provide a helping hand to humans determined to solve those problems. Lacking the political will and social forces necessary to solve problems, any technology is just another tool which may throw us into "techno-optimism", that is, the belief that "future economic prosperity is dependent upon the rapid development of national electronic infrastructures" without actually meaningfully solving the burning problems facing the developing world.

Commenting on the role and impact of Bangalore, capital of the Indian state of Karnataka, and that country's foremost hi-tech centre, noted economist and Nobel laureate Dr. Amartya Sen[2] said: "New centres of excellence such as Bangalore can prosper and flourish. Yet even 100 Bangalores would not solve India's poverty and deep-seated inequality. For this to happen, many more people must participate in growth. This will be difficult to achieve across the barriers of illiteracy, ill health and inequalities in social and economic opportunities." (from The Oxfam Education Report Chapter 1)[3]

Already at this stage, we should note that the present study is not an economics-based one. The team responsible for it lack expertise in economics, and is not making any significant claims regarding the impact of ICT on economies. Having said that, we can still refer to a number of studies and views which actually show that there is no direct link between computers and productivity. For instance, World Bank economist Charles Kenny, in his well argumented paper at a WIDER conference on New Economy

in May 2002,[4] believes that the "'Solow paradox'[5] — widespread evidence of computer use, little evidence of (widespread) productivity growth — continues, at least in modified form."

Warning against techno-optimism and pinning too many hopes on the Internet and ICT, Kenny notes: "The Internet is a powerful technology that will have a long-term impact on the quality of life in developing countries" and "Having said that, our record in predicting the dynamic impact of technologies on development in the past has been very weak. To take three communications-related examples, the railway was predicted to spark the dictatorship of the proletariat, the telegraph was predicted to engender world peace and the television to revolutionize education. Broadly, it appears that even while the role of technology in economic growth cannot be questioned, the dynamic impact of a particular, invented technology is never very large. It looks increasingly as if the impact of the computer on US productivity will be a good example of this. The impact has been limited so far, and might not increase in the future." (Charles Kenny: The Internet and Economic Growth in Least Developed Countries. A Case of Managing Expectations?)[6].

At the same time, however, we can note that ICT, or rather the lack of it, does significantly impede access to information and knowledge for a vast majority of developing countries, especially their academic and educational institutions, students, government officials, economic and financial institutions, businesses, etc.

The main objective of this report has been to analyse the significance and relevance of FLOSS for developing countries.[i] In doing so, we have tried to take a brief look at the the overall use of ICT and FLOSS, especially at some of its most significant and popular software, such as GNU/Linux, Apache, Mozilla, Open Office etc, as well as its possible impact on the societies, lives, and economies of the people of those countries.

As noted earlier, our focus in this study is more on the wider impact of ICT and FLOSS on societies than on economics. That is why we have tried to look at a number of issues which hinder a more widespread use of ICT in general and FLOSS in particular in most of the developing world. Keeping in mind a host of social, political and economic factors, especially the overall huge cost of employing ICT (compounded in most cases by hard currency shortages), we contend that FLOSS offers an affordable and useful alternative to proprietary software for all the concerned parties in those countries: governments, public institutions, education, NGOs and the private sector.

(i) The term "developing countries" used in this study is meant to describe a group of countries alternatively described as the Third World, or more recently Majority Countries. The former socialist countries, or the 'countries in transformation' are not included in this study.

Another objective has been to evaluate projects which utilise FLOSS technologies and to see whether they have any significant impact on the democratization of countries, increased access to knowledge, enhancing the quality of education, and aiding sustainable development. We have tried to achieve that objective by going beyond the purely technical merits and use of FLOSS and look instead at the very nature of FLOSS (its philosophy of freedom, openness, community activation and collaborative nature) as well as make a link between FLOSS and any developmental effort dependant upon humans determined to solve problems.

We let the reader determine if we have succeeded in achieving those objectives. We can only reiterate that FLOSS and developing countries make a great partnership.

Helsinki, 28th February 2003

Niranjan Rajani Timo Mielonen Juha Rekola

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Acknowledgements

This modest study would not have been possible without a passionate and active participation and support of Cesar Brod, Fredrick Noronha, Nico Coetzee, Timo Mielonen, Juha Rekola, and Tere Vadén. I thank all of them from the bottom of my heart, in making this study a fun job.

My thanks also go to Gareth Griffiths for correcting my 'Singlish'; to my boss Kuno Öhrman at Hanken for allowing me a freer work schedule, to my wife Susanne Dahlgren for coping with countless late-night working sessions, and to my son Chang for enthusiastically learning Linux at the age of 7 on his old computer.

Niranjan

Foreword

FLOSS, Information Society and the Verbs

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The possibilities that Free/Libre and Open Source Software (FLOSS) offers for development in information and communications technology (ICT), in general, and for the developing countries, in particular, have recently gained increasing attention and importance. The following report provides encouraging examples of the role FLOSS has already had or can have in the developing countries and developmental co-operation. The reason for the increased attention is simple: the philosophy, economy and software development model of FLOSS have in the past 20 years or so made an ineradicable impact on how information technology is conceptualised, used and developed. Since FLOSS does not rely on concepts like intellectual property or copyright but rather on concepts of voluntary co-operation and copyleft ("copyright turned around"), it has been seen as an ideal tool for bridging the so-called digital divides. What has made an even stronger impression on some researchers has been the fact that in the case of FLOSS fun and ethics seem to travel hand in hand, at least part of the way. The developers of FLOSS, the hackers, often "scratch their own itch", that is, do what is fun. It appears that in most cases this fun can be had only if the software the hackers are interested in having fun with is free and open. The background motivations that the hackers have for engaging in FLOSS development can, indeed, be quite varied, and still the result contributes to a freely distributable, modifiable and usable pool of good quality software. For instance, the philosophical and social motivations of the Free Software movement and the Open Source movement are quite different, even antithetical at places, but the movements can still share-and-share-alike when it comes to creating software that excels in its technical qualities. It seems that this kind of co-operation is precisely what bridging the digital divides on the software side needs. The question of whether ICT development is necessary or whether it should be prioritised when it comes to countries that have severe problems with providing for the basic needs of their citizens may be debated. It seems clear, however, that if and when ICT development is, for instance, a part of developmental co-operation, the basic concepts and day-to-day practises of using and developing FLOSS offer a footing that may be used with benefit.

Because the background motivations for creating and using FLOSS are varied, the arguments for FLOSS are also diverse. They range from the purely technical (e.g. speed of development, security and privacy, technological independence, ease of use) to the deeply economic, social, political and philosophical (e.g. price, co-operation, equality, commitment to the right to know). This spectrum of arguments can be stratified by thinking about the different levels on which digital information has an impact. Underlying all the discussions on ICT and its effect on the emerging information societies is the fact that by its nature *information is different from material things*. Information is abstract in the sense that giving or sharing information does not diminish the amount of information that the giver or sharer has. Furthermore, the reproduction and copying of information can be done with much less cost than the reproduction and copying of material goods. These characterisations of the nature of information can be captured in the phrase "Information *can* be free". As a means of production and exchange, information is different from material things in that it can be free; as a resource, information is non-rivalrous. The different kind of "being" that information has compared to the "being" of material things means that the sharing of information is in its ontological nature unlike the sharing of material goods: this is the sense in which information "can" be free.

The next level of argumentation is crystallised in the rallying-cry of hackerdom: "Information *wants* to be free". Information wants to be free in the sense that information, e.g. computer software, as a tool is made better if it is free. This is the level of argument that the Open Source movement emphasises. The development of good quality software is faster and more efficient if the source code of the software is open and if everyone potentially interested in the code is free to contribute to the development. As a means to an end, software is best developed if it is free. The so-called Linus' Law, after the Linux-hacker Linus Torvalds, is often cited in this context: "Given enough eyeballs all bugs are shallow". The global society of hackers has through the internet harnessed its pool of skills and interests in a distributed working model that has produced software at a pace that has defied all economic theory and continues to baffle computer scientists. Software as a tool makes best progress when it is free. Therefore it wants to be free; its goal as a tool is to be free.

Information technology as a means is, of course, used towards some ends. The use and development of technology is embedded in practises and cultures. It is obvious that technology in general and information technology in particular are not culturally neutral: a given type of technology use and development always favours or disfavours different types of social arrangements. In the case of FLOSS, the position of the Free Software movement is formulated through considering the ends to which software contributes. From this viewpoint, the question to be asked about different models of using and developing software is what kind of society does this or that model promote.

Like Richard M. Stallman, the founder of the Free Software movement, has emphasised, the goal of the Free Software movement is to create a society based on co-operation, equality and sharing, therefore software is instrumental only if it is free. Software can be a means to the end of a co-operative and ethically sound society only if it is free in the sense of free speech; even openness of the source code is not enough. This third level of viewing software through its social and political goals can be expressed in the slogan "Information *ought to* be free". The social commitment to supporting and creating a society that is not a jungle but a co-operative whole implies an ethical commitment to the freedom of information.

This third level of argument can be augmented. Following Aristotle, we may see the goals towards which we are striving as finalities, as goals-in-themselves that do not require any further motivation. Finalities do not require motivation, they *are* the motivation that give shape to the tools, practises and social arrangements that embody the finalities. It is this level of commitment that often means taking extra effort. In this sense the (ethical) commitment to certain finalities can also be quite different from having fun, or from the technical considerations that have to do with the properties of software seen purely as a tool. For instance, democracy is often seen as a finality. Even though democracy might be inefficient and costly, the extra effort is worth taking, because of the ethical and social goods that democracy includes. Democracy is worth it for its own sake. This level of motivation applies also to FLOSS, even though it can not be easily captured in a phrase. Maybe the verb "x" describing this fourth level of finalities in the phrase "Information '*x*' be free" would have to combine the senses of the verbs "can", "wants to", "ought to" and "will".

It is also through this fourth level of argumentation that we reach one of the crucial questions that the so-called developed countries face when it comes to the use of FLOSS in developmental co-operation. The global trend towards an "information society" gives an increasing role to information, knowledge and other immaterial assets in production. Therefore the economy is also seeking ways of controlling, identifying and using immaterial assets. This happens largely through the concept of intellectual property. In economic terms, the notion of intellectual property and the connected immaterial property rights are a way of regulating free markets, setting up limited monopolies in the name of economic incentive for innovation and creativity. This mega-company-driven trend towards an increasingly tight "intellectual property" regime conflicts squarely with all the above verbs. If information is made into property, it can not, will not and should not be free.

Taken to its extreme, the notion that information or knowledge is owned and that its use should be controlled by the "owners" becomes absurd. An infant either has to be taught that information is owned or otherwise remains ignorant of the fact. In both cases information freely shared is the basis on which the ownership of information can

be based. The absurdity can be seen in the following scenario: if all information is proprietary, then the information that information is proprietary is proprietary, too, and I can choose to stay ignorant of that information. As with material property, intellectual property relies on the goodwill of non-proprietary social functions and arrangements. Therefore its beneficiality is not a given.

Through this perspective it is obvious that a very strict regime of intellectual property will lead to increased fragmentation and the unbalanced division of wealth in the world. It would not be too extreme to claim that certain forms and applications of so-called intellectual property rights are a way of protecting the "firstness" of the "first" world against the interests of the other worlds. At its worst, the concept of intellectual property works in ways that are analogous to the colonialising effects that the concept of material property has had in the previous centuries. It has always been known that "intellectual property laws" can be a hindrance to economic development. This was the reason why the United States decided not to recognise European copyrights and patents in the 19th century. It is very likely that following a tight regime of intellectual property rights will be an obstacle to the economic development of the developing countries today, too. Therefore it is essential that the legislative system and the policies of the "first" world will allow for intellectual and software freedom.

When it comes to information technology, the task is to create a balanced environment for innovation, both social and technological. It is a well-known fact that things like software patents and the idea of "trusted computing" seriously threaten the possibility of FLOSS development. Therefore it is extremely troubling to see how a strong big-industry lobby is pushing the legislation and its interpretation in the "first" world towards an increasingly biased and restrictive direction. Software patents have already become a burden on FLOSS development and the innovation of small and medium-sized software companies in the US, and currently the EU is thinking about having a software patent legislation of its own. Software patents are a good example of "intellectual property rights" that are not only harmful to FLOSS in the "first" world but also to the use of FLOSS in developmental co-operation. A healthy global information society needs a political and legal environment that gives possibilities to both independent FLOSS type development and proprietary software development. Shutting one or the other out will only aggravate the existing digital divides.

From the point of view of finalities the question is: "What is information technology *for*?" Answering this "why" question can give sustainable form to the "how" questions. For instance, economic and cultural "whys" may give different weights to different factors. Globalisation as a narrowly defined economic trend and the creation of *a particular type of* information society push towards a strict intellectual property regime. This, however, does not mean that intellectual property as a concept or as a practice systematically favours equality, democracy or development - quite the contrary.

Intellectual property rights might, in principle, protect the livelihood of indigenous populations and local cultural endeavours, but in practice they next to never do. This is because established organisations, institutions and companies have an upper hand when it comes to interpreting the concept and enforcing the laws that codify it. "First" world countries like Finland can therefore advance the creation of a global sustainable information society by giving enough weight to social and ethical issues in the legislative framework that partly creates the international information environment. Especially so because there are also strong economic arguments that speak in favour of free markets and against the restrictions in terms of "intellectual property".

The use of FLOSS is motivated through concepts like freedom, independence and *swantantra*. These concepts have at the same time their economic, technical and cultural meanings. Freedom and independence in all of these senses are finalities, goals in themselves and in that sense very well in line with the ideals of a global sustainable information society. Making grand ideals like this happen is, of course, always a complicated thing. However, to be fair, FLOSS is not a dream, but a rapidly growing reality that has several success stories in its track record. As noted above, FLOSS is no one thing, either. There are different sets of philosophical underpinnings, different models of development, different technological options and so on. There is no reason to downplay the internal variation of FLOSS or the different options in building an information society. The proof of the pudding is in the eating, and the proof of the bridge is in the crossing. Let us attend to the details.

Chapter 1

A Brief Overview of the Free Libre and Open Source Software Movements

– and relevant concepts

> "Open-source software has been called many things: a movement, a fad, a virus, a Communist conspiracy, even the heart and soul of the Internet. But one point is often overlooked: Open-source software is also a highly effective vehicle for the transfer of wealth from the industrialized world to developing countries".
>
> Andrew Leonard,7 In IHT on-line.[8]

Free Software

The term Free Software[9] is a bit tricky for speakers of English and German. German Philosopher Theodor Adorno already around the end of WWII wrote "German and English reserve the word 'free' for things and services which cost nothing."[i] This problem with the word 'free' is something that Richard Stallman, the founder of Free Software Foundation, has had to tackle again and again, in order to distinguish between the *zero price* and *freedom* aspects of the word 'free'. In many languages, there are two separate words denoting 'freedom' and 'zero price': for instance, in Finnish 'vapaa' [free as in freedom] and 'ilmainen' [free as in zero price] are two separate words, making it simpler to accept the distinction and appreciate the importance of the *freedom* aspect.

But what's the point of this concern over the word 'free'? The point is to have the freedom to use, view, copy, redistribute and modify a piece of software, irrespective of the price aspect. The predominant proprietary software has its source code[ii] closed, so that one can not view or study it, let alone copy, modify and redistribute it. When one

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(i) Theodor Adorno "Message in a Bottle" in *New Left Review* no.200 (July/August 1993) p. 7.

(ii) Source Code is a text, consisting of a set of instructions and statements that coders write in a language (such as BASIC, C, FORTRAN, or GPG), which is understood by computers and humans alike. However, in order to execute those instructions on a computer, the "set of instructions" need to be compiled, i.e, converted into a language which is understood only by the computer - a machine-language or **object code.** At this stage the compiled version of the "set of instructions" consists only of ones and zeroes, and become a computer program, hiding the original set of instructions — **source code** — from people. Some more definitions of source and object code can be found at: http://labs.google.com/glossary

installs any proprietary software you are asked to agree to an EULA (End User License Agreement), prohibiting you from viewing, modifying or copying the source code, whether or not you have paid for the software.

It is of course true that most of the users around the world do not actually go on editing the software source code, but, on the other hand, an increasingly larger number of users, especially companies, governments and other similar entities, do find that they may need to modify the code in order to make the purchased software work for their specific needs. The number of such users is increasing constantly as ICT proliferates, and as computer literacy increases. This is where the freedom aspect comes into play, and the free software as formulated by the Free Software Foundation [FSF].

> "Free software is a matter of the users' freedom to run, copy, distribute, study, change and improve the software. More precisely, it refers to four kinds of freedom, for the users of the software:
>
> - The freedom to run the program, for any purpose (freedom 0).
> - The freedom to study how the program works, and adapt it to your needs (freedom 1). Access to the source code is a precondition for this.
> - The freedom to redistribute copies so you can help your neighbor (freedom 2).
> - The freedom to improve the program, and release your improvements to the public, so that the whole community benefits (freedom 3). Access to the source code is a precondition for this.
>
> A program is free software if users have all of these freedoms. Thus, you should be free to redistribute copies, either with or without modifications, either gratis or charging a fee for distribution, to anyone anywhere.[10] Being free to do these things means (among other things) that you do not have to ask or pay for permission."[11]

In practical terms, the above philosophy is legally "embedded" in a software license called GPL (GNU General Public License) and dubbed Copyleft. The GPL explicitly grants all the above freedoms, and tops those off with a requirement which makes sure that the use of the code of a GPL software does not result in anybody redistributing the same and expanded code with a proprietary scheme.

Free Software is not the same as Freeware, Shareware, Adware, Spyware or Crippleware, which are all types of Proprietary Software made available at no price, providing various degrees of freedom of use, but in most cases not other freedoms as described by FSF. Freeware, Shareware, Adware, Spyware and Crippleware are made available at no price as a part of some business strategy. Microsoft Internet Explorer, for example, is a web browser available at no price, produced and distributed as part of a business strategy to gain market share over its rival Netscape.

Open Source Initiative

The Open Source Initiative[12] (OSI) tends to differ with FSF philosophy, and instead emphasizes the practicality and technical superiority of a method of software development. It explicitly rejects the political and social philosophy of Richard Stallman. Instead it points to the open source model as a superior model of developing software, which is based on the availability of the source code, combined with rights to inspect, modify and distribute to everyone, resulting in a technically superior software, because any programmer can see and fix the problems and bugs, and improve functionality at a far faster pace than a proprietary model of developing software can ever do. The OSI[13] site puts their case as follows: "The basic idea behind open source is very simple: When programmers can read, redistribute, and modify the source code for a piece of software, the software evolves. People improve it, people adapt it, people fix bugs. And this can happen at a speed that, if one is used to the slow pace of conventional software development, seems astonishing." The important features of this model are that a large number of programmers can in the age of Internet co-operate on producing software of a very complex nature, despite being physically far apart, and despite not working in a traditional 'cathedral-building style' setting.

Furthermore, the Open Source Initiative claims, in its own words ".. to make this case to the commercial world." They seem to believe that FSF and Richard Stallman, despite their great initial contributions, failed to take the movement to the commercial world. Their view of him is that "…he's been one fifteen-year long continuous disaster" (See Eric Raymond in "shut-up-and-show-them-the-code").[14]

In both cases software is developed by a community of hackers,[15] testers, users, etc., who spend significant amounts of their time and energy contributing and participating in projects which they consider important. The participation is of different types and levels, ranging from writing code, finding bugs, fixing bugs, testing, suggesting features, translating to other languages, writing documentation, working in advocacy groups, etc. This can mean different levels of participation, ranging between an hour a week to full-time employment, occasionally getting paid but most of the time going unpaid. There are cases in which some coders work 40 hours a week at their normal work and then spend about 30-40 hours a week on a project they like or own. A recent study gives a more detailed picture of who these people are and how and why they do what they do. (FLOSS Report[16] especially chapter IV and IVa give a better idea of Nationality, Gender, Income, etc. of the developers. An article in news.com[17] also takes a look at these aspects).

Hackers and what motivates them

> "We do develop a lot of free software. If a theory says we can't, you have to look for the flaws in the theory" Richard Stallman[18]

> "Understanding the open source movement has been hard, in part because of the lack of good research done by people who understand the community (as opposed to those trying to force fit it into their convenient existing models). A second problem arises because the most well known studies from inside the community lack academic rigour and in at least one case come from an extreme political viewpoint which denies the existence of society as a concept." Alan Cox[19]

As already noted, Hacker is the key word when one describes the Free and Open Source Software phenomena. So who are the hackers?[20] The mainstream view of a hacker is someone who tries to break in to computer systems. However, this view is a gross misunderstanding and results in demonizing people who are responsible for the development of some of the most sophisticated software in existence. In contrast to this rather recent and pejorative description, hackers understand themselves as "warriors, explorers, guerrillas, and joyous adventurers of the Digital Age."

The Hackers hall of fame at the learning channel discovery.com lists the 15 greatest hackers in the world, among them: Richard Stallman, Dennis Ritchie and Ken Thompson, John Draper, Mark Abene, Robert Morris, Kevin Mitnick, Kevin Poulsen, Johan Helsingius, Vladimir Levin, Steve Wozniak, Tsutomu Shimomura, and Linus Torvalds.

What all of these individuals have in common is a passionate relation to computers, but a few of them, (for example the two Kevins and a Levin) are easily separated from the rest, and are in fact the reason why mainstream journalism equates hackers with criminals, since all three have been convicted for unauthorised intrusion into computer systems. Hacker Tsutomu Shimomura is the one who made it possible to apprehend Kevin Mitnick.

Incidentally, two of these most well-known hackers are Finns: Johan Helsingius and Linus Torvalds. Johan "Julf" Helsingius established and operated the world's most popular anonymous remailer called penet.fi, until he was forced to close it in September 1996 after being raided in 1995 by the Finnish police following a complaint by the Church of Scientology, who claimed that a penet.fi customer was posting the "church's" secrets on the internet. Helsingius closed the remailer after a Finnish court ruling made him reveal the customer's real e-mail address. His "run-of-the mill 486 with a 200-megabyte hard drive" was the machine which ran the world's busiest remailer, and took him just two days to set-up. (For a more detailed account of anon.penet.fi,

see this CMC article).[21] Helsingius was awarded the EFF[22] Pioneer Award for his contribution to on-line freedom and privacy by establishing and maintaining the first practical anonymous e-mail server. "For many years his anonymous remailer, anon.penet.fi, allowed people who might otherwise be intimidated or even endangered to speak out and to express their views. From battered women to political refugees, Helsingius' system provided all users the ability to communicate freely and safely in cyberspace."

In the case of Helsingius, the prime motivation behind his initiative was to prove to those in the Finnish universities who wanted to be able to trace each e-mail to its originator, that it was not possible to do so because "the Internet works according to different principles and it would always be possible to find a technical loophole to get around using one's real name". Another motivation was his belief in free speech. But what about other hackers? Or to be more precise, what motivates current hackers to spend hours, months, and sometimes years of their time and effort contributing to making software 'free' in both senses of the word, while not getting any overwhelming or significant monetary returns.

Why would a perfectly sane person write software code and make it open, accessible and usable by everybody? The question itself emanates from a cultural mileau which finds it hard to understand the possibility of human co-operation without a significant involvement of money. So entrenched is the culture of "everything has a price" that human behaviour which does not follow the pattern of greed and monetary gain is deemed suspicious.

The answer(s), in the case of software developers, coders and programmers, is neither simple nor singular. The reasons hackers want to contribute code, are manifold. For the most part, the motivations are private:

- altruism and a sense of sharing knowledge.
- a challenging task.
- just for fun.
- something needed to be done for one's own work.
- developing new skills.
- expectation of indirect reward, such as improving job opportunities, etc.

However, as part 2 of the FLOSS Report[23] points out "..about a third of the surveyed developers are being paid directly for developing Open Source software". This points to a lot of firms employing programmers to work on Free and OpenSource Software projects. IBM[24] alone has several hundred full-time employees working on Linux. Others include HP,[25] Sun Microsystems,[26] Oracle,[27] etc.

The FLOSS report chapter on engagement,[28] looks at the Open Source engagement of 25 top Software companies in 2001, but this list of activities may already require an

update since some of the firms categorised as “No OS activities visible” have since joined the bandwagon.

The motivation of any firm for engaging in Free Software development, apart from making profits on hardware or services sales, could be strategic positioning, rivalry to Microsoft, the fear of being left out, being prepared for any eventualities, etc.

However, one should note that the above description basically applies to programmers and developers, while the FLOSS movements consist of a pretty large number of people who contribute in other not-less important ways, like testing, bug finding and reporting, documentation, translating, advocacy, helping others to use and learn, etc. All this makes FLOSS a very plausible and attractive alternative for developing countries.

Chapter 2

Free as in Education

> *"Two little boys exchanged toys, both went away with one toy each. Two wise men exchanged ideas, both went away with two ideas each."* African Saying.

> "He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me."[29] Thomas Jefferson.

The FSF and OSI movements have repeatedly emphasised the distinction between free and gratis. "**Free as in speech**" contrasted to "**free as in beer**" is meant to de-emphasize the price aspect of software. Thus, for example, Microsoft Internet Explorer, Opera, Kazaa, and other software may be available at zero price, but these are not understood as free software since they do not allow their source code to be open and do not grant freedoms described by the FSF. On the other hand, any particular distribution of Linux might be available at zero price but also could be available for a price, yet remains a free software both in terms of FSF or the OSI.

The emphasis on freedom and the openness of the source code is intended to point out that the *price* (zero price) aspect of software is unimportant compared to the *freedom* aspect. Again, in the words of Richard Stallman, "The identifying characteristic is not the absence of price. Some free software is sold (Red Hat). Some proprietary software is given away (freeware)."

From the point of view of the developing countries, we would argue that though the freedom is of paramount importance in more than one way, the price aspect is also very important, without which developing nations would not be able to significantly meet the challenges of the computer age. In fact, the Freedom aspect can be seen in terms of "**free education**", which ought to be free in terms of *freedom* as well as *price*.

Some might find it difficult to come to terms with this idea, but in the Nordic countries, as well in many other European countries, free education is regarded as a fundamental fact of life. Education is free in Finland in terms of price as well as freedom. To emphasize the contrast, one can note that education is provided free in terms of price in many countries like Saudi Arabia and other countries possessing abundant natural resources, but is not free in terms of freedom. It is rather obvious to see what is meant by free as in zero-price, but still it is a bit different from "free as beer", since beer is not a necessity, while education is.

In terms of freedom, the democratically constituted state must make sure that the content, form and mode of education is free from, among other things, commercial interests, racism, sexism, etc., that it meets the agreed standards and remains open and available to citizens irrespective of their race, gender, colour, religious belief and financial standing or poverty/richness and even IQ level.

Intellectual Property

A large part of the debate around FLOSS, its implications and its significance for developing countries is focused on the phrase "Intellectual Property" (IP). Representatives of proprietary software companies are keen on portraying FLOSS, and especially the GPL license,[30] as being against "Intellectual Property", and hence harmful.

But more importantly, should IP be seen in the context of development and social advancement, or should it only be seen as an abstract right and end in itself?

According to Professor Mark Lemley,[31] the earliest use of the term 'intellectual property' can be found in the title of the World Intellectual Property Organization (WIPO),[32] first assembled in 1967. According to WIPO,[33] "Intellectual property refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce." It further states:

"Intellectual property is divided into two categories: *Industrial property*, which includes inventions (patents), trademarks, industrial designs, and geographic indications of source; and *Copyright,* which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and those of broadcasters in their radio and television programs."

However, one should note that about 90% of WIPO's funding comes not from UN member governments (as does the WTO or other UN agencies) but from the private sector by way of fees paid by patent applicants under the PCT — effectively from the community of patentees. Also WIPO is, according to its founding charter, solely concerned with the promotion of IPRs, in effect making it a well-organised lobbying group. Its objectives and functions do not include any development agenda.

The Free Software Foundation seems to believe that the term 'Intellectual Property' is confusing, and should be avoided, firstly, because it is "based on an analogy with physical objects, and our ideas of them as property", and secondly, because "it is a catch-all that lumps together several disparate legal systems, including copyright, patents, trademarks, and others, which have very little in common." Supporters of

this set of ideas point out obvious differences between *copyrights, patents, and trademarks* – and the laws dealing with these categories differs in all countries.

The Open Source Initiative[34] ".....does not have a position on whether ideas can be owned, whether patents are good or bad, or any of the related controversies."

The CIPR (Commission on Intellectual Property Rights),[35] established in May 2001 by Clare Short, the UK Secretary of State for International Development, in the foreword of its report notes:

> "On the one side, the developed world side, there exists a powerful lobby of those who believe that all IPRs are good for business, benefit the public at large and act as catalysts for technical progress. They believe and argue that, if IPRs are good, more IPRs must be better. On the other side, the developing world side, there exists a vociferous lobby of those who believe that IPRs are likely to cripple the development of local industry and technology, will harm the local population and benefit none but the developed world. They believe and argue that, if IPRs are bad, the fewer the better. The process of implementing Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) [36] has not resulted in a shrinking of the gap that divides these two sides, rather it has helped to reinforce the views already held. Those in favour of more IPRs and the creation of a "level playing field" hail TRIPS as a useful tool with which to achieve their objectives. On the other hand those who believe that IPRs are bad for developing countries believe that the economic playing field was uneven before TRIPS and that its introduction has reinforced the inequality." (From Report of the CIPR)[37]

Since the CIPR was initially asked to "consider, amongst other things, how national IPR rights could best be designed to benefit developing countries" its terms of reference are totally different from WIPO, which by contrast is a sort of pressure group of patentees. Thus the observations of CIPR reflect not just the defence of IP, but also its relationship to developing countries, and the development and diffusion of knowledge.

"In particular, says the commission (Chapter 5 of the final report), developing countries should allow their citizens to circumvent copyright protection mechanisms and should not follow the example of the US and the EU by enacting laws that ban such practices."(Matt Loney in Zdnet.)[38]

"Even weak levels of copyright enforcement have had a major impact on diffusion of knowledge and knowledge products throughout the developing world. "Stronger protection and enforcement of copyright rules may well reduce access to knowledge required by developing to support education and research, and access to copyrighted products such as software," notes the commission. "This would have damaging consequences for developing their human resources and technological capacity, and for poor people."" (Matt Loney in Zdnet.)[39]

Even though the main focus of the present study is on software and knowledge aspects of IPRs, it's instructive to look at other aspects as well. For example, Dr. Vandana Shiva,[40] author of several celebrated works including Staying Alive, The Violence of the Green Revolution, and Monocultures of the Mind, and other books, regards IPRs as an instrument of three level piracy: resource piracy, intellectual and cultural piracy, and economic piracy. Providing several examples,[41] she contends that:

"IPRs systems evolved in industrialised countries reflected in the TRIPs agreement only recognise western knowledge systems as scientific and formal and non-western knowledge systems are regarded as unscientific and informal. The creation of monopoly rights to biodiversity utilisation through its claim to the creation of 'novelty' can have serious implications for erosion of national and community rights to biodiversity and devaluation of India's indigenous knowledge. TRIPs gives countries the option of formulating its own sui generis regime for plants as an alternative to patent protection. Collective rights can be a strong candidate for such sui generis systems for agricultural biodiversity and medicinal plant biodiversity. Therefore, it is crucial that community held and utilised biodiversity knowledge systems are accorded legal recognition as the 'common property' owned by the communities concerned. Building such an alternative is essential to prevent biodiversity and knowledge monopolization by an unbalanced mechanistic and non-innovative implementation of TRIPs or in response to Special 301 threats from the US."

The impact of current IPRs in the context of development issues, and particularly software, is also adverse and not insignificant. According to Indian estimates, if India was to pay the cost of currently illegally-copied software in use in accordance with the TRIPS requirements, the result would be that India would lose a significant chunk of the billions it earned from its software industry during the past decade.

The story of IPRs actually is not limited to its current status. The CIPR report notes[42] the "trend for developed countries to seek commitments on IP standards from an increasing number of developing countries in bilateral or regional trade and investment agreements that go beyond TRIPS." In one such case reported by etaiwannews.com,[43] the Ministry of Economic Affairs of Taiwan has rejected the extension of local copyright protection to 70 years, as well as the expansion of the scope of prosecution for IPR violations even to personal or non-profit use.

The CIPR report also notes[44] "Increasingly there is concern that protection, under the influence of commercial pressures insufficiently circumscribed by considerations of public interest, is being extended more for the purpose of protecting the value of investments than to stimulate invention or creation."

Another interesting view on the issue of IP comes from the Vatican. In paragraph 11 of a document titled, IP and access to Basic Medicine,[45] Mons. Diarmuid Martin states:

> "The Holy See, consistent with the traditions of Catholic social thought, underlines that there is a 'social mortgage' on all private property, namely, that the reason for the very existence the institution of private property is to ensure that the basic needs of every man and woman are met and sustained. This "social mortgage" on private property must also be applied today to 'intellectual property' and to 'knowledge' (John Paul II, *Message to the "Jubilee 2000 Debt Campaign" Group*, September 23, 1999). The law of profit alone cannot be applied to that which is essential for the fight against hunger, disease and poverty. Hence, whenever there is a conflict between property rights, on the one hand, and fundamental human rights and concerns of the common good, on the other, property rights should be moderated by an appropriate authority, in order to achieve a just balance of rights."

The Vatican views are thus in direct opposition to the supporters of strong IPRs or the Fundamentalist school of copyright law, "according to which broad appeals to values beyond material concerns—culture, beauty, dignity, democracy—invite inefficiency into social, political, and economic systems. These extra-economic principles are not bad ideas per se, ... but proposals that appeal to them should be justified by tests of their utility." (Siva Vaidhyanathan *Copyrights and Copywrongs,* page 157).

Another interesting set of viewpoints and proposals have been put forward recently in the form a question: Should the intellectual property be taxed? [46] Supporters of strong IPRs usually frown at this suggestion, implicitly admitting that IP is not a property in the normal sense of the word, and should be seen in a wider context of human progress and innovation.

Software Patents.

Another central aspect of IPRs, as related to software, is patents. As distinct from copyright, which is automatic, one has to apply for a patent subject to the normal tests of *novelty*, *inventiveness* and *industrial applicability* (i.e. novel, non-obvious and useful). In addition to that, patents are limited, originally for a period of 4 years, which was later extended and is now close to a 20 year period.

Until 1980, it was generally believed in the USA that patent law did not cover software programs, because programs were considered algorithms, and thus mathematical things.

Professor Donald Knuth,[47] professor Emeritus of The Art of Computer Programming[48] at Stanford University,[49] says in a letter to the US Commissioner of Patents and Trademarks[50]: "Congress wisely decided long ago that mathematical things cannot be patented. Surely nobody could apply mathematics if it were necessary to pay a license fee whenever the theorem of Pythagoras is employed." and "When I

think of the computer programs I require daily to get my own work done, I cannot help but realize that none of them would exist today if software patents had been prevalent in the 1960s and 1970s." At the end of the letter, Professor Knuth asks the Commissioner "Please do what you can to reverse this alarming trend" [of allowing software patents].

Using different words, Microsoft Chairman Bill Gates[51] noted the same problems when he said in a memo to Microsoft executives in 1991: "If people had understood how patents would be granted when most of today's ideas were invented and had taken out patents, the industry would be at a complete stand-still today."

However when it comes to a solution, Bill Gates has a rather different one than Professor Donald Knuth: "The solution . . . is patenting as much as we can. . . . A future start-up with no patents of its own will be forced to pay whatever price the giants choose to impose. That price might be high: Established companies have an interest in excluding future competitors." (Free Culture)[52]

Many in the Free and Open Source Software movements believe that the practice of granting software patents is extremely harmful for FLOSS, among other reasons because if the source code is open, the risk of being sued is multiplied. Suing would not be that easy in the case of proprietary software, since the source code is secret. Thus any interested party determined on attacking FLOSS could easily sue programmers for the sole purpose of putting them out of action. Apart from these legal risks, US software patent laws have already played havoc with free software development by delaying the development of GNU Privacy Guard.[53] It is interesting to note that GnuPG is going to be used in Germany to help government users secure their mails, even using email clients like Microsoft Outlook. In 1999 the German Ministry of Economics and Technology[54] approved a grant for further development of GnuPG. (More examples of how software patents have affected the FLOSS development can be found at GNU)[55]

"Should the Patent and Trademark Office be issuing 20,000+ new software patents every year? Is there that much novel and unobvious, unpublished, innovation in the software industry?" is a question posed by Bust Patents,[56] a US-based website which monitors the software patent scene in the US. One can find a huge number of invalid software patents; so much so that some of the companies who registered those patents later withdrew them realizing the triviality of their claims. For example, IBM has quietly eliminated a patent it received on a method for determining who gets to use the bathroom next (see this news.com story.[57] A BBC story describes[58] a number of "patently absurd" patents).

To take an example, few people know that the US patent #5443036 controls how you play with your pet. The abstract from "Method of exercising a cat" by Kevin T. Amiss and Martin H. Abbott, filed on 2nd November 1993 and issued on 22nd August

1995, says it all: "A method for inducing cats to exercise consists of directing a beam of invisible light produced by a hand-held laser apparatus onto the floor or wall or other opaque surface in the vicinity of the cat, then moving the laser so as to cause the bright pattern of light to move in an irregular way fascinating to cats, and to any other animal with a chase instinct."

Away from the software scene but related to development issues, one of the most bizarre patents ever granted by the US Patent Office[59] is number 6,098,905. This patent, according to an InfoChangeIndia.Org article[60] is granted to a Nebraska-based private company, ConAgra Inc,[61] for 'a method for producing "atta" flour — typically used to produce Asian breads such as chapatti and roti'. So "novel" is this invention that it is used by hundreds of thousands, if not millions of "atta chakkis" or flour mills in India, Pakistan, Bangladesh, Nepal, Sri Lanka and many other countries around the world. And the 'inventors' — Ali Salem, Sarath K Katta and Sambasiva R Chigurupati (all of Asian descent) — of the method have a patent that covers the 'spirit and scope' of the invention, as well as any modification and variation to this 'invention'. Is it difficult to imagine the consequences of demanding royalties from everybody making flour in accordance with one of the variations of ConAgra Inc method? Another similar patent is Number 5,663,484 on basmati rice lines and grains, which according to Ben Lilliston, of the Institute for Agriculture and Trade Policy,[62] "is a clear example of biopiracy which the US government, perhaps unwittingly, supports."[63] [http://www.greens.org/]

GNU Public License

[CopyLeft[64] (GPL, LGPL, GGPL etc) and other open source licenses]

Though Microsoft, and other opponents of FLOSS, are vehement in their rejection of both Free and Open Source movements, they are particular about targeting the GPL (General Public License) because of what they call its "viral" nature. One must note that GPL is not the only type of free and open source software license; currently there are more than 30 different types[65] of free and open source software licenses, which provide varying degrees of access and conditions, but a very large number of software, for example Linux, is under GPL version 2.0. What licenses which cover Mozilla,[66] Apache,[67] BSD Berkeley Software Distribution[68] etc., as well as GPL, have in common is that the source code is open and users are free to use, copy, duplicate, distribute, modify them; but GPL adds the condition that any modified version of the software, if distributed outside, has to be governed by the same conditions as the original. This clause is designed to make sure that anyone using the work of the community also

contributes the improvements and additions back within the community.

The primary term in "Copyleft" is, according to Professor Yochai Benkler,[69] that "people have same rights with combined product that you had with the original code you modified."

Brendan Scott, an Australian lawyer specialising in IT and telecommunications law, describes the distinction between bare Open Source licenses and the GPL in the following words: "In the bare Open Source Initiative definition, the license must *allow* modifications to be distributed on the basis of the original license, but does not *require* it. Contrast this with the GNU GPL (the main free software license endorsed by the FSF) which *requires* that if redistribution occurs, that redistribution must be on the terms of the GPL." (See Brendan Scott. 'Why Free Software's Long Run TCO must be lower' 15 July 2002).[70]

(A ZDNet,[71] article authored by Nikos Drakos and Alexa Bona for Gartner,[72] takes a look at different open source license types. This analysis is mainly targeted at businesses, to inform them about different aspects and legal ramifications of open source licenses).

One interesting addition to these license types, though not listed on OSI pages, is GGPL, or Greater Good Public License.[73] This license is designed to add a moral and environmental dimension to GPL. Many people have been faced with a situation in which the prospective use of one's creative work and effort may run counter to one's ethical beliefs. In these cases the authors of GGPL propose that two more conditions be added to the original GPL:

1. Use, copying, distribution, and modification does not violate the Universal Declaration of Human Rights.[74]
2. Use, copying, distribution, and modification does not violate Four TNS System conditions.[75]

Even though it is obvious that it would be impossible to implement such a license because of the simple fact that there is no authority to enact such a license, the point raised here is important from the point of view of civil society and NGOs engaged in the struggle for democracy and social justice. To illustrate the point, I can relate a personal example: I myself have suffered at the hands of a dictatorship in Pakistan, one of my best friends was tortured to death by the ISI (Inter Services Intelligence) of Pakistan[76] in 1980, and numerous others were tortured and spent tens of years in prison. Now as much as I would like FLOSS, I find it hard to live with the idea that the ISI[77] may be running Linux on their servers, and thus actually saving money to perhaps buy more surveillance and torture equipment. It is obvious that I can not stop them from using Linux, but one can make a point of disapproval, which is on the basis of generally accepted norms like the UN Charter of Human Rights.

It is interesting to note that among other Open Source Licenses, even a Nokia Open Source License[78] is listed.

One common misconception about the GPL license is that it is not suitable for companies and commercial entities. Many companies have discovered that releasing their code under the GPL protects it from being stolen and closed by rival companies. GPL doesn't stop anyone from using the code but since it requires the redistribution of the code, it makes sure that the code contributed by any company is open for all. For example, if HP, Sun or IBM contribute code to the Linux Kernel, they don't have to worry that any of them, or any rivals for that matter, will be able to steal it and incorporate that code in some other software (as Microsoft has done with BSD TCP/IP stack).

There is some speculation about GPL suggesting that it is not enforcible because "users haven't accepted the license". This speculation, according to Professor Eben Moglen,[79] professor of law and legal history at Columbia University Law School,[80] is either a misunderstanding or part of Fear Uncertainty Doubt [FUD]. This is how he explains it:

> "The license does not require anyone to accept it in order to acquire, install, use, inspect, or even experimentally modify GPL'd software. All of those activities are either forbidden or controlled by proprietary software firms, so they require you to accept a license, including contractual provisions outside the reach of copyright, before you can use their works. The free software movement thinks all those activities are rights, which all users ought to have; we don't even want to cover those activities by license. Almost everyone who uses GPL'd software from day to day needs no license, and accepts none. The GPL only obliges you if you distribute software made from GPL'd code, and only needs to be accepted when redistribution occurs. And because no one can ever redistribute without a license, we can safely presume that anyone redistributing GPL'd software intended to accept the GPL. After all, the GPL requires each copy of covered software to include the license text, so everyone is fully informed."

Many people regard GPL as a brilliant legal tool, which has made possible the success of FLOSS. But one must note that only once has GPL been tried in a court of Law, in the MySQL-NuSphere lawsuit.[81] Many companies are fearful of the outcome of challenges to GPL in the US and other courts.

As it stands, GPL, its many variations, and other Open Source licenses, provide a variety of approaches which programmers, companies and other concerned parties may take in accordance with their specific requirements.

Public Domain

"Public domain" is a legal term which means "not copyrighted". Any work whose copyright has run out, or where there is no copyright, is in the public domain. More than 6000 such past works are available on-line in text format at Project Gutenberg,[82] through the efforts of Michael Hart, Professor of Electronic Text at Benedictine University (Illinois, USA).

"In 1930, 10,027 books were published. Today, 174 of those books are still in print. What would it take to put the remaining 9,853 out-of-print books onto the Internet?. To most, this sounds like a question about technology: How could all those books be scanned? How many servers would it require? But to a lawyer, the question evokes a very different puzzle: who owns the rights to these out-of-print books? For though the copyright initially offered to the authors of these books should have expired in 1987, Congress has extended copyright terms again and again—from a maximum term for these works of 56 years, to 75 years, and now 95 years. On the current schedule, no work will pass into the public domain through copyright expiration until 2019—assuming Congress does not extend the existing terms again." (Lawrence Lessig in Red Herring)[83]

Shakespeare freed!

It is hardly possible to calculate the effects of taking Shakespeare out of public domain. Though Shakespeare is important for English culture, similar cases can be easily identified in all nations and cultures around the world, where locking out cultural heritage would be not so different from a murder attempt on those cultures.

In that context, it is very interesting to see how Shakespeare was freed. The story is told by Professor Lawrence Lessig.[84] Addressing the O'Reilly Open Source Convention,[85] he said:[86] "In 1774, free culture was born. In a case called *Donaldson v. Beckett* in the House of Lords in England, free culture was made because copyright was stopped. In 1710, the statute had said that copyright should be for a limited term of just 14 years. But in the 1740s, when Scottish publishers started reprinting classics (you gotta' love the Scots), the London publishers said "Stop!" They said, "Copyright is forever!" Sonny Bono said "Copyright should be forever minus a day," but the London publishers said "Copyright is forever." These publishers, people whom Milton referred to as old patentees and monopolisers in the trade of book selling, men who do not labor in an honest profession (except Tim here), to [them] learning is indebted. These publishers demanded a common-law copyright that would be forever. In 1769, in a case called Miller v. Taylor, they won their claim, but just five years later, in Donaldson, Miller was reversed, and for the first time in history, the works of Shakespeare were freed,

freed from the control of a monopoly of publishers. Freed culture was the result of that case."

In his passionate attempt to stop the trend of extending the copyrights into perpetuity and shrinking the public domain, Professor Lessig challenged the right of US Congress to extend copyright terms. The petition, or the Eldred case,[87] was heard by the US supreme court in 2002, and in January 2003 the supreme court upheld the term extension.

The novel method employed by Professor Lessig in preparing this challenge is in itself a significant corollary of the FLOSS movements, and is described elsewhere in this paper. However, one interesting episode to note is that when Professor Lessig first approached Michael Hart of Project Gutenburg to be a plaintiff in the case, Hart wanted that the Berkman team's briefs integrate his manifestos against the greed[88] of copyright holders, without which, he would become a mere "figurehead". (See also the story at Wired.Com)[89]

The contraction of the Public Domain through the extension of copyright terms is not only a US phenomenon. It is spreading like fire among many European countries. Australia seems to be the only country which has officially stated that they will not extend the copyright term to more than 70 years. This has made possible books by many authors, such as Khalil Gibran, D. H. Lawrence and all of George Orwell's novels, to be made available from the Australian Project Gutenberg.[90] (A list of books[91] in the public domain across the world [but due to the latest Copyright Extension Act are still locked under US law] can be found at the The Online Books[92] of the University of Pennsylvania.[93])

Chapter 3

The Expansion of FLOSS ideas into other Walks of Life

> *"Alchemists turned into chemists when they stopped keeping secrets."*[94]
> Eric Raymond.

The ideas behind Free and Open Source movements are being used far beyond the field of software technology. Initiatives like the MIT OpenCourseWare,[95] Open Law,[96] even Open Source Biology[97] and Open Source Mining,[98] Free Encyclopedia,[99] Open Music, etc., are well worth mentioning, in the context of their importance for developing countries.

A lot of these types of initiatives are just hype, trying to bank on the success of Open Source and the concept of openness, but a significantly large part of these are very important and socially useful projects which give a different face to the society we live in. These initiatives and attempts touch upon a set of more fundamental values and questions governing our life, and the future of the society we live in, as well as possibilities for developing countries.

Let us take a look at some of these initiatives:

Open Law

Open Law[100] is perhaps the most important initiative outside of FSF and OSI. This experimental project, hosted by the Berkman Center for Internet & Society[101] at the Harvard Law School, is an attempt to bring the model of open source software into legal practice. The basic idea is "crafting legal argument in an open forum" and harnessing "the distributed resources of the Internet community".

Under traditional legal practice, legal arguments are crafted in closed rooms by lawyers, and are kept secret until the court, where the opponent unprepared for a particular line of argument may fail to make a convincing counter-argument. The Open Law Project, on the other hand, constructs legal arguments out in the open, removing the surprise element from the arguments. This approach is what Heidi Kriz, in a wired.com article "Open Source in Open Court"[102] calls "to turn the traditionally adversarial and secretive world of the legal system on its head." Of course this approach can not be applied to all legal practice.

Professor Lawrence Lessig[103] of Stanford Law School, who is the motivating force behind the project, is testing the approach of open legal argument, utilizing internet forums, and other collaboration tools.[104]

In first Open Law case *Eldred v. Reno* (now *Eldred*[i] *v. Ashcroft*) — a challenge to the Sonny Bono Copyright Term Extension Act — many believed that the Sonny Bono act could not be challenged, and that the US Supreme Court would not even agree to a hearing. Yet in October 2002, the U.S. Supreme Court heard arguments to challenge the practice of extending copyright terms. On January 15th 2003 the US Supreme Court upheld the term extension by a vote of 7-2, Justice Stevens and Justice Breyer dissented.

Open Source Biology

Out-innovating the corporate researchers!

Nicholas Thompson[105] of the New America Foundation and a contributing editor at the Washington Monthly[106] asks in a very interesting article "May the source be with you"[107]: "Can a band of biologists who share data freely out-innovate corporate researchers?" The answer seems to be in the making. In line with Albert Einstein's famous quote "The right to search for truth implies also a duty; one must not conceal any part of what one has recognized to be true", a number of scientists are conducting research, using the internet, in a way that would look like a "complete antithesis of corporatized research". The idea is not so different from the development model which produced Linux. Scientists use huge online-databases to unload their findings, instead of hoarding them behind iron walls, hoping to organize "a massive public brainstorm", which could, for example, bring the decades required to develop a new drug down to a few years, saving hundreds of millions. For sure, Noble Laureate Alfred Gilman,[108] who is behind one of those projects, will certainly not make any more money than he is paid through his grants, but the world and science will benefit immensely. Similar processes are taking place in the field of Scientific Journals publishing.

The Public Library of Science PLoS,[109] "is a non-profit organization of scientists committed to making the world's scientific and medical literature freely accessible to

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(i) Eric Eldred is founder of a company that publishes rare and out-of-print books on its web site http://www.eldritchpress.org/. See also: A Bookworm's Battle http://chronicle.com/free/v49/i09/09a03501.htm.

scientists and to the public around the world, for the benefit of scientific progress, education and the public good."

This initiative is supported by Nobel Laureate Richard J. Roberts,[110] who wrote an open letter to fellow scientists around the world to urge "publishers to allow the research reports that have appeared in their journals to be distributed freely by independent, on-line public libraries of science." As of February 2003, 32,772 people from 183 countries have signed the open letter, which states that "we pledge that, beginning in September, 2001, we will publish in, edit or review for, and personally subscribe to, only those scholarly and scientific journals that have agreed to grant unrestricted free distribution rights to any and all original research reports that they have published, through PubMed Central[111] and similar on-line public resources, within 6 months of their initial publication date."

"PubMed Central and Medline may not seem that different. But scientists and publishers alike agree that it would be revolutionary to pass from searchable abstract to searchable texts. People in the Third World would suddenly have access to the planet's great libraries; lay people interested in specific diseases would have the best information at their fingertips; all current medical researchers would save countless hours and could investigate their work much more thoroughly." says Nicholas Thompson[112] in another article "Publisher Perish".[113] (See also a Guardian article[114] by James Meek).

PubMed and similar projects like GenBank[115] etc. are hosted by the US National Center for Biotechnology Information, at the national Library of Medicine.[116]

One more interesting site is The Library of Sciences and Medicine. (Stanford University's HighWire Press.[117]) HighWire is a leading not-for-profit aggregator of electronic-based academic journals, which started in early 1995 with the on-line production of the Journal of Biological Chemistry. The on-line production company, which is now the leading aggregator of scholarly life science publications, is currently responsible for the production and upkeep of 190 sites on-line and over half a million articles.

Sadly, one excellent resource, PubScience, was closed down. The original PubScience website http://www.osti.gov/disconps.html now says: PubSCIENCE Discontinued (November 4, 2002). It is a well known fact that the discontinuation of PubScience was the result of lobbying by SIIA, the Software and Information Industry Association,[118] including Dutch giant Elsevier Science,[119] which argued that PubScience amounted to improper government-funded competition with commercial information services. According to William Matthews,[120] SIIA has begun efforts to remove other public databases of on-line scientific and technical literature.

MIT OpenCourseWare

OpenCourseWare,[121] a free and open publication of Massachusetts Institute of Technology (MIT)[122] course materials available via the web, and Dspace,[123] a software which makes OpenCourseWare possible, are said to be some of the boldest projects by MIT in years. Dspace is a long-term "digital library" or a super archive of virtually the entire intellectual and research output of MIT scholars and researchers, estimated to be around 10,000 papers, data files, images, collections of field notes, and audio and video clips each year. Initially it will be managed by a federation of eight universities (Cambridge, Columbia, Cornell, Ohio State, Rochester, Toronto and Washington State) including MIT, and will be available on-line, allowing storage in text, audio, video and other file formats.

Since Dspace or MIT Durable Digital Depository[124] (available under a BSD-style license as version 1.0 at Sourceforge.Net)[i] has been in production use at MIT Libraries for a while, and was developed in conjunction with Hewlett Packard, anyone else can use or adapt the program to create digital libraries and repositories of their own that could easily be linked to Dspace. It would also include a Google-like search engine. The annual cost of about US $250,000 for maintaining and operating Dspace has been set by MIT.

Both OpenCourseWare and Dspace are going to be of immense use for education in all parts of the world in terms of availability of content as well as availability of a robust Open Source tool for other educational and research institutions to deploy and to make more content available.

Project Gutenberg and Books Online

Project Gutenberg (PG)[125] was founded in 1971 by Michael Hart, Professor of Electronic Text at Benedictine University (Illinois, U.S.A.), to create a library of books in the public domain.

"When I chose the name, the major factor in mind was that publishing eBooks would change the map of literacy and education as much as did the Gutenberg Press which reduced the price of books to 1/400th their previous price tag. From the equivalent of the cost of an average family farm, books became so inexpensive that you

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(i) SourceForge.net is the world's largest Open Source software development website, with the largest repository of Open Source code and applications available on the Internet. SourceForge.net provides free services to Open Source developers. Dspace is developed at http://sourceforge.net/projects/dspace/

could see a wagonload of them in the weekend marketplace in small villages at prices that even these people could afford. ....Another way our Project compares to Gutenberg's revolution is that copyright laws were created to stop both." says Michael Hart (in an interview with Sam Vaknin.)[126]

The project does not have a head office and is run by volunteers or "Gutenbergers" (about 1700 in 2002). Anybody can find a book in the public domain, get copyright clearance, scan or type the book into a computer, proofread it and send it to PG, where it is posted on the PG website available for anybody to download. In order to effectivise this cumbersome task, Charles Franks has started an extremely exciting project called Distributed Proofreaders (DP),[127] which is a web-based method of easing the proofreading work associated with the creation of Project Gutenberg E-Texts. By breaking the work into individual pages many proofreaders work on the same book at the same time, speeding up the proofreading/E-Text creation process. The site includes a hourly and daily page count of pages completed by the site visitors. The project uses MySQL, PHP and Java Script.

A similar initiative Project Runeberg[128] has been publishing works of literature and art in Scandinavian languages (Swedish, Danish, Norwegian, Icelandic and Faroese) since 1992.

In addition to books on line in the public domain, such as Eldritch Press,[129] Bartleby.com: Great Books Online,[130] many authors and authors' collectives publish their own books on-line. Baen Free Library [131] is one such initiative.

These kinds of initiatives make an incalculable contribution to culture and get immense help not only from Free and Open Source Software as tools, but also from the larger community spirit of people, as can be seen by the growing number of Gutenbergers using Distributed Proofreaders(DP)[132] to contribute to proofreading. These are very likely to proliferate in the developing countries.

Free Dictionaries and Encyclopedias.

There are a number of initiatives to create and provide on-line dictionaries and encylopedias. The idea behind these projects is simple: harness the power, activity and creativity of internet citizens to create dictionaries and encyclopaedias available to all. Without doubt, this is not an unproblematic method, since if everyone can contribute to the making of a dictionary or encyclopedia, how does one distinguish between accurate and inaccurate information? The method employed by Nupedia[133] is to provide an easy method for people to join as an editor and/or peer reviewer. Nupedia has an open detailed policy guideline,[134] which describes, among other things, how to become an editor or peer reviewer. Other similar initiatives have their own open methods and

policies on how to filter out inaccurate entries. As a rule, these initiatives are covered by some sort of free documentation,[135] or open content licenses.[136]

As the content of the internet is slowly being internationalised, the chances and possibilities of dictionaries and encyclopedias appearing in other languages or translations of present ones in other languages are increasing by the day. I could already find a Bulgarian-English-Bulgarian Dictionary, but chances are that many more, especially from developing countries, will appear.

Among the dictionary and encyclopedia initiatives, Nupedia,[137] Wikipedia[138] and The Open Dictionary are well known. The Open Dictionary[139] project[140] is a dictionary of "definitions" typically links to web pages and unlike ordinary dictionaries, content is organized hierarchically by context. Wikipedia,[141] being a multilingual project including Dansk, Deutsch, Esperanto, Español, Français, Italiano, Nederlands, Polski, Português and Svenska has already crossed 100,000 entries for its English language edition.

There are many on-going Free and Opens Source software projects for creating dictionaries in a number of east-European languages as well as from developing countries. In addition, a lot of open source tools for creating dictionaries are also available. Even the Oxford English Dictionary [OED][142] makes extensive use of Perl, which is open source and the most popular web programming language.

Even though OED is not a free or open source project, it is interesting to note that it has never been commercially profitable for Oxford University Press. Despite that, the Press "remains committed to sustaining research into the origins and development of the English language wherever it is spoken. This commitment to the cultural values embodied in the Dictionary is shown by the £34 million funding of the current revision programme and the associated programme for new words." (See Resource Unlimited)[143]

Open Music Movement.

Another pervasive expansion of FLOSS technologies and ideas is in the field of music distribution. Almost perfect copying and compression technologies, like mp3 and ogg, coupled with the peer-to-peer P2P technologies like Napster, Kazaa, Gnutella, have made it almost trivial to copy and share music, thus jeopardizing the enormous profits of the record companies; so much so that Charles C. Mann provocatively titled his February 2003 wired.com article as "The Year The Music Dies."[144] While music is hardly going to die this year, the business of music as a cash cow of conglomerates is no longer sustainable. The Recording Industry Association of America [RIAA][145] has been trying to blame on-line piracy as the main reason for the recent decline in record sales, yet many see a link to the fact that record companies have for years kept the

prices of music records artificially high in different parts of the world. Instead of looking at the business model and price structure of the records they sell, the record industry has been spending billions on mechanisms and technical solutions to stop the digital copying of records. So far all of those attempts have failed, and will never succeed, if one takes heed from a white paper written by four scientists, Peter Biddle, Paul England, Marcus Peinado and Bryan Willman, working for Microsoft. The paper "The darknet and the future of content distribution"[146] was presented at the "Ninth ACM Conference on Computer and Communications Security".[147] In conclusion, the paper states: "In short, if you are competing with the darknet, you must compete on the darknet's own terms: that is convenience and low cost rather than additional security." This is what most hackers have been saying all along; that is, take a second look at the business model and prices, rather that technologies. The point is that the proliferation of cheap computer equipment and software has greatly reduced the cost of investment in equipment, which earlier costed a fortune and needed a huge investment beyond the reach of the average musician. This fact shows that the record industry needs to bring prices down in relation to their investment.

Beyond the technological factors, one can also find other reasons behind the growing Open Music Movement which is not as widespread and powerful as the Open Source and Open Information movements, but it is getting there. Many of its proponents describe it as "an anarchistic grass-roots, but high-tech, system of spreading music: the idea that creating, copying, and distributing music must be as unrestricted as breathing air, plucking a blade of grass, or basking in the rays of the sun." It must be added that the philosophy of free and open music[148] is not limited to anarchists or libertarians, but even to religious people. For example Jack Decker in his article Christians and the Copyright Law[149] complains:

"You may not have realized it, but most Christian songs are copyrighted. If you reproduce them without the permission of the copyright owner, you have broken the copyright law and are subject to a fine. One church in Chicago apparently was fined $5,000 for copyright violations. The most common copyright violation is in the area of music intended for use of the congregation. Many churches use mimeographed song sheets or use an overhead projector to project a handwritten transparency of the song, both of which are illegal (it's legal to use a projector but only if the transparencies you use are obtained from or approved by the copyright holder)."

(Another religious view point comes from John M. Frame in his article "The Other Shoe: Copyright and the Reasonable Use of Technology".)[150]

Just like in software and books, people have come up with a number of licenses as an alternative to the official copyright schemes: licenses such as CreativeLiberty License[151] and OpenAudioLicense[152] are making their way into the music scene.

The questions asked from the proponents of Open Music are not very different from the ones asked from the FLOSS supporters. For example, to the question "Why would an artist want to release music as Open Audio?" the answers are not very dissimilar to those which apply for authors or programmers: self-promotion, sharing art with the world without worrying about money issues, making a statement against commercial entertainment, an attempt to "free the music" from the control of the record companies, or giving something to fans in appreciation for their past support, etc. (A lot more information can be found, for example, at: FreeMusicRegistry,[153] The OpenSource Music,[154] or OpenMusicWiki.)[155]

FLOSS is helping free music in technical terms as well. Not so long ago Fraunhofer-Gesellshaft, the owners of the popular MP3 file format, began charging a minimum of $15,000 for MP3 technology licenses, but the FLOSS came up with an alternative, the Ogg Vorbis,[156] or just plain "Vorbis" music format, which is not only better in retaining the quality of music but takes less space. Oggs are now spreading and even the British Broadcasting Corporation [BBC] has started to use it for their on-line audio content. Once again FLOSS provides an alternative.

Chapter 4

Most Successful Examples of FLOSS Projects and Technologies

GNU/Linux, Apache, Mozilla, OpenOffice, Koha, Sendmail, Postfix, Bind, PHP, Perl, MySQL, Zope etc.

Though the FLOSS movement has produced hundreds of millions of lines of code, and thousands, if not tens of thousands, of Software Programs and Packages, which do immensely important work for modern society, it is important to describe some of the most known, useful and successful examples of the products and projects out there.

These projects and resultant technologies have a huge potential for improving the security levels, stability and quality of computing environments, and for cutting costs in developed countries, but they also provide a viable and affordable alternative for developing countries in their pursuit of developmental goals.

GNU/Linux

GNU/Linux,[157] or Linux[158] as it is more popularly known, is perhaps the most famous and significant achievement of the Free and Open Source movements. The Linux kernel, the core of a UNIX-like Computer Operating System, originally written by Linus Torvalds and developed by tens of thousands of programmers around the world, is estimated to be running almost 30% of Server systems around the world.

The Linux kernel, together with a host of other software components, applications and tools, most of which are developed under FSF's GNU project, constitute a computer operating system which is freely distributed by a number of organizations and companies. These distributions are usually named after the company which compiles and distributes or sells them. Some popular Linux distributions (compilations) include Debian GNU/Linux,[159] SuSe Linux[160] and Red Hat Linux.[161] Currently there are more than 100 such distributions[162] which work in different ways and serve the needs of a huge variety of users. All of these distributors use the same Linux kernel, but also provide a number of additional tools and applications.

GNU/Linux or Linux, whichever you prefer to call it, is a very stable, multi-user and multitasking operating system [OS] which is being used on a very wide range of computers and devices. Computers running on Linux range between Super Computers[163] and Tiny Single-Chip Computers.[164] Linux is used to power devices such as cameras, PDAs, watches, robots,[165] (even a Robot Brain Surgeon),[166] mobile phones, audio and video devices, etc. (See also Linux vs. Windows: The Rematch)[167]

Apache

Apache[168] is the world's most popular web server. Netcraft's statistics show that Apache powers more than 60% of the world's web servers. This is about twice the size of Microsoft's IIS (Internet Information Server). Apache is available for more than 20 platforms, including Linux and Microsoft Windows.

Mozilla

Mozilla[169] is a wonderful Web Browser, available on Linux, Windows and Mac Operating Systems. Gecko, the engine behind Mozilla is also used in the current versions of Netscape.

OpenOffice

OpenOffice.org.[170] components include word processing, spreadsheets, presentations, drawings, data charting, formula editing, and file conversion facilities (including those for Microsoft Office formats). OpenOffice.org uses EXtensible Markup Language (XML) as a standard for its data formats because it is an industry standard and the best choice for interoperable documents, which is a huge plus since any documents created by the OpenOffice applications can be opened with other XML aware applications.

OpenOffice.org is currently available in more than 10 languages, and work is in progress for another 20 or so languages. Most of the work is done by volunteers. The L10N and I18N project contains a framework and tools for localization (l10n)[171] and internationalization(i18n)[172].

Koha

Koha[173]. is an integrated Library system made in New Zealand by Katipo Communications Ltd. and maintained by a team of volunteers from around the globe.

Sendmail

Sendmail[174] is the most widely used mail server software in the world accounting for at least 40% of mail servers.

Postfix

Postfix[175] is a newer mail server which was developed as an alternative to the popular Sendmail. It is designed to be faster and more secure than Sendmail.

BIND

BIND[176] stands for "Berkeley Internet Name Daemon", and is the Internet de-facto standard program for turning host names into IP addresses. More than 90% of the Domain Name Servers of the world use BIND.

PHP

PHP[177] (recursive acronym for "PHP: Hypertext Preprocessor") is a widely-used Open Source general-purpose scripting language that is especially suited for Web development and can be embedded into HTML.

Perl

PERL[178] is a high-level programming language with an eclectic heritage written by Larry Wall[179] and a cast of thousands. It is the favourite tool of any system administrator, and runs on most of the UNIX platforms, Windows and Mac.

MySQL

MySQL[180] is produced by the MySQL AB company, established by two Swedes and a Finn, produces MySQL, the most popular open source database server in the world, with more than 4 million installations powering websites, datawarehouses, business applications, logging systems and more. The MySQL database server is distributed under a dual licensing scheme, which means it is available at zero price under the GNU General Public License (GPL), but is also sold under a commercial license to those who do not wish to be bound by the terms of the GPL and require support.

The MySQL database has an estimated 4,000,000 active installations worldwide, and up to 27,000 copies of MySQL are downloaded per day. Yahoo!, Cisco, NASA, Lucent Technologies, Motorola, Google, Silicon Graphics, HP, Xerox and Sony Pictures use MySQL for mission-critical applications.

Samba

Samba[181] is an award winning Free Software/Open Source implementation of Microsoft's SMB/CIFS protocol for file and printer sharing. Samba lets a Linux computer act like Windows NT or 2000 servers, offering a better performance and stability. Samba is a widely used software which makes a seamless co-existence of Windows, Linux and even Macintosh computers possible. According to an itweek.co.uk report,[182] Samba outperforms Windows 2000 by a wide margin.

Zope

Zope[183] is a leading open source application server, specializing in content management, portals, and custom applications. Zope enables teams to collaborate in the creation and management of dynamic web-based business applications such as intranets and portals.

A large number of other Free and Open Source software is included as: "Appendix 4 - Free Software" which is almost entirely taken from the GNU Free Software directory at: http://www.gnu.org/directory/

Chapter 5

A Review of the Actual Use of FLOSS Around the World.

> *"If someone had told me 12 years ago what would happen, I'd have been flabbergasted..."*
> Linus Torvalds. Quoted from *The Linux Uprising.*[184]

The actual use of Free and Open Source Software in the industrialized world, and indeed in the developing world, is very widespread, as will be shown in the following pages. Counting the initiatives and steps taken by a significant number of governments, international bodies, the public and private sectors, NGOs, etc., and noting the momentum FLOSS has gained during last couple of years, it is safe to say that it is unstoppable.

On the following pages:

- Some general comments, facts and figures.
- A review of FLOSS in the industrialised world.
- A review of some important initiatives, events and news which may have significant impact.
- A brief overview of the regional reports.

Some General Comments, Facts and Figures

Though it is not simple to accurately ascertain the market share of different FLOSS technologies and products, David Wheeler provides a very up-to-date assessment of FLOSS market share on a world scale in his excellent article Why OSS/FS?.[185]

Of all the available Free and Open Source Software, Apache[186] tops the list in terms of impact and market share at over 60% of all the webservers, with Microsoft IIS (Internet Information Server) at around 25%. (See he survey done by Netcraft[187] and E-soft.[188]). (The share of Apache web server was also found to be similar in a survey of 366 OneWorld partner organizations. Using Netcraft.Com, we conducted the survey in September 2002, and found out that out of 366 organizations, 203 had their web sites on Apache web server, 112 used Microsofts IIS, 10 unknown, and 41 were using other servers like Netscape etc.)

GNU/Linux's share of web server operating systems is estimated to be roughly 30%, plus an approximate 6% of BSDs (FreeBSD, NetBSD, and OpenBSD) which are FLOSS. This can be contrasted to about 50% for Microsoft Windows. In monetary

terms, "Coming from near zero three years ago, it has grabbed 13.7% of the $50.9 billion market for server computers. That figure is expected to jump to 25.2% in 2006, putting Linux in the No. 2 position, according to market researcher IDC. And get this: Starting this year, No. 1 Microsoft's 59.9% share in the server market will reverse its long climb and slowly slide backwards, predicts IDC" claims a Special Report in BusinessWeek.Com[189] "The Linux Uprising".[190] On desktops, GNU/Linux has a very small share, but since the end of 2002 it has started to grow fast. In terms of Linux users, the number is estimated to be around 20 million at the end of year 2002. Another sphere where Linux is making huge inroads is embedded computing. All types of PDAs, mobile phones, SmartPhones, entertainment devices, web-pads, cameras and other devices are increasingly relying on Linux as a robust and reliable operating system. In December 2002, two major Japanese electronics manufacturers Sony and Matsushita, said they will jointly develop a Linux-based system for digital consumer electronics. Indian-born Simputer,[191] a low-cost alternative to PC which aims to bridge the digital divide by using a truly simple and natural user interfaces based on sight, touch and audio using innovative Information Markup Language (IML), is also based on Linux.

Sendmail leads the mail server market share, at more than 40%, followed by Microsft Exchange, at over 20%. BIND is another FLOSS, which is estimated to be used on over 90% of the world's DNS servers. Another number 1 is OpenSHH,[192] a free version of the SSH (Secure Shell) protocol suite of network connectivity tools, originally developed by Tatu Ylönen,[193] at more than 60% of the market. The growth in the use of OpenSHH is quite meteoric because at the end of year 2000, it had only 5% of the market.

Among the languages, PHP is the web's number 1 server-side scripting language and Perl is the number 1 favourite scripting language of system administrators.

Two other pieces of software, the OpenOffice suite of productivity applications and the Mozilla web browser, are very widely used, but no figures are currently available.

In addition to the general figures given above, some very interesting observations include:

- The fifth most powerful computer on earth as of November 2002 is Linux NetworX.[194]
- World's first robot brain surgeon runs on Linux[195].
- Linux is used in Space by NASA and ESA (European Space Agency) (see also FlightLinux).

A Review of FLOSS in the Industrialised World

USA, European Union, Netherlands, France, Germany, UK, Sweden, Norway, Finland, Denmark, Australia and New Zealand, Japan.

USA - Though we have not found overall figures of usage of FLOSS in the USA, the most popular Linux distribution company, Red Hat[196] does most of its business there. The widest use of FLOSS in the USA is said to be in academic and educational institutions, though its use in companies is growing at a mind-boggling speed.

USA Companies which use Linux include:

Amazon - The internet bookstore recently moved entirely to Linux, saving around US$ 17 million.

Google - The most popular search engine on the web runs on a cluster of over 10,000 Linux servers![197]

IBM – The company made a (much-publicised) US$1 billion investment on Linux, and in August 2002 launched a US$2.5 billion new state-of-the-art fab[i] or "center of nanotechnology", whose IT infrastructure is all Linux-based, controlled by some 1,700 1-GHz microprocessors able to access some 600 terabytes of data. According to an eetimes.com story,[198] "...Linux was evaluated against a Windows-based system and performed flawlessly for three months, whereas the Windows-based system failed after six or seven days."

Dreamworks - Starting with the blockbuster animated movie "Shrek," Dreamworks has been using Linux to render 3D graphics and special effects. (For example, in the movie "Spirit, Stallion of the Cimarron").

Industrial Light and Magic - The special effects division of LucasFilm used Linux to render the 3D graphics in the latest Star Wars movie, "Attack of the Clones".

Kaiser Aluminum - One of the world's largest producers of aluminium sheet and foil, Kaiser Aluminium has chosen Linux for many applications on the manufacturing floor.

WesternGeco - IBM has built a Linux-based supercomputer for analysing seismic data. This machine is built from 256 IBM eServer xSeries. This is the second largest Linux cluster IBM has built for oil exploration, the largest being the 1024 xSeries cluster for Shell.

(i) Semiconductor industry abbreviation for wafer fabrication facility, where wafers are manufactured. It can also be called a front end as this is where semiconductor diffusion is done. A wafer fab needs a special environment. Extremely strict criteria for cleanliness (required for the high precision processes). The air in the manufacturing rooms is 10,000 to 100,000 times more pure than the surrounding air; and the operators wear special clothing.
(definition taken from: http://us.st.com/stonline/press/news/glossary.htm)

Merrill Lynch - One of the world's leading financial management and advisory companies, with offices in 36 countries and total client assets of approximately US$1.3 trillion, did a large scale Linux deployment in 2002 in order to cut costs and boost revenues.

United States Postal Service - It sorts all the bulk mail on over 900 Linux clusters scattered around the country.

US Governmental and Semi-governmental organizations using Linux include:

Apart from NASA's well known FlightLinux, NSA (National Security Agency) and DoD (Department of Defence) use Linux and other FLOSS for various purposes. A MITRE paper, "Use of Free and Open-Source Software (FOSS) in the U.S. Department of Defense"[199] (version 1.2.04 updated in January 2003), identifies some 115 FLOSS applications and 251 examples of their use in the Infrastructure Support, Software Development, Security Applications etc, at the DoD.

The City of Largo in Florida moved to Linux in 2002, and currently they are talking about Linux-based terminals in all the city's police cars.

The above list is only a very small sample of FLOSS use in the USA. People at M-Tech Canada have put up a Linux in Business[200] list, and Automation Access – AAX [201] has its own small list of Companies Using Linux.[202]

The European Union[203] The EU has taken many initiatives over the years to investigate the potential of FLOSS for its member countries. Some of the important projects are:

European Working Group on Libre Software[204] - was given the task of analysing the free software phenomenon, to create a set of recommendations for the EU and to create a paper to be presented to the Commission. The paper[205] was presented on 23rd of March 2000 in Brussels. Some observations and recommendations of the working group include:

- Open source software can be considered both a great opportunity and an important resource.
- Europe has now the opportunity of participating in, and benefiting from the open source movement.
- Open source software is already behaving rather well from a technical point of view, both in terms of quantity and quality, competing head to head with market leaders in several niches.
- The recommendations should be considered not as "how to help open source software", but "how to help Europe to benefit from open source software".

European IDA (Interchange of Data between Administrations)[206] is a strategic initiative to support rapid electronic exchange of information between EU Member State

administrations, and which aims to improve Community decision-making, to facilitate the operation of the internal market and to accelerate policy implementation. An IDA feasibility study about POSS, or "Pooling Open Source Software",[207] conducted by Unisys and concluded in June 2002, finds that the sharing and pooling of software resources between European administrations based on the open source development model and using available mature Free and Open Source Software is desirable and possible.

FLOSS - Free/Libre and Open Source Software: Survey and Study – was completed in October 2002. The final report[208] of the study has produced excellent results in terms of its mandated targets, such as remedying the lack of information on FLOSS, and the development of a base for extending these to the broader economic measurement of non-monetary and trans-monetary activity in the information society, beyond the domain of OS/FS. (Incidentally, the acronym FLOSS used in the present study is taken from this initiative.)

In November 2002, The European Union awarded a 250,000 Euro contract to Netproject[209] to examine the deployment of FLOSS in the German provincial state of Mecklenburg-Vorpommern. This project complements another project involving the deployment of Linux on the desktop for the UK Police IT Organisation.

(Andy Oram in this Oreilynet.com article reviews some EU initiatives, including OpenEvidence, which produces technology for "evidence" creation and validation of electronic documents.)

The Netherlands - Royal Dutch/Shell,[210] one of the world's largest petroleum companies, has decided to set up a huge Linux cluster.

France - The French Government has created the Agency for Technologies of Information and Communication in Administration (ATICA), one of whose missions is "to encourage administrations to use free software and open standards".

Germany - Debeka, one of Germany's largest insurance and financial services groups, uses Linux on over 3000 clients. The SuSE Customer reference site contains a large list of companies using FLOSS in Germany and elsewhere. IBM and German Government signed a major deal involving SuSE Linux on IBM hardware for the public sector. The German City of Schwäbisch Hall is building IT infrastructure based on SuSE Linux and IBM Servers. The software used to handle the results from the last Parliamentary Elections in Germany used FLOSS platforms. The police force in Lower Saxony "Niedersachsen", Germany's second largest provincial state, plans to use Linux on 11,000 clients as of 2004. The German Bundestag uses Linux on its 150 servers.

UK - The UK government is currently considering open-source software as a way to avoid getting locked into proprietary information technology products, according to a news.com report. The Police Force in West Yorkshire, has taken delivery of its first Linux desktop computers, as part of a trial for English and Welsh police forces.

Sweden - Swedish Government also considers Linux according to this theregister.co.uk report. IKEA, the giant Swedish furniture and home furnishings store (with stores throughout the industrialised world) uses Linux

Norway - The Norwegian government apparently has cancelled an exclusive contract with Microsoft to provide software for the computers in its public offices, according to a news.com report. The decision was encouraged by Administration Secretary Victor D. Norman, who is regarded as a conservative free-marketeer.

Finland – The City of Turku[211] is migrating all of its desktops to Linux and OpenOffice. Initially a pilot project of 200 computers is in progress as of end of 2002. This move could result in tens of other cities in Finland also making the same move.

According to an article[212] (March 2002) in Helsingin Sanomat,[213] the Finnish State Administration (Valtionhallinto) is seriously considering replacing Windows with Linux on all 147,000 computers under its control. This could result in a saving of 26 million Euros a year. Currently Microsoft Windows is running on 88% of all the state computers. Even the Evangelical Lutheran Church of Finland is considering a bigger use of Linux and other FLOSS according to a report[214] on their website. (Around 85% of the population of Finland are members of the Lutheran Church).

Denmark – According to an October 2002 report by Danish Board of Technology, the public administration can save billions of Danish kroners using Free and Open Source Software. Theregister.co.uk reports "Seven Danish IT directors, including Hans Lembøl, an IT manager for the city of Slagelse, have got together under the auspices of the Association of Danish Municipalities, to investigate open source software packages as an alternative to Microsoft products." Starting with an evaluation of StarOffice, "..Lembøl and his colleagues plan to evaluate Linux as a replacement for Windows 2000 on the server (and possibly desktop)." A deal between Sun Micrososystems and UNI-C (IT-Center of Research and Education of Denmark) allows all the school pupils, students and teachers to download the office program StarOffice for free and install it on their home computer. Alternatively they can buy it on a CD-ROM for the price of duplication: 10 kr per CD. StarOffice is the commercial twin of OpenOffice.Org.

Australia and New Zealand - After serious concerns over newer Microsoft licensing scheme, many organizations in Australia, including the Federal Government are moving to Linux. Among big organisations making the move is Air New Zealand.

Japan – According to a Yahoo report, Japan plans to spend about 1 billion yen (8 million Euro) to fund Asian software developers working on open-source Linux operating system. Initially a sum of 50 million yen (400,000 Euro) has been allocated to study the possibility of switching government computers to an open-source operating system. Also, the Linux white paper 2003 (in Japanese, English summary from David Wheeler) finds that overall use of Linux increased from 35.5% in 2001 to 64.3% in 2002 of Japanese corporations, and GNU/Linux was the most popular platform for small projects.

All the above shows that FLOSS is already a serious contender and, not just on the fringes, as was the case many years ago. So phenomenal is the rise of FLOSS that Linus Torvalds is reported to have said "If someone had told me 12 years ago what would happen, I'd have been flabbergasted."

In conclusion of our brief survey of the FLOSS scene in developed countries, we can say that FLOSS is an attractive alternative in terms of cost, quality, reliability, security of software solutions, and is an invaluable source in terms of community, democratisation, human-rights, etc. Repeating one of the observations of the European [Commission] Working Group on Libre Software, "*Consider the recommendations not as "how to help open source software", but "how to help Europe to benefit from open source software,"* one can only reiterate that if FLOSS can be relied upon to help Europe it can help everyone else.

As far as we know, no research has been done which would show whether there is more jobs or less jobs are being created because of FLOSS, but one thing is for sure, a lot of entities have saved huge amounts of money in a multitude of ways, but where that saved money is invested is a question which needs further investigation.

Some Major Projects, Initiatives and Events

- which may have far reaching effects for the Developing World

In the following section, we will try to present a few initiatives, events and news, which may have momentous and very pervasive effects on the overall development efforts of developing countries. They are not presented in any particular order, but at least one item has been identified in each broad area: Asia, Africa and Latin America.

1. Taiwan's "National Open Source Plan", as reported by the Central News Agency, the government news agency of Taiwan, in June 2002, to invest money into local FLOSS development efforts, and consequently to save money in the future, is very significant. The plan aims to improve the quality and levels of software technology in Taiwan, and involves the National Supercomputer Center

An English summary of the original Chinese language article,[215] (found at Kuor5hin), states that by 2005 the program will save the government about NT$ 2 billion (roughly 60 million Euros) and society NT$ 10 billion (roughly 300 million Euros). The number of computers in schools and in the Taiwanese government was estimated to be around 1,230,000 in the year 2000. The license fees alone for MS Windows and MS Office for these computers would be around NT $10 billion (roughly 300 million Euros).

The most important components of the plan, which really make it stick out from similar initiatives in other parts of the world, are:

- creating a totally Chinese free software environment and free software application development for Taiwan users
- training 120,000 users in free software skills,
- efforts of schools to provide diverse information technology environments to ensure the freedom of information.

As can be seen, the idea is not just to save money but also to spend money wisely, so as to get maximum benefit for whole the society.

The goal of teaching the basic skills of Free and Open Source Software environments is to be achieved by cooperating with Taiwan's community colleges and NGOs. 6 training centres will train 120,000 users, while roughly another 10,000 will get advanced courses, who will then help the further adoption of FLOSS.

The Taiwanese plan can potentially provide other developing countries with an example to follow. It would be a big help in chalking out similar plans in other circumstances. One must, however, note that in cases where governments and businesses in developing countries, or anywhere else for that matter, do not pay for software they will have very little or no possibilities of saving money from license fees. These countries have a unique chance to avoid the lock-in already now and invest in FLOSS solutions. (The news of the plan is also covered by the TaipeiTimes.Com,[216] and TheRegister.)[217]

2. In China, news of several parallel moves involving FLOSS have surfaced during 1999-2002. Various government bodies and institutes — like the Ministry of Science and Technology, CAS [Chinese Academy of Sciences], Beijing Software Industry Productivity Center (a group said to be established by the government to organize Linux development in China), China Computer Software Corp, Red Flag Linux and many others — have been interested in FLOSS, and a lot of news suggests that FLOSS is really being put to ever bigger use in China. However, one of the most significant recent steps has been the launching of China's first "dragon chip", which is "equivalent to the performance of the Intel 486 CPU", can run under Linux, and "will not fall into the foreign intellectual property rights trap". Based on the "dragon chip" is the "Soaring Dragon" server, jointly developed by Shuguang Co. and the Computer Institution of the Chinese Academy of Sciences, which will be used initially in routers and Linux-based firewalls. At 200 MHz, it looks like a modest start, but Chinese scientists are planning to develop the chips equivalent to Pentium III already in 2003.

The significance of this step is to be seen in the context of discussions around so-called "trusted computing". According to Professor Eben Moglen, "The most important threat to the survival of free software is the concept of "trusted computing," which

really means the building of hardware you as a user can't trust at all." In this Slashdot interview,[218] Professor Moglen further states: "If the free software movement and its allies can avoid having "trusted" computing forced on PC consumers by either mandatory legislation or industry "consensus," I believe free software will be around forever, and will become the dominant mode of software production and distribution in the course of the next two decades." That being the fear and suspicion, and chip producers like Intel and AMD supporting and delivering "trusted computer" chips, the news from China, or a possible similar development in some other country like say India or Brazil, may become godsend in defeating such a scheme.

3. In South Africa there has been a debate over the merits and demerits of FLOSS versus proprietary software in government, education, and official use during last couple of years (2001-2003). There has been news about the Microsoft donation of 32,000 Windows licenses for the schools, and a discussion about its worth and use.

A number of state agencies and bodies like National Advisory Council on Innovation (NACI), Council for Scientific and Industrial Research (CSIR), the State Information and Technology Agency (SITA), Centre for Public Service Innovation (CPSI), and the Department of Public Service and Administration (DPSA), have been talking about the greater use of FLOSS in South Africa. In January 2003, SITA announced its commitment "to transforming open source software from a niche product into a mainstream tool for delivering government services" during an OSS workshop attended by representatives from CSIR, CPSI, DPSA and SITA. The seminar participants expressed their determination to speed up the testing and implementation of FLOSS in government, setting-up an OSS unit within SITA and the development of a framework for assessing and recording the results of OSS use.

In addition to that, the Government Information Officers' Council (GITOC) has come up with a new document, "Using Open Source Software in the South African Government" (version 3.3 on 16th January 2003),[219] which proposes to go one step beyond simply using the FLOSS, namely contributing code to a community of developers. It also notes that "The South African Government is the largest procurer of ICT on the continent" and the government could significantly contribute and benefit by "Stimulating the local software industry. This will lead to better export potential and better capacity locally to satisfy the Government's ICT needs. It will also contribute significantly to human resource development, especially in the area of ICT." One should note that presently the South African Government's yearly spending on software licenses is R3bn (about 350m Euro).

These moves and initiatives in South Africa, if wisely implemented, can provide examples for many other African countries, in addition to actual software and accumulated experience.

One more South African initiative which can have far-reaching effects for all developing countries is Translate.Org.Za. This project, as noted by Nico Coetzee in the Africa Report, (See Appendix) is aimed at translating FLOSS into all the 11 official languages of South Africa, and has already translated Mozilla to six languages: Xhosa, Zulu, Venda, Northern Sotho, Siswati and Tswana.

4. **In Latin America,** many hopes are pinned on LACFREE [220] — Latin American and Caribbean Conference on Free Software Development and Usage due to take place in Peru on 11-13 June 2003 — which will be the first conference of its kind in Latin America and the Caribbean, and is organised by UNESCO's Office in Montevideo as part of its Free Software Developers and Users Consortium.[221] The results of LACFREE, along with a joint declaration of its participants, will be presented at the WSIS - World Summit on the Information Society[222] in Geneva in December 2003. The conference is expected to pool continent wide-efforts aimed at promoting FLOSS.

An Overview of the Regional Reports

Limits on time and resources do not permit a thorough investigation of Free and Open Source Software in all the developing countries. One of the biggest hindrances is availability of data. My colleagues Fredrick Noronha from India, Nico Coetzee from South Africa and Cesar Brod from Brazil have authored three reports: Asia Report (LIBERATION TECHNOLOGY for the lands of diversity? Free Software in Asia), Africa Report (Free- and Open Source Software in Africa) and Latin America Report (Free Software in Latin America), included as Appendixes 1, 2 and 3. Each of them has tried to find out as much as possible using online tools as well as personal communications with individuals and organizations involved in the FLOSS scene, as well as development efforts. The work they have done has not been very easy, given the fact that they did not have a chance to visit any of the "areas", which are of course whole continents, with a wide variety of languages, in addition to the meagre channels of communication open in many countries. Nevertheless, the work done is significant and using the FLOSS model can be developed further over the coming months and years. The hope is to put these reports on-line and to fill in the blanks by people from the concerned regions.

The overall FLOSS related activity in Asia, Africa and Latin America is seen in terms of level of usage of FLOSS solutions and technologies in the region, as well as writing code and other forms of contribution to FLOSS from these areas.

Another important indicator of FLOSS related activity is numerous societal, political and legal initiatives in different parts of the world, pointing to and promoting the use of FLOSS in the government, private sector and civil society.

At this stage it is simply far too early to see any results in terms of impact of FLOSS on civil society, but future research in this sphere could be illuminating.

Going through 20+ countries mentioned in the Asia report, the highest overall FLOSS related activity seems to be taking place in countries like India, China and Taiwan, (excluding Japan, which is not object of this study) followed by South Korea, Malaysia, Singapore, Thailand etc. Rest of the Indian sub-continent (Bangladesh, Pakistan, Sri Lanka, Nepal etc.) having a medium level activity, while Arab world (with the exception of Israel) seems to be the least active zone, only Afghanistan and North Korea being at the very end.

In Latin America, Mexico, Brazil and Argentina top FLOSS related activity in overall usage of FLOSS as well as writing code, followed by Colombia, Venezuela and Peru. The Latin American programmers have made significant contributions to the overall FLOSS projects around the globe.

In Africa, South Africa tops the list, closely followed by Kenya, Namibia, Nigeria. Though there is significant activity starting in countries like Ethiopia, Ghana and Zambia.

Of all the three regions reviewed, Latin America tops in terms of code contribution, but Asia is not far behind, and as noted earlier with reference to GITOC document, South Africa in the African continent is poised for more code contribution in addition to its reasonably high use of FLOSS.

In his aptly titled report "Liberation Technology for the Land of Diversity", Fredrick Noronha, makes a very interesting observation: "In the next few years, the contribution of Asians to GNU/Linux is going to become increasingly apparent." This observation is based on his intimate knowledge of the FLOSS scene in India and elsewhere in Asia. The point to note here is that there is already a lot of code being contributed now, but that is not advertised and thus not so visible. In the coming years, however, there will be more contributions and some will excel so much that they will get attention. The situation in Asia and even Africa can be contrasted to Latin America where the contribution of code to FLOSS started much earlier, and is duly noticed and recognised.

Another point Fredrick Noronha makes about FLOSS in Asia is that FLOSS-related activity and the active use of FLOSS is not always noticed by government officials in many countries, and in cases where some do notice they pretty much fail to understand it, let alone understand its significance. It will take time and a lot of patience before the changes caused by FLOSS are felt.

Noronha walks through all parts of Asia, covering China with its Redflag Linux, BluePoint Linux, many projects and actions of the Chinese Academy of Sciences, etc. He also looks at India, several initiatives to make computing available to Indian languages, briefly reviewing projects like MayaVi, Kaai, Yudit etc. In the Arab world, he look at a very interesting grass roots initiative ArabEyes, which is dedicated to Arabization of FLOSS. ArabEyes spans several countries.

In his report "Free Software in Latin America" Cesar Brod notes the trend of legislative proposals in many Latin American countries (e.g. Peru, Brazil, Mexico, Argentina) aimed at fostering the use of Free and OpenSource Software in governments. These proposals, despite being quite rational and mild, are vehemently opposed by Microsoft and its sponsored groups like Software Choice,[223] CompTIA,[224] etc. Cesar Brod further notes: "It is very difficult to ensure transparency when someone doesn't want to provide information. When this is government information, it should, in principle, be readily available for the public this government rules and represents. The several proposals of [parliamentary] bills which are trying to push Latin American governments to use free software take this in consideration. One must admit, however, there is not enough free software tools to run a government, and a lot of developed countries are not willing to use free software as a standard tool for government administration."

Cesar Brod notes that GNOME, one of the two competing GUIs (Graphical User Interfaces) available for Linux, was started by Mexican developer Miguel de Icaza, while working at the Institute of Nuclear Sciences (UNAM – Universidad Autónoma de Mexico). Cesar also briefly reviews projects like CódigoLivre at the UNIVATES and Rede Escolar Livre RS project in Brazil, UTUTU, BioLinux and Via Libre Foundation in Argentina, PHP-Nuke from Venezuela, INFOMED in Cuba, etc.

In terms of the future of FLOSS in Latin America, Cesar Brod has great hopes in the newly elected president of Brazil, whose presidency could positively affect the status of FLOSS in Brazil, and elsewhere in Latin America.

In his report, Nico Coetzee takes a look at various projects and initiatives which are certainly going to benefit Africa. He takes a brief look at Translate.Org in South Africa, OpenLab (South Africa and Nigeria), SchoolTool, LinuxLab etc. Also noted are Radio E-Mail in Guinea, and how Linux Wireless Router brings in subscribers for ISP in Ghana. After the completion of Nico's report, a new initiative, FOSSFA - Free and Open Source Softwre Foundation Africa, was launched on 21st February 2003 in Geneva during the WSIS PrepCom2 meeting. In its own words: "It all started during the ICT policy and civil society workshop in Addis Ababa, Ethiopia, when 82 participants from 25 different countries invited by APC - The Association for Progressive Communications, Article 19 and UNECA - United Nations Economic Commission for Africa assembled to discuss ICTs in Africa. The workshop participants agreed that open source software is paramount to Africa's progress in the ICT arena, and began work on a coordinated approach to support open source development, distribution and integration."

The Africa, Asia and Latin America reports are appended as follows:

Appendix 1 - Africa Report.

Appendix 2 - Asia Report.

Appendix 3 - Latin America Report.

Chapter 6

Factors Contributing to the Expansion of FLOSS in the Developing World

Three factors stand out when it comes to why many developing nations have started taking first, and sometimes second, steps towards FLOSS: cost, the anti-piracy campaign and security concerns.

1. Lower Cost

Definitely the most overarching factor is the lower cost, despite a well-known assertion that people in developing countries don't pay for software anyway. It is true that a large number of users in the developing countries don't and, more importantly, can't really pay for software. Jordi Carrasco-Muñoz, who works for the EU delegation in Vietnam, calculates that the cost of Windows XP and MS Office is between $560 and $800 (home to professional version, prices from Amazon.com). In a country like Vietnam, where the GDP per capita (2002) is $440 per year, the cost of just the operating system would be equivalent to one year and three month's wages of an average Vietnamese. "The cost-equivalent for the US, where the GDP per capita is $30,200 per year, would be $38,436 for just XP and Office". Therefore, "Is it 'very surprising' that the percentage of illegally-copied software in Vietnam is 97%?", asked Carrasco-Muñoz during his presentation at the Open Source and eGovernance Conference in October 16-18 Washington, DC.

Relevant figures for other countries, as calculated by the Business Software Alliance(BSA)[225] are given in the following table:

25 Countries with the Highest Software Piracy Rates2[26]

	Year 2000	Year 2001
Vietnam	97,00%	94,00%
China	94,00%	92,00%
Indonesia	89,00%	88,00%
Ukraine/Other CIS	89,00%	87,00%
Russia	88,00%	87,00%
Pakistan	83,00%	83,00%
Lebanon	83,00%	79,00%
Qatar	81,00%	78,00%
Nicaragua	78,00%	78,00%
Bolivia	81,00%	77,00%
Thailand	79,00%	77,00%
Bahrain	80,00%	77,00%
Oman	78,00%	77,00%
Kenya	67,00%	77,00%
Kuwait	80,00%	76,00%
Bulgaria	78,00%	75,00%
Romania	77,00%	75,00%
El Salvador	79,00%	73,00%
Guatemala	77,00%	73,00%
Paraguay	76,00%	72,00%
Nigeria	67,00%	71,00%
Malaysia	66,00%	70,00%
India	63,00%	70,00%
Zimbabwe	59,00%	68,00%
Honduras	68,00%	68.00%

Source: Seventh Annual BSA Global Software Piracy Study

The BSA document "Seventh Annual BSA Global Software Piracy Study" notes that the "United States and Canada experienced continued piracy, with the U.S. at 25%, up from 24% in 2000, but still the lowest of all countries worldwide. The piracy rate in Canada remained the same at 38%." One can only wonder what would be the percentage of illegally-copied software in North America if people were offered Windows and Office packages for $38,000.

It should be noted here that many have questioned the methodology of BSA in their calculations, which often ignores Free and OpenSource Software. Nathan Cochrane, in an article "Piracy and free software not always counted"[227] points to "phantom" piracy aimed at inflating losses.

Another article in The Register [228] is critical[229] of "the narrow view that money not spent on software licences vanishes from the economy as a whole. It doesn't - it's simply spent or invested on something else, possibly sustaining jobs elsewhere in the economy and recouping tax revenue there."

Jordi Carrasco-Muñoz thinks that the developing countries can neither **afford to miss** the benefits of the IT revolution, nor can they **afford its cost** (particularly of IPRs).

It is no secret that Free and OpenSource Software costs little. However, businesses and governments can not simply presume that if software itself doesn't cost much, it is also cheaper to move over to it. Everyone knows that buying a bubble jet printer from HP or Canon may be very cheap, but the cost of buying the ink cartridges definitely makes it a more expensive solution than a more expensive laser printer. In order to get the accounting right, businesses often investigate the Total Cost of Ownership (TCO), which looks at the total cost of a solution, instead of just the cost of individual components. Even though "ownership" of software in TCO, as explained by Brendan Scott, is a bit anathema, since neither FLOSS nor proprietary software is actually owned by any user, the expense of operating and migrating to FLOSS are not trivial. This, however, should not confuse anyone into believing that FLOSS can be more expensive than proprietary software, because the fact of taking into account the additional operational costs, like retraining the users and hiring the right skill-set, simply puts the focus on a different problem: human resources and learning.

Nevertheless, costs associated with migrating to FLOSS are real, but at the end of the day, as many articles and studies have shown, such as those by the Robert Frances Group,[230] Cybersource Pty Ltd,[231] and MITRE's business case study of OSS, they are still much lower than the available proprietary solutions. If one also takes into account the "hidden" costs, like upgrades, then the difference in TCO is even wider in favour of FLOSS. Besides, the proprietary software companies have also noticed the lower costs of FLOSS, and are trying to find their place in a new and different market that is strongly influenced by FLOSS. This is evidenced by Microsoft CEO Steve Ballmer, when he says: "We have prided ourselves on always being the cheapest guy on the block - we were going to be higher volume and lower priced than anybody else out there, whether it was Novell, Lotus or anybody else," but "One issue we have now, a unique competitor, is Linux. We haven't figured out how to be lower priced than Linux. For us as a company, we're going through a whole new world of thinking." (See 15th July 2002 article at varbusiness.com by Rich Cirillo "Ballmer: Linux changed our game")[232]. In January 2003, Microsoft, in its filing with the US Securities and Exchange Commission blamed open source for a possible decline in its profits, and warned that the company "...may have to reduce the prices it charges for its products, and revenues and operating margins may consequently decline.." (See CNET.com staff writer Ian Fried's article "Microsoft: Open source could harm us")[233]. It would not be difficult to guess what Windows would cost if Linux was not there or if FLOSS were absent, and how TCOs would be calculated.

It is relevant to note that in the case of developing countries, the costs associated with re-training users and hiring skilled people to migrate and run FLOSS based systems are not that high as in developed countries because of lower labour costs and, more importantly, people thus employed are locals contributing to the local economy rather than paying expensive software license fees. These costs become a non-issue if one has the chance to start from the beginning with FLOSS, instead of migrating from proprietary solutions. One doesn't need much maths to work out that ultimately the *cost of **not** changing now will exceed the cost of changing now.*

2. The Anti-Piracy Campaign

Many in the developing countries have realised that not paying for licenses for the software being used can not go on for ever. Home users may not come to this conclusion soon but governments and enterprises can not fail to note that the license payments for software will have to be made one day, if one keeps using proprietary solutions. This realisation, combined with the campaigns of BSA and WIPO, has become a de facto ally of FLOSS. The more aggressive these campaigns become, the more interested will countries become in FLOSS, as both short-term and long-term strategies. The short-term strategy entails using FLOSS as a lever in getting price reduction from vendors, and the long-term strategy entails investing in local FLOSS-based solutions to reduce foreign currency spending and increase support for the local economy.

3. Security and Technological Independence

Combined with cost, security is perhaps the most important factor pushing FLOSS in every country outside the United States.

In basic terms, security is understood as denying unwanted/unauthorised access, damage, modification or destruction of your system, to ensure confidentiality, integrity and availability of the information processed and stored by a computer. The unwanted in this case could be anything from thieves, rivals and terrorists to government agencies. Usually one has recourse to the law, which takes its course if and when a breach of security is discovered.

However, security is also seen in national and state terms where, apart from local intruders, government agencies, business rivals or crackers from another country (irrespective of that country being friendly or hostile) could gain unauthorised access. In this case the US is in a unique position since most of the software companies selling proprietary software coming from that country could be seen as secretly colluding with the US intelligence agencies.

For instance, "Big Brother" and "MiniTruth", which emerged from the news of the US National Security Agency (NSA)[234] encryption NSAKEY found in Windows[235] and later in Lotus Notes,[236] are enough to create fear and suspicion for any government except the US. Adam Back,[237] who discovered the key in Lotus Notes, writes: "Anyway as clearly inside the application somewhere would be an NSA public key that the NSA had the private key for, I tried reverse engineering it to get the public key. In doing this I discovered that the NSA public key had the organizational name of "MiniTruth", and the common name of "Big Brother"."

In addition to the above news, a former NSA employee, Wayne Madsen, now working for Internet rights watchdog EPIC (Electronic Privacy Information Centre)[238] has publicly stated that "A lot of manufacturers play ball with the NSA", "This is an area that the NSA is moving into a lot and we have to be really careful about it." (The Full story is carried by ZDNet.[239])

The whole argument boils down to two things – verifiability and trust. How does one confirm whether a piece of software contains a backdoor or spyware? In the case of closed source software there is really no sure way of ascertaining the absence or presence of backdoors, but in the case of FLOSS, one can always go back to the source and check it line by line. Anyone buying software from closed source vendors (not only Microsoft Windows or Office Suite but all proprietary UNIX systems and software) can only take their word for it, something increasingly difficult given the record of most corporations.

Another aspect of security is what is called SPOF (Single Point of Failure) or a part which renders an entire system unusable when it fails. Keeping this concept in mind, many governments and IT departments plan to avoid reliance on a single OS, single vendor or technology, single centre of operations or even single source of energy, so that if one fails at least some other parts of the system keep working. Following that logic, Otto Schily, Minister of the Interior of the Federal Republic of Germany, said in a statement quoted in a BBC story,[240] about his country's recent policy decision to adopt Linux and Open Source, "We raise the level of IT security by avoiding monocultures; we lower the dependency on single software vendors; and we reach costs savings in software and operation costs."

In addition to the practical problems mentioned above, most states want to achieve some level of technological independence, which is understood as employing policies geared to ever greater self reliance in terms of technologies. Investing in local software development based on FLOSS sits very well with the overall ideas of technological independence.

FLOSS solutions have proved their worth in every aspect of security. Even the NSA[241] has its own version of Linux, the SELinux or Security-Enhanced Linux,[242] which is increasingly used by security sensitive sites and establishments. SELinux uses

"Mandatory Access Control" to harden its security. (For a more detailed description, check Susan Rajnic "An Introduction to the NSA's Security-Enhanced Linux: SELinux").[243] According to some reports, the intelligence agencies of Russia, China and many other countries have their own versions of secure Linux.

Security and privacy concerns, vis-à-vis proprietary software, are not limited just to governments and companies, but even to private individuals. Michael Jennings of Futurepower Computer Systems has set up a constantly updated website "Windows XP Shows the Direction Microsoft is Going"[244] which details many of the security issues related to Microsoft Windows XP. According to it: "Microsoft Office keeps a number in each file you create with Visual Basic macros that identifies your computer. Microsoft Office 97 keeps an identifying number even if there are no macros. (The free and excellent Open Office[245] does not have this problem, even when it uses the Microsoft file formats.)"

All of the security- and privacy-related concerns noted above make it very likely that more and more decision-makers in the developing countries look to FLOSS as a very viable alternative to proprietary solutions. Realising this, Microsoft has recently been talking about shared source and, according to some news, has offered to let some governments see the Windows source code. This approach is not entirely new, since Microsoft has had a similar deal with the Austrian government. But as many critics have pointed out, these deals are done under a very strict NDA (non-disclosure agreement) which stops the party from disclosing anything under any circumstances whatsoever. Also there are reports that the source has been "shown" in a Microsoft-controlled environment. Besides, there is no guarantee that the source code shown to an official is the same from which the binaries are compiled: in other words the inspecting party doesn't really know if the inspected version is really the same as current the Windows executable.

It was not so long ago (May 2002) that a senior Microsoft Executive, Jim Allchin, told a US federal court that sharing information with competitors could damage national security and even threaten the U.S. war effort in Afghanistan. He later acknowledged that some Microsoft code was so flawed it could not be safely disclosed (See the story at eweek.com.[246])

Chapter 7

Obstacles to the Extensive Use of FLOSS in the Developing World.

Since it can be convincingly shown that developing countries definitely stand to gain in very many ways from an adoption and extensive use of FLOSS, the question that begs to be answered is: Why, then, is it not already widely adopted? There is no single conclusive answer to this question. However, we can point to a number of factors and issues which can be central to understanding why a majority of developing countries still do not make use of the opportunities provided by FLOSS.

The issues and factors can be broadly divided into 3 major groups:

1. Financial,
2. Technical,
3. Political and Social.

1. Financial

A lack of financial resources is of course a major issue with any development effort. Many governments often have to choose between acute issues, like poverty, illiteracy, ethnic conflicts, droughts, disease, lack of simple infrastructure, ICT, etc.

However, it is a simple fact that Free and Open Source Software are relevant to a development effort only if a reasonable investment in ICT infrastructure is made. If no hardware is available, software is good for nothing. It is beyond the scope and mandate of this study to suggest to any country where and how the available scant resources should be used. One can only say, in very general terms, that investment in education and ICT is something without which countries will find it increasingly difficult to cope with the needs of both the present and the future.

In more concrete terms, one important factor to note for policy makers is that ICT does not imply expenses only, but also carries a significant possibility of earning money, job creation, increased efficiency in meeting the needs of citizens, and the creation of a more informed citizen. It is in all of these contexts that FLOSS can give a helping hand.

2. Technical

A dearth of trained IT professionals is a very important factor impeding the spread of FLOSS in many developing countries. This issue can be best addressed by taking a

second look at the educational and vocational training policies, which should make sure that the students get a chance to know multiple technologies, and are not limited by the predominance of a single vendor or technology in the educational curriculum and laboratories.

3. Overall Political and Social Issues

Bureaucracy.

Bureaucracy is perhaps the most fundamental barrier to a wider adoption of FLOSS. All bureaucracies, whether in the developed or developing countries, and whether in governments or in corporations, tend to be lethargic and bound to a set of written and unwritten rules which makes it difficult for them to respond in a dynamic fashion to a fast-changing world. It is difficult enough for anyone to cope with the pace of changes (technological as well as socio-political), let alone for a bureaucrat, a significant part of whose motivation is to climb the career ladder while covering his/her back.

That being the case, it is not difficult to imagine how bureaucrats in governments will respond to a technological solution which is not provided by a single vendor/company, but rather mainly the result of the voluntary efforts of a community of hackers. Many of them even fail to comprehend that such a thing is possible. Add to that a "reasonable" degree of FUD, and you have many bureaucrats suspecting communism.

Even in cases when a particular group of government bureaucrats is sympathetic to FLOSS, for whatever grounds (cost-saving, security, code access), its implementation can go wildly off target, as for example in the case of the "Red Escolar Libre" (Free School Network) project in Mexican Schools. (See "Mexican Schools Embrace Windows).[247] In the year 2000, Mexico had 120,000 schools. In order to achieve the goal of providing one computer lab consisting of 1 server and 6 desktops to all the 120,000 schools in Mexico, someone calculated that instead of paying US$ 500 per server and US$ 55 per desktop license for Windows, a Linux CD would save a lot of money. It would indeed have saved a lot of money, but no proper plan was made to actually implement it in a properly structured way and to make the labs work. A CD with Linux software was shipped to the schools with the hope that it would simply be installed, like a painting on a wall. Consequently, the plan looked good on paper, but did not work. The problem here was not the software, but rather the implementation of a plan. Based on the Mexican Red Escolar Libre project, and learning from its mistakes, the Rede Escolar Livre RS project is sponsored by the government of the state of Rio Grande do Sul in Brazil. (Some more details of this project are given by Cesar Brod in the Latin America Report in the appendix.)

Corruption

Corruption is another ingredient of a situation in which FLOSS, despite being extremely cost-effective and of competitive quality, is still kept out because companies with enough cash can buy off decision-makers in order to bring in solutions which look great on presentation charts and in company propaganda. Corruption is not just typical of developing countries or countries with autocratic and authoritarian regimes, but is spread more or less across the world. For sure, it is not spread evenly, yet in many countries it has become endemic.

Even in countries which seem to suffer least from it, corruption is hardly as rare as one is made to believe. Consider, for example, what a Pratt &Whitney[248] spokesperson said, when explaining why the company charged the US Air Force nearly $1,000 for an ordinary pair of pliers. "They're multipurpose. Not only do they put the clips on, but they take them off." The humour aside, when a company like Pratt &Whitney – which claims to be "a leader in the design, manufacture and support of engines for commercial, military and general aviation aircraft, space propulsion and power systems" and boasts on being "a $27.9 billion company that includes Otis elevators and escalators, Carrier heating and air-conditioning systems, Sikorsky helicopters and Hamilton Sundstrand aerospace systems" – can go so low as to charge $1,000 for a simple pliers from the US Air force and is involved in a number of well-known bribery cases, then there is something even more rotten than, say, a Tanzanian policeman extorting a buck or a Burmese customs official taking bribes. Examples such as how Lockheed [249] bribed Japanese Prime Minister Kakuei Tanaka in the 1970s, how the Swedish company Bofors AB[250] bribed members of the Indian government in late 1990s to sell weapons,[251] or how in 2002 Oracle managed to sell a deal to the State of California[252] which had not been put out for competitive bidding, and then sold them more Oracle licenses than state employees to use them, are hardly isolated incidents. The recent demise of Houston-based energy giant ENRON[253] and details of how its bosses funded election campaigns of policy makers, leaving very few politicians in Washington not on the receiving end of "donations" from Enron or its auditor, Arthur Andersen, can only be shocking if one regarded corruption as the privilege and prerogative of Third World or East European regimes. A special report at The Centre for Public Integrity,[254] aptly titled "A Most Favored Corporation: Enron Prevailed in Federal, State Lobbying Efforts 49 Times",[255] describes the workings and successes of the "formidable lobbying machine".

According to a Corp Watch.Org. story,[256] Arthur Andersen indulged in "a massive scheme to destroy documents related to the Enron meltdown." "Tons of paper relating to the Enron audit were promptly shredded as part of the orchestrated document destruction," a federal indictment against Andersen alleged. "The shredder at the

Andersen office at the Enron building was used virtually constantly and, to handle the overload, dozens of large trunks filled with Enron documents were sent to Andersen's main Houston office to be shredded." Andersen was convicted of illegal document destruction, effectively putting the company out of business.[257] (Anyone interested in finding out how multinational corporations behave can take a look at "Bad Apples in a Rotten System. The 10 Worst Corporations of 2002") [258]

It wasn't many years ago (1996 and revised in 1997) that the OECD council recommended that those of its 34 member countries that had not yet disallowed the tax deductibility of bribes to foreign public officials should re-examine such treatment with the intention of denying deductibility for combating bribery in international business transactions. One can only note that the initiative was not about punishing people who either receive or pay bribes, but only to "disallow tax deductions" to those offering them. Many more examples can be cited in all parts of the world of what many researchers have described as "structural corruption", which conveniently is named 'lobbying', 'election contributions', etc.

The purpose of the examples given so far is neither to prove nor to disprove that there is widespread corruption in developing countries. The point being raised is that corruption can and does adversely affect the spread of FLOSS in many countries, especially the Third World, where corruption becomes more lethal when combined with the arrogant diplomatic missions of the developed world, who come to the defence of their own companies even when these companies are faulted at home for monopolistic behaviour. The best example related to FLOSS would be the intervention of the US Ambassador to Peru[259] in his efforts to support Microsoft against a bill tabled by Peruvian Congressman Edgar Villanueva.[260]

Many more examples can be found of how officials from developed countries intervene to "persuade" politicians and officials of developing countries when it comes to giving preferential treatment to "one's own". US Ambassador to Pakistan Robert Oakley, intervened on behalf of the American oil company UNOCAL[261] which was pitched against an Argentinian company, Bridas, (which has since merged with BP Amoco Argentina)[262] to convince Pakistani Prime Minister Benazir Bhutto for a deal on oil- and gas-pipelines through Afghanistan during the rule of the Taliban regime. The incident created a small scandal in Pakistan at the time. But the point being emphasized here is that in an entirely different part of the world raw corruption combined with the structural corruption called 'lobbying' can do wonders for companies with cash.

At the end of the day, corruption in this case is allied only to companies with enough cash and stakes, and is on the opposite side of FLOSS, which doesn't offer anything to decision-makers. When the government officials are corrupt, they are not really worried about saving on software or about the future IT capabilities of the country

concerned, but about the commission which they personally may receive from a deal. One thing is sure: FLOSS doesn't corrupt.

Brain Drain

The 'brain drain' is another of those acute socio-political problems which is a big obstacle in any development effort on the part of developing countries. Irrespective of the amount of resources spent by developing countries for the education and training of specialists and scholarships offered by developed countries, a pretty large number of the individuals happen to find better paid and more rewarding jobs in the industrialized countries. The intensity of the brain drain keeps changing for different professions in accordance with the market needs of developed countries. The current period of economic uncertainty in the Western world has somehow dampened the migration of ICT specialists, but a couple of years back the immigration was at its height.

In terms of ICT in general and FLOSS in particular, the effects of a brain drain are not as singular as in the case of other professions in the past. Thus, if an engineer or doctor moves from India or China to the USA or UK, there is little that person does and can do in terms of development effort in his or her home country, apart from perhaps sending money to relatives. But an ICT specialist, a software developer, can contribute in many ways to ICT solutions in the country of his or her birth while living abroad. This can take the form of working on projects such as localizations of software systems, research and development, participating financially in pet projects, etc. Thus the effects of the ICT brain drain are not that devastating as in other cases.

Political Freedoms

Many people in important policy-making positions tend to believe that lack of political freedoms may significantly hinder the development efforts of a country. However, the proliferation of ICT in China, South Korea (during its darkest dictatorial times), Singapore and Malaysia reveals no direct link between freedom and ICT. Software and any technology are neutral in terms of the level of freedom in a country, while the companies selling technology are not neutral. In general, companies are biased towards so-called stable regimes and political systems. A look at the investment commitments of multinational companies shows these to be tilted in favour of governments and regimes which offer a more "stable" form of government. (irrespective of whether it is a parliamentary democracy or not)

Even though GPL or other open source software licenses do not make any distinction between a despotic or democratic country, between a racist or a humanist, a sexist or a feminist - allowing all users equal access to it - there is one significant way in which

FLOSS differentiates from proprietary software companies. In terms of FLOSS, the lack of political freedoms in any given country ultimately results in conditions not conducive to the creation of a hacker community and culture, and FLOSS can not play a significant role if an active community of hackers does not exist. The fundamental tenets of hacker culture in North America and Europe are freedom and openness - everything else comes afterwards. Even if on the surface it would seem that the Open Source movement, as distinct from the Free Software movement, is more concerned about technical soundness and a continued improvement in the quality of the software they produce, the very existence of that community requires freedom and openness. Even if countries like China do have a significant hacker community, that community is ultimately going to clash with the official line of censorship and control.

Indeed, the same applies to hacker communities in North America, Europe, Japan, Australia, etc. One can see increasing signs of alarm among hackers at the blatant attempts of corporations and governments to intensify and extend control even to the level of hardware. Heated discussions around DRM, Palladium, Trusted Computing and similar initiatives are examples of such concerns.

One more point to note here is the relationship between freedom and ICT, especially the Internet. Many policy makers tend to think in terms of the Internet being a "virus of freedom" and as an inherent force of democracy which will threaten autocratic and authoritarian regimes. A new book "Open Networks, Closed Regimes" by Shanthi Kalathil and Taylor C. Boas of the Carnegie Endowment for International Peace,[263] examines and challenges those views on the basis of a study of Internet use in eight countries: China, Cuba, Singapore, Vietnam, Burma, the United Arab Emirates, Saudi Arabia, and Egypt. The authors rightly claim that: "The Internet, however, is only a set of connections between computers (or a set of protocols allowing computers to exchange information); it can have no impact apart from its use by human beings." (The first 2 chapters of "Open Networks, Closed Regimes" are available at firstmonday.org)

Legal Framework

Another concern often raised is the lack of a legal framework in many developing countries, which is believed to be the cause of many companies shying away from investing in these countries. Free and Open Source Software solutions and technologies are not directly affected by, or are not dependant upon, any specific legal framework. Anybody who wants to, can basically use and learn these technologies. However, it will be affected indirectly if a lack of investment results in no hardware to work with, or no private sector to participate in utilizing and benefiting from FLOSS.

Conclusions and Recommendations

Conclusions:

Is FLOSS a useful and significant tool for the developing countries? We are convinced that FLOSS clearly has the potential to help democratization and positively help find solutions to the most pressing problems faced by the populations of developing countries. More specifically, we see its relevance in the following specific fields:

Democratization

Even a quick look at the use of computers in the education sector, NGOs, alternative media, and civil society is enough to convince us of the potential of FLOSS. Students, teachers, journalists, and democracy activists have been using computers, email, web publishing, desktop publishing, and internet to get their message across the world, participating in societal debates, acquiring as well as disseminating knowledge, and skills.

All of that can for sure be done without it but FLOSS has some intrinsic characteristics that make it a convincing and integral ally of democratization process.

- **Community and Cooperation** - As described earlier, community orientation is one of the basic elements of FLOSS. The development process of Free and Open Source Software requires participation and the active role of communities, and the outcome and success of the work greatly depends on how well the community can communicate and cooperate – both key elements of democracy.
- **Freedom** - Freedom is the *raison d'être* of Free and Open Source Software movements. As described in chapter 7, any software can successfully be used by anybody for any purpose, but the full potential of FLOSS can only be realised if extensive political freedoms exist, creating an environment conducive for the existence of a community of hackers; after all, without hackers there is no FLOSS.
- **Openness and Transparency** - FLOSS is openness. There is hardly a more practical way to demonstrate the necessity and importance of openness and freedom of information than FLOSS itself.
- **Active Participation** – FLOSS, in addition to being a tool, is also a way to activate civil society and NGOs and to improve their capacity to participate in political debate and other forms of social and political life.

Education and Research

FLOSS has a complementary and reciprocal relationship to education. One needs an educated section of the population to fulfil the full potential of FLOSS, and at the same time FLOSS helps, enhances, and complements education by providing tools to promote education.

In the case of education in computer sciences, FLOSS provides opportunities which nothing else can:

- Unrestricted access to the source code.
- An environment of unlimited experimentation and tinkering.
- Collaboration and interaction with a community of programmers, coders and users around the world.

In the case of the promotion of education, in addition to providing ready and available tools, FLOSS provides positive examples from projects around the globe. In practice this means that if someone in some other place has created a tool to reach a specific educational goal, one can take it as a starting point and build on it, without the need to "reinvent the wheel". The Dspace project and the Koha library software, mentioned earlier, are but two simple examples of such possibilities. As far as collaboration is concerned, Sourceforge.Net is perhaps the biggest collaboration project ever created, uniting tens of thousands of software projects and hundreds of thousands of people around the world. FLOSS itself has been called the most collaborative human effort ever.

In addition to the above, the inherent qualities of FLOSS make it a prime tool for achieving local language educational software, especially for languages which are not deemed commercially viable for proprietary software vendors. These languages include not only languages from developing countries, but many small European languages like the Sami language in the Nordic countries, Catalan, Basque etc, opening new possibilities for the speakers of these languages.

Alleviation of poverty.

If the adoption of FLOSS in developing countries is done wisely, it can help stimulate indigenous software industry and create local jobs.

In the case of Government spending, the resources potentially saved from license fees can be invested in local segments of industry, which has the biggest potential of job creation, and thus helping alleviate poverty. In the case of the private sector, money saved from license fees can enhance the competitiveness of a company, inducing it to invest more in areas it deems necessary, including job creation.

Reducing conflicts

Communities of FLOSS developers and users from opposite sides in a war or other type of conflicts can not only talk to each other but can potentially open channels of communication beyond the control of government and authorities. This possibility, not realised and utilized so far, can potentially help reduce many ongoing conflicts and prevent future ones.

Enhancing independence

Developing countries can use FLOSS to reduce dependence on industrial countries, thus enhancing political, economic and technological independence. FLOSS technologies are simply there to be taken and utilized: no one is there to ask questions or create hindrances.

Meeting international obligations

Developing countries can use FLOSS to address the issues of illegally copied software, thus meeting some of the requirements of the TRIPs agreement.

Recommendations:

The potentials shown in this survey of Free (Libre) and Open Source software are well in line with the Finnish development policy aims, as they are described in "Finland's Policy on Relations with Developing Countries" (Oct 1998) and other guiding documents of the Finnish ODA. Also, Finland is identified around the world as the native country of the father of the Linux kernel, as well as some other notable figures in FLOSS communities and software development. We, therefore, consider it very proper for the Finnish Ministry for Foreign Affairs to use, promote and support Free (Libre) and Open Source Software in multiple ways.

- The preparatory process for the World Summit on Information Society (WSIS, 2003/2005) would offer a good opportunity for Finland to promote and identify with FLOSS on a world platform, and thus take advantage of the fact that in the ITC sector Finland has had, and continues to have, remarkable contributions to the rest of the world other than the NOKIA company, with its products and services, as good as they as such are.
- Given the advantages in cost, quality and stability, we would recommend the MFA to further research, survey and consider the use of the FLOSS alternative whenever applicable, or considered feasible, within the MFA ITC systems. The

Finnish NGO Coalition KEPA will during 2003 shift to Linux, and could provide practical experience to those interested. In the long run, this could lead to a welcome situation, where the Ministry itself would not only be a user of FLOSS software, but also a contributor to the code. This would also within the Ministry develop skills necessary in training developing country governments in FLOSS.

For Finnish ODA programmes, Free (Libre) and Open Source Software have a lot to offer and a lot to gain. Where Information and Communications Technologies are used as tools for efficient administration or other applications, we would recommend a step-by-step survey and consideration of the FLOSS alternatives in comparison to proprietary solutions. Further, surveying the needs and uses of, for example, database solutions in Finnish projects in different parts of the world with e-governance, e-democracy or e-education links, could well lead to a decision to develop an easily adaptable FLOSS tool, and its translation into local languages, in which proprietary software may be unavailable. Again, this would be both using FLOSS, and contributing to the development of the code.

- Even proposing a pilot project of this kind would demand surveying Finnish programmes and projects from ICT perspectives generally, and from the perspective of the present study in particular. We do not know whether any survey of this kind has been done or initiated in the MFA. However, we recommend a pilot survey to this effect to be undertaken, including a specific component looking into FLOSS alternatives.

The Finnish government's February 2001 decision-in-principle on "Operationalisation of Development Policy Objectives in Finland's International Development Co-operation" states that "in order to better harness the potential of civil society, new ways of development cooperation will be developed in cooperation with non-governmental organisations". Combining this decision with both the technical and societal potentials of FLOSS as a movement would open perhaps the most promising prospects for Finnish contributions in this field. There are at least four angles from which to start exploring the field.

- There is a need for *further research and surveying* of the ground realities concerning ICT, especially FLOSS projects and the experiences of local Civil Society organisations in a more limited selection of partner countries. As shown in the field research reports of this survey (and Chapter 5.4), it turned out that any thorough field work would demand much more time-consuming legwork than what was able to be done within the framework of this overall survey.

- There is a need of *sensitizing Civil Society organisations* in our partner countries to the potentials of ICTs in general and FLOSS in particular, both in their own work and in the empowerment of the Civil Society. Access to and publishing on the Internet with a local content in the local language, and local job creation are only a few of the opportunities here.
- There is a need of *training of the motivated* NGOs and other Civil Society organisations in the basics of computing and FLOSS. This training should combine both technical ICT/FLOSS and community empowerment aspects. There could be a combination of local training programmes, and an international training course for the key persons and local trainers, arranged in collaboration with, for example, the Linux Institute of the University of Helsinki, which is to be founded in spring 2003.
- There is a need of *community building*. The locally trained ”grassroots hackers” should be or become natural members of both their local communities and Civil Society organisations as well as the worldwide Free (Libre) and Open Source Software movements, “hacker communities”, through the training process, their natural contacts and support networks, and the existing hacker networks, e.g. Linux users groups.

Our recommendation is that all these aspects will be given a further look, from the basis given by this ground-breaking research survey. The producers of this report, OneWorld Finland and KEPA, together with their partners and international networks, would be willing to participate in developing further these ideas into more precise pilot projects in the future.

Conferences and Seminars Attended:

- “Information Society LIBRARY or SUPERMARKET” June 2002, St. Petersburg, Russia.
- Organized by Attac Finland[264] together with The Globalization Institute (Moscow) and Computerra.[265]
- Conference on The New Economy in Development[266] May 2002, Helsinki, Finland.
- Organized by the UNU’s World Institute for Development Economics Research - WIDER [267]
- World Forum on Community Networking [268] 2002, Montreal, Canada.
- Open Source and E-Governance[269] October 16-18, Washington, DC. Organized by infoDev,[270] the Cyberspace Policy Institute of The George Washington University - CSPRI,[271] and the UNDP.

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EETimes	http://www.eetimes.com/
Eric Raymond	http://www.catb.org/~esr/
eWeek	http://www.eweek.com
First Monday	http://www.firstmonday.org
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GNU FSF	http://gnu.org
Greens	http://www.greens.org/
Guardian	http://www.guardian.co.uk/
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iBiblio	http://www.ibiblio.org/
Infonomics	http://www.infonomics.nl/FLOSS
Infoweek	http://www.infoweek.com/
IPR Commission	http://www.iprcommission.org/
ITSecurity	http://www.itsecurity.com/
ITweek	http://www.itweek.co.uk/
Lawrence Lessig	http://lessig.org/
Linux	http://www.linux.org/
Linux Journal	http://www.linuxjournal.com/
News.Com	http://news.com.com/
Newsforge	http://newsforge.com/
New York Times	http://www.nytimes.com/
Nupedia	http://www.nupedia.org/
Open Source Initiative	http://www.opensource.org
O'Reilly	http://www.oreillynet.com/
Public-i	http://www.public-i.org
Red Herring	http://www.redherring.com/
Richard Stallman	http://stallman.org
Salon.Com	http://www.salon.com
Slashdot	http://slashdot.org
Softpanorama	http://www.softpanorama.org/index.shtml
The Register	http://www.theregister.co.uk/
Vandana Shiva	http://www.vshiva.net/
Vatican	http://www.vatican.va/
Washington Monthly	http://www.washingtonmonthly.com/
Washington Post	http://www.washingtonpost.com/
WIDER	http://www.wider.unu.edu/
Wired	http://www.wired.com
World Wide Web Consortium	http://www.w3.org/
ZDnet	http://www.zdnet.com/

Acronyms, Glossary, Terms.

This brief glossary has been compiled by using online sources. We appreciate the efforts of the compilers of these sources. Most important of these sources are listed below. Many thanks for compilers of these sources for making them available.

The New Hacker's Dictionary	http://catb.org/esr/jargon/html/frames.html
Salon's Free Software Project – Glossary.	http://www.salon.com/tech/fsp/glossary/index.html
Walt's Internet Glossary	http://www.walthowe.com/glossary/
Tucows Glossary	http://www.tucows.com/help/glos.html
Florida Digital Turnpike - Glossary of Terms Q-Z	http://www.fdt.net/support/q-z.html
The UNIX Acronym List	http://www.roesler-ac.de/wolfram/acro/index.htm

Term	Explanation
Adware	Software which displays advertising while running is called Adware. Usually display of advertisements can not be turned off. http://www.adware.info/ See also *freeware, shareware, spyware*
anonymous remailer:	A Net-connected computer that strips identifying information from an email message or Usenet post and then forwards it on to its intended destination. Anonymous remailers are a crucial element in crypto-libertarian freedom fighting, but are unfortunately not impervious to the powers of the state. http://www.salon.com/tech/fsp/glossary/index.html
APC	The Association for Progressive Communications
back door n.	In the security of a system, a hole deliberately left in place by designers or maintainers. May be intended for use by service technicians. syn. trap door.
CERN	Conseil Européen pour la Recherche Nucléaire (CERN) or the European Organization for Nuclear Research.
CIPR	CIPR (Commission on Intellectual Property Rights)
COTS	Commercial Off-the-Shelf
CPU	Central Processing Unit or the brains of the computer, where most calculations take place.
cracker n.	One who breaks security on a system. Coined by hackers in defense against journalistic misuse of the term "hacker." The term "cracker" reflects a strong revulsion at the theft and vandalism perpetrated by cracking rings. There is far less overlap between hackerdom and crackerdom than most would suspect.
DNS	Domain Name System, a system by which one Internet host can find another so it can send e-mail, connect FTP sessions, and so on.
DoD	US Department of Defence
DRM	Digital Rights Management also reffered as Digital Restrictions Management by critics.
EFF	Electronic Frontier Foundation
ESA	European Space Agency
EULA	End User License Agreement
fab	Semiconductor industry abbreviation for wafer fabrication facility, where wafers are manufactured. It can also be called a front end as this is where semiconductor diffusion is done. A wafer fab needs a special environment. Extremely strict criteria for cleanliness (required for the high precision processes). The air in the manufacturing rooms is 10,000 to 100,000 times more pure than the surrounding air; and the operators wear special clothing. http://us.st.com/stonline/press/news/glossary.htm
FAQ	Frequently Asked Questions
FLOSS	Free Libre Open Source Software
Freeware	See also shareware, adware, spyware
FSF	Free Software Foundation
FUD	Fear Uncertainity Doubt "Abbreviation for Fear, Uncertainty, and Doubt. A set of sales tactics employed

	by market leaders to cast aspersion on competing products. Computer products are often purchased on the basis of perceived market leadership because no one wants to get stuck with a losing product that might not be supported in the near future. The usefulness of using FUD to confuse a market is epitomized by the apocryphal saying, "No one ever got fired for buying IBM." A good example of FUD is Microsoft's tactic of pre-announcing products far in advance of their actual availability. All of a sudden the market for competing products evaporates as customers await a dominating Microsoft product." http://www.therighthandwoman.com/techdefinitions/f.htm
GIMP	The GNU Image Manipulation Program
hacker n.	[originally, someone who makes furniture with an axe] 1. A person who enjoys exploring the details of programmable systems and how to stretch their capabilities, as opposed to most users, who prefer to learn only the minimum necessary. 2. One who programs enthusiastically (even obsessively) or who enjoys programming rather than just theorizing about programming. 3. A person capable of appreciating hack value. 4. A person who is good at programming quickly. 5. An expert at a particular program, or one who frequently does work using it or on it; as in 'a Unix hacker'. (Definitions 1 through 5 are correlated, and people who fit them congregate.) 6. An expert or enthusiast of any kind. One might be an astronomy hacker, for example. 7. One who enjoys the intellectual challenge of creatively overcoming or circumventing limitations. 8. [deprecated] A malicious meddler who tries to discover sensitive information by poking around. Hence 'password hacker', 'network hacker'. The correct term for this sense is cracker.
HTML	Hyper Text Markup Language.
ICT	Information and Communications Technologies
IDA	European Interchange of Data between Administrations http://europa.eu.int/ISPO/ida/jsps/index.jsp
IP	Intellectual Property
IPR	Intellectual Property Rights
KISS Principle n.	"Keep It Simple, Stupid." Often invoked when discussing design to fend off creeping featurism and control development complexity. Possibly related to the marketroid maxim, "Keep It Short and Simple."
LDC	Least Developed Countries
LUG	Linux Users Group
MITRE	MITRE is a not-for-profit national resource that provides systems engineering, research and development, and information technology support to the US government. It operates federally funded research and development centers for the DOD, the FAA, and the IRS, with principal locations in Bedford, Massachusetts, and Northern Virginia. http://www.mitre.org/
MP3	The most popular Audio file format

NACI	National Advisory Council on Innovation (NACI), created to advise the Minister of Science and Technology of South Africa on the role and contribution of science, mathematics, innovation and technology, including indigenous technologies, in promoting and achieving national objectives. http://www.naci.org.za
NASA	National Aeronautics and Space Administration
NEPAD	New Partnership for Africa's Development http://www.nepad.org/
netiquette n.	The conventions of politeness recognized on Usenet, such as avoidance of cross-pointing to inappropriate groups and refraining from commercial pluggery outside the biz groups.
NSA	National Security Agency of the USA
OECD	Organisation for Economic Cooperation and Development
OED	Oxford English Dictionary
ogg	Free Audio file format
OS	Operating System
OSI	Open Source Initiative
OSS	Open Source Software
P2P	Peer to Peer Network
Palladium	' Palladium is software that Microsoft says it plans to incorporate in future versions of Windows; it will build on the TCPA hardware,
PDA	Personal Digital Assitant
RIAA	Recording Industry Association of America the trade group that represents the U.S. recording industry. security through obscurity n. (alt. security by obscurity) A hacker term for vendors' favorite way of coping with security holes — namely, ignoring them; documenting neither any known holes nor the underlying security algorithms; or trusting that nobody will find out about them, and that people who did find about them won't exploit them. This "strategy" never works for long.
Shareware	Shareware refers to software that is distributed at no price with the understanding that the user will probably pay for it later. Some shareware comes with a built-in expiration date (usually 30 days). Other shareware (sometimes called liteware) comes with certain capabilities disabled. In essence shareware is a marketing strategy. Shareware is called crippleware if and when it denies access to data stored or created with it after a period of time. In some case it may even cripple the operating system, requiring a reinstall. See also freeware, adware, spyware
SITA	State Information Technology Agency of South Africa
Source code	Source Code is a text, consisting of a set of instructions and statements that coders write in a language (such as BASIC, C, FORTRAN, or GPG.) which is understood by computers and humans alike. However in order to execute those instructions on a computer, the "set of instructions" need to be compiled, i.e, converted into a language which is understood only by the computer - a machine-language or **object code**. At this stage the compiled version of the "set of instructions" consists only of ones and zeroes, and become a computer program, hiding the original set of instructions — **source code** — from humans. Some more definitions of source and object code can be found at: http://labs.google.com/glossary

SPOF	Single Point of Failure
Spyware	Software that sends data back to a third party – without asking and/or notifying the user - is Spyware. http://www.adware.info/, http://www.spychecker.com/ http://www.doxdesk.com/parasite/ See also *freeware, shareware, adware*
TCO	Total Cost of Ownership
TCPA	Trusted Computing Platform Alliance an industry working group, initially formed by Compaq, HP, IBM, Intel and Microsoft in October 1999 that is focusing on improving trust and security on computing platforms, has since grown to over 150 participating companies. http://www.trustedcomputing.org/tcpaasp4/index.asp
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights TRIPS took effect on 1 January 1995. WTO Members considered as developed countries were given one year to comply whilst developing countries and transition economies were given until 1 January 2000 although for developing countries required to extend product patent protection to new areas such as pharmaceuticals, a further five years was provided before such protection had to be introduced. Least Developed Countries (LDCs) are expected to enact TRIPS by 2006 although the Doha Ministerial Declaration on the TRIPS Agreement and Public Health allowed them a further 10 years in respect of pharmaceutical products.
Trojan horse n.	A malicious, security-breaking program that is disguised as something benign, such as a directory lister, archiver, game or (in one notorious 1990 case on the Mac) a program to find and destroy viruses.
UNAM	Universidad Autónoma de Mexico
UNECA	United Nations Economic Commission for Africa
UNIX	From UNICS, a pun on its predecessor MULTICS (Unix wasn't originally designed to be a multi-tasking system) http://www.roesler-ac.de/wolfram/acro/all.htm#Unix Unix is a family of command-line-driven 32-bit operating systems. Unix is not an acronym, however the name "Unix" was half-jokingly named after an operating system developed by MIT, called Multics. Some common "flavors" of Unix include: Irix, SCO-Unix, Linux, AIX, SunOS, Ultrix, HP-UX, etc. Later, a graphical interface became available for Unix, called X-Windows. http://www.fdt.net/support/q-z.html
UNU	United Nations University
WIDER	World Institute for Development Economics Research
WWW	World Wide Web
XML	EXtensible Markup Language, the next-generation of HTML, is now viewed as the standard way information will be exchanged in environments that do not share common platforms Further information at http://xml.org/xml/aboutxml.shtml
zipperhead n.	A person with a closed mind.

1 See David Wheeler's constantly updated article Why OSS/FS? Look at the Numbers! http:// www.dwheeler.com/oss_fs_why.html#market_share
2 http://www.nobel.se/economics/laureates/1998/
3 The Oxfam Education report Chapter 1. http://www.oxfam.org.uk/educationnow/edreport/Chap%201.pdf
The full Oxfam Education Report can be found at http://www.oxfam.org.uk/educationnow/edreport/report.htm
4 http://www.wider.unu.edu/publications/dps/dps2002/dp2002-75.pdf
5 http://abcnews.go.com/sections/tech/FredMoody/moody990818.html
6 http://www.wider.unu.edu/publications/dps/dps2002/dp2002-75.pdf
7 http://www.salon.com/tech/fsp/index.html
8 http://www.iht.com/cgi-bin/generic.cgi?template=articleprint.tmplh&ArticleId=24330
9 http://fsf.org/
10 http://www.fsf.org/philosophy/free-sw.html#exportcontrol
11 http://www.fsf.org/philosophy/free-sw.html
12 http://www.opensource.org/
13 http://www.opensource.org/
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25 http://h10018.www1.hp.com/wwsolutions/linux/about_linux_hp/strategy.html
26 http://www.sun.com/linux
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29 http://nyet.org/
30 http://www.gnu.org/copyleft/gpl.html
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35 http://www.iprcommission.org/text/home.htm
36 http://www.wto.org/english/tratop_e/trips_e/t_agm0_e.htm
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52 http://www.oreillynet.com/lpt/a/2641
53 http://www.gnupg.org/
54 http://www.sicherheit-im-internet.de/themes/themes.phtml?ttid=20&tsid=199&tdid=122&page=0
55 http://www.gnu.org/philosophy/savingeurope.html
56 http://www.bustpatents.com/
57 http://news.com.com/2100-1017-961803.html?tag=fd_top_6
58 http://news.bbc.co.uk/1/hi/uk/2327327.stm
59 http://patft.uspto.gov/netahtml/srchnum.htm
60 http://www.infochangeindia.org/AgricultureItop.jsp?recordno=1815&section_idv=10#1815
61 http://www.conagrafoods.com/
62 http://www.iatp.org/
63 http://www.greens.org/s-r/24/24-24.html
64 http://www.gnu.org/licenses/licenses.html#GPL
65 http://www.opensource.org/licenses/
66 http://www.opensource.org/licenses/mozilla1.1.php
67 http://www.opensource.org/licenses/apachepl.php
68 http://www.gnu.org/philosophy/bsd.html
69 http://www.law.nyu.edu/benklery/
70 http://www.members.optushome.com.au/brendanscott/papers/freesoftwaretco150702.html
71 http://techupdate.zdnet.com/
72 http://www.gartner.com/
73 http://www.ggpl.org/
74 http://www.un.org/Overview/rights.html
75 http://www.naturalstep.org/
76 http://www.fas.org/irp/world/pakistan/isi/
77 http://news.bbc.co.uk/1/hi/world/south_asia/1750265.stm
78 http://www.opensource.org/licenses/nokia.php
79 http://emoglen.law.columbia.edu/
80 http://www.law.columbia.edu/
81 http://www.oreillynet.com/pub/wlg/1168
82 http://www.gutenberg.org/
83 http://www.redherring.com/insider/2002/10/roast-pig-copyright-102202.html
84 http://lessig.org/
85 http://www.oreillynet.com/oscon2002/
86 http://www.oreillynet.com/lpt/a/2641
87 http://eon.law.harvard.edu/openlaw/eldredvashcroft/
88 http://www.ibiblio.org/gutenberg/etext95/bhoti01.txt

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98 http://www.fastcompany.com/online/59/mcewen.html
99 http://www.nupedia.org/
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125 http://promo.net/pg/
126 http://12.108.175.91/ebookweb/discuss/msgReader$1362
127 http://texts01.archive.org/dp/
128 http://www.lysator.liu.se/runeberg/
129 http://www.eldritchpress.org/
130 http://www.bartleby.com/sv/welcome.html
131 http://www.baen.com/library/
132 http://texts01.archive.org/dp/
133 http://www.nupedia.com/about.shtml
134 http://www.nupedia.com/policy.shtml
135 http://www.gnu.org/licenses/fdl.html

136 http://opencontent.org/openpub/
137 http://www.nupedia.com/about.shtml
138 http://www.wikipedia.org/
139 http://www.w3k.org/
140 http://ccrma-www.stanford.edu/~jos/od/
141 http://www.wikipedia.org/
142 http://www.oed.com/
143 http://www.studyb.com/swcse/oed-p/p2-history.html
144 http://www.wired.com/wired/archive/11.02/dirge.html
145 http://www.riaa.org/index.cfm
146 http://crypto.stanford.edu/DRM2002/prog.html
147 http://www.acm.org/sigs/sigsac/ccs/CCS2002/ccs9_program_details.htm
148 http://www.ram.org/ramblings/philosophy/fmp/freemusic.html
149 http://www.workbench.net/~jack/copyright.html
150 http://www.visi.com/~contra_m/antithesis/v2n4/ant_v2n4_copyright.html
151 http://www.lunkwill.org/pubwiki/wiki.cgi/CreativeLibertyLicense
152 http://www.eff.org/IP/Open_licenses/eff_oal.html
153 http://www.openmusicregistry.org/
154 http://www.opensource-music.com/
155 http://www.lunkwill.org/pubwiki/wiki.cgi/OpenMusicWiki
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158 http://www.linux.org/
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168 http://www.apache.org/
169 http://www.mozilla.org/
170 http://www.openoffice.org/
171 http://l10n.openoffice.org/#l10n
172 http://l10n.openoffice.org/#i18n
173 http://www.koha.org/
174 http://www.sendmail.org/
175 http://www.postfix.org
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204 http://eu.conecta.it/
205 http://eu.conecta.it/paper/
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211 http://www.turku.fi/
212 http://www.helsinginsanomat.fi/arkisto/juttu.asp?id=20020309TA10
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217 http://www.theregister.co.uk/content/4/25566.html
218 http://interviews.slashdot.org/article.pl?sid=03/02/20/
1544245&mode=nested&tid=117&tid=123
219 http://www.oss.gov.za/docs/OSS_Strategy_v3.pdf
220 http://peru.cpsr.org/modules.php?op=modload&name=News&file=article&sid=29
221 http://www.unesco.org.uy/informatica/consorcio/menezes-en.html
222 http://www.geneva2003.org
223 http://www.softwarechoice.org/
224 http://www.comptia.org/
225 http://www.bsa.org/
226 http://www.bsa.org/usa/policyres/admin/2002-06-10.130.pdf
227 http://www.theage.com.au/articles/2002/07/20/1026898931824.html
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235 http://www.itsecurity.com/dictionary/nsakey.htm
236 http://www.cypherspace.org/~adam/hacks/lotus-nsa-key.html
237 http://www.cypherspace.org/~adam/
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239 http://news.zdnet.co.uk/story/0,,s2081591,00.html
240 http://news.bbc.co.uk/1/hi/business/2023127.stm
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242 http://www.nsa.gov/selinux/
243 http://www.sans.org/rr/linux/SELinux.php
244 http://www.hevanet.com/peace/microsoft.htm
245 http://www.openoffice.org/
246 http://www.eweek.com/article2/0,3959,5264,00.asp
247 http://www.wired.com/news/technology/0,1282,45737,00.html
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252 http://news.com.com/2100-1017-900588.html
253 http://www.enron.com/corp/
254 http://www.public-i.org
255 http://www.public-i.org/dtaweb/
report.asp?ReportID=487&L1=10&L2=10&L3=0&L4=0&L5=0
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266 http://www.wider.unu.edu/conference/conference-2002-1/conference2002-1.htm
267 http://www.wider.unu.edu/
268 http://www.globalcn.org/
269 http://www.egovos.org/oct2002.html
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271 http://www.cpi.seas.gwu.edu/

Free and Open Source Software in Africa

25 October 2002

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Table of Contents

1. Introduction

Africa is largely considered to be a developing continent. A thousand odd years ago, the greater part of Africa was unaware of the developments in Europe and Asia. By the time the Western civilisations explored deep into Africa, they also colonised[1] the better part of Africa. The major colonialist were the British, Dutch, French and Portuguese. The colonisation did not take into account the natural borders between different ethnic groups. Colonialism has a broad research base, most of which is available via the Internet. It is not the aim of this document to go into the depths. All that is important is that the reader understand that colonialism was responsible to a very large extend for the current situation the African continent finds itself in, namely a poor, developing continent, plagued by war, famine, AIDS and dept.

With this background, it should be obvious even with the first thought how FS/OSS can benefit struggling economies in Africa[2]. Unfortunately large commercial software companies are trying to expand into Africa and there are fierce competition often hidden from the casual observer. The reader will see early on in this paper what the issues are surrounding commercial software in Africa and how FS/OSS can have a positive influence.

Having world class software is one thing. Having the computers and infrastructure to run it, is a totally different thing. The reader will discover the status of Information and Communication Technology (ICT) in Africa and will also see what possible benefits FS/OSS brings along in this area as well.

To get an even better view of the current FS/OSS situation in Africa, it is also necessary to understand what the penetration into the market place is of FS/OSS, and how various Governments react to the use of FS/OSS. We will also look into the use of FS/OSS per sector, including Government, NGO, Private Sector and Education.

Probably the most difficult subject matter in this paper is the exploration of FS/OSS projects that has being launched in Africa. We have used various techniques and sources to try and get a picture of what was going on. The most challenging aspect of FS/OSS is that there really are no geographical boundaries in the Internet age, and it is very difficult to choose criteria when defining a Project as an “African” project.

Finally we look at the conclusions of how FS/OSS can benefit Africa in various areas, including help enhance democratization, provide access to knowledge, help alleviate poverty, contribute to sustainable development.

2. A brief overview of the overall ICT usage in the Africa

The general picture all over Africa is somewhat modern, to high-tech ICT centers in the primary metropolitan areas of each country, with very little or non-existent infrastructure in the rest of the country, especially rural areas.

There are some exceptions to the above scenario, and a good example is South Africa, which has a fast and ultra high-tech telecommunications infrastructure. The cellular market took of and broke all expectations[3] . South Africa has 13 million of the 23 million cellular users in Africa[4] . The SA mobile market was also recently boosted by the grant of a third cellular license.

South Africa is also one of the view countries in Africa that has coverage in most part of the country.

Land line based telecommunications is also a major problem in Africa. These are not many people with the privilege of having a telephone, and those that have pay relatively high prices for communications. Typically, less then 20% of a countries population have a land line. Again, South Africa is a major exception, with large percentage of the population having access to landline based communications.

The Internet Access data also reflects the findings of the previous topics. A lot of progress have being made in the last 5 years to connect Africa. South Africa again absolutely dominate the statistics in terms of people connected and hosts connected. Access costs is not the lowest in SA, but is realistic in the current economical climate:

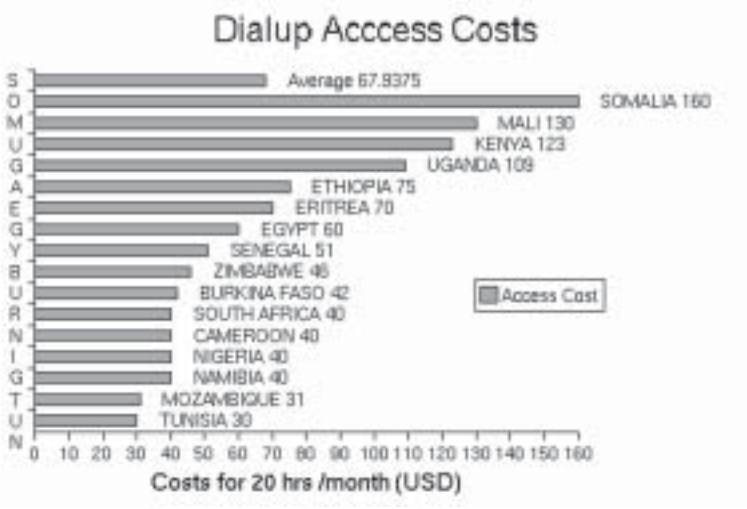

Illustration 1Internet Access Costs

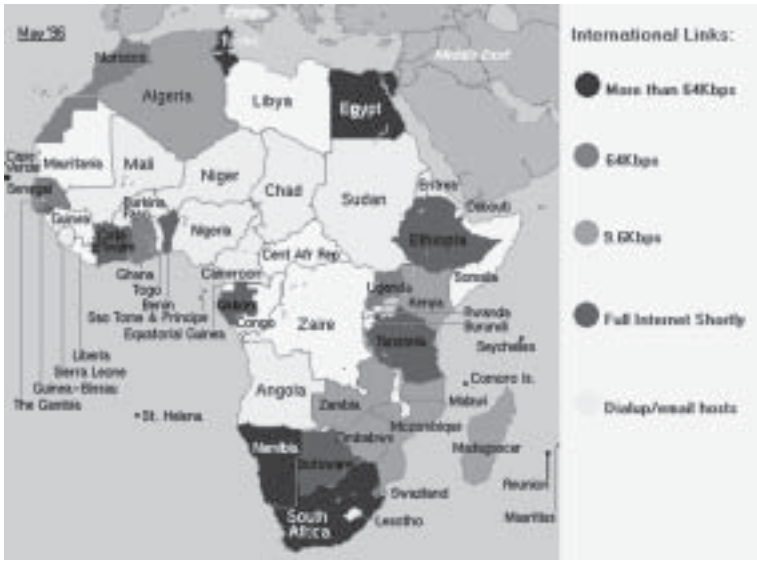

Illustration 2Internet Access - 97/98

Illustration 3Internet Access - 01/02

Note: All Internet related data and graphs was obtained from http://www3.wn.apc.org/africa/afrmain.htm - permission to use graphs included in Attachment D.

Also refer to Attachment A, which is a copy of the original text of the above mentioned web page.

Also refer to the excellent research done by NITA[5] , here attached as Attachment C.

Another area which will become increasingly important in the future is Internet Exchanges in Africa.

It seems Southern African countries (Namibie and Botswana to name two) use SAIX (South African Internet Exchange) for routing, although I am not sure if they use SAIX exclusively. For the rest, all other African countries use 3rd party Internet Exchanges, which means that mail to your neighbor travels about 4000 to 10000 miles if not further. The only other reference to an exchange I could find was one in Kenya : http://www.kixp.net – apparently the local telecom wants them shut down, because they have monopoly rights. This is the typical African way. According to Mike Jensen[6] there is no other exchange points in Africa.

We have already mentioned the relative low bandwidth available to African countries, and now including the facts about Internet Exchange facilities, it is clear that Internet Connectivity remains a big challange in Africa. Even the simplest of tasks, like downloading a Linux Distro ISO's, can take days - 3 CD's over 64 kbps! That is IF you are the only one using the Internet for that time period.

Distances to POP sites are also a problem. Only the large cities have a somewhat developed infrastructure to deliver POP access to those who can afford it. The only exception is South Africa, where there is very little physical limitation on your location to connect to the Internet. Telkom SA also offer ISDN services, and ADSL (up to 512kbps) are now installed in 1700 pilot sites. It seems that broadband access for the average man in SA is on the horison.

At this stage it seems that wireless communication should be high on any agenda when talking communications in Africa. The catch is to deliver it affordable enough to connect schools and tertiary educational institutions to the Net. Unfortunately, monopolistic telecoms and the various government's lack of commitment to deregulation, communication costs will remain high for some time to come.

3. FS/OSS Usage in Africa

This is always a difficult item to quantify. The primary reason being that FS/OSS does not need to be registered any where to be counted. The best we can do in these circumstances is to take "educated guesses" as to the market penetration of OS/FSS.

The first obvious indicator is that of Internet hosts statistics. According to netcraft[7] , roughly 60% of the Internet is hosted on the Apache Web Server platform, which is OSS. Remember that the Operating System in this case is irrelevant, as we look at the use of Software in general, which include both OS and Application layers. According to the Internet Software Consortium[8] less then 300 000 hosts are from Africa. Given

the 60% ratio above, it translates to about 180 000 Internet hosts in Africa running some form of OSS.

Unfortunately Netcraft can't look "behind the scenes" which means we don't know what software runs the DNS and Mail servers, although we might assume the bulk of ISP's will run tried and tested software like Sendmail and BIND.

Another approach is to use the official Linux Counter web site, located at http://counter.li.org/ which also has an interesting page on estimations of Linux users world wide[9] . The ratio between machines per registered user is 0.8 to 1. Interesting is the fact that the site estimates the number of Linux users at 18 million, although they only have 135251 registered users in their database (as on 25 October 2002). This is a factor of 133. Therefor, if we take the amount of registered users in African countries and multiply it by 133, we could assume that the result should reflect the number of Linux users in Africa. This however is a very inaccurate way and is based entirely on various assumptions, and therefor should not be considered an accurate method at all.

From a South African perspective we can see that the interest in FS/OSS is on the increase, though. Some indicators are government[10] and Private sector drives in Open Source Software. The South African Government is actively participating with the community in defining a OSS strategy for the future. The SA Government uses SITA (State Information Technology Agency) as it's primary IT supplier, and SITA has indicated there commitment to OSS in at least one document[11] .

In other countries there are also indicators in the media about FS/OSS driven projects, with special references to allafrica.com[12] and itweb.co.za[13] .

On the site allafrica.com articles range from HP's commitment to support Linux in Africa to a brilliant article on OSS in action[14] . The article mentions Linux's role at the World Summit for Sustainable development. At the summit, the entire media center was running 100 thin-clients off 6 Linux servers, which in turn authenticated via one sign-on server. Interestingly the whole center was managed by only two support staff. This is a typical example of FS/OSS in action in key areas.

As can be expected by now, the major drive of OSS in Africa comes from South Africa. There are various private sector companies that provide OSS based solutions. Although the services offered are still commercial, the Total Cost of Ownership (TCO) can be up to 15 times less then with the use of other commercial software solutions.

Also interesting to note is the fierce FUD (Fear, Uncertainty, Doubt) campaign that especially Microsoft Corporation[15] has launched in South Africa. Microsoft has recently announced that it would supply free software to 32000 schools in South Africa[16]. The gesture might look good for the short term, but there are several issues here:

- Eventually, Microsoft will no longer support the deployed software, which means schools will have to upgrade. There is no indication at this stage if Microsoft will continue to deliver free software to schools, and it's a risk the schools have to live with.
- Current Microsoft software require a reasonably fast computer with a lot of memory and hard drive space. OSS OS's can run on much older and cheaper hardware. In the long term this should save millions of Rands in TCO.
- Although Microsoft supplies the OS for free, it is still unclear which, if any, other software will also be supplied. The only positive point here is that there are many other OSS applications that will also run on the Microsoft OS platforms, notably OpenOffice for Windows.
- Microsoft has also indicated that it would not reduce it's OS costs[17] to compete with FS/OSS solutions. Given the volatile status of most of Africa's countries, it will be increasingly difficult to budget for future upgrades and license renewals.

In the not to distant past, a great factor in Africa when it came to the deployment of FS/OSS solutions was support. Times have changed, and more companies in Africa (especially South Africa) now offer Linux support. A number of good examples include Computer Associates[18] which announced recently the addition of 23 Linux based applications[19] and Obsidian Systems[20], which not only provide the only RHCE program in South Africa, but also committed to consultancy services. SuSe has also official representation in South Africa[21].

Good news is that there are evidence that FS/OSS are used to the greater benefit all over Africa. There are individuals that seems to have taken the task on themselves to promote the use of FS/OSS in various parts of Africa. For example, Wayne Marshall now lives in Guinea, West Africa. He wrote a very interesting article in Linux Journal[22] about his experiences, and we encourage all to read it.

There are also reports from Kenya[23] and Nigeria[24] where various projects are running to help poor communities bridge the digital divide with the use of FS/OSS.

In summary, we can conclude that although it is very hard to get actual usage figures, there are sufficient evidence that FS/OSS is used on a relatively large scale in Africa, especially when it comes to Internet Connectivity (infrastructure) and Educational Projects.

On a slightly different note, if we look at FS/OSS usage per sector, we see a very similar pattern all over - everybody is testing the playing field. South Africa it seems is the only country in Africa that has a structured Government body to investigate the use of FS/OSS, inside Government and in general. Although the future of FS/OSS seems bright, no official policy have being committed by any sector in any country.

South Africa also has organised Linux organisations that help promote the use of FS/OSS in SA. An excellent example is the Linux User Association (LUA)[25] which

will hold it's first Linux Seminar on 8 November in Johannesburg, South Africa. During this seminar, various speakers will introduce representatives of the various sectors to Linux based solutions that they can implement now. The seminar also has a somewhat hidden agenda in that it will demonstrate that South Africa has the capacity to drive Linux technically in the field. Support was always an issue when it came to FS/OSS, especially since the developer community is largely oversees.

4. FS/OSS Projects in Africa

Africa is a poor continent with a largely non-existent infrastructure. For this reason it is not at all easy to start any meaningful IT project, and many challenges are faced in the initial phases which often lead to the Project failing, or not progressing as far as was hoped. Another problem is funding for many of the existing projects. Funding is used for renumeration for certain individual's services, i.e. Programmers, network specialists, translators, facilities and day to day running of the project.

Africa is diverse and big. Searching for projects that meet FS/OSS criteria can be difficult. We used Google to see if we could identify such projects in Africa. The first search[26] returned 1610 results, and here are some interesting projects we found:

- Translate.org[27] (South Africa) - Translation effort to make Linux available in South Africa's 11 official languages. [**Status:** Mature ; **Maintainer:** dwayne@translate.org.za]
- Openlab (South Africa & Nigeria) - Thin client solutions using LTSP [**Status:** Mature ; **Maintainer:** Edward Holcroft]
- There are also several project under the The Shuttleworth Foundation[28] , namely:
  - SchoolTool : An administrative application that can be implemented in schools [**Status:** Discontinued]
  - Linux Libraries Project : ICT Library Access Points [**Status:** Pilot]
  - Linux Lab Project : Setting up of Linux based thin clients in schools [**Status:** Pilot]
- Radio E-Mail[29] (Guinea) - Remote networking with high-frequency (HF) radio and Dan Bernstein's qmail. [**Status:** Mature ; **Maintainer:** Wayne Marshall]
- Linux wireless router[30] (Ghana) - Linux WiFi Router brings in Subscribers for Ghana's Largest ISP [**Status:** Mature ; **Maintainer:** Dan DiNicolo]
- Rwandan Database Project[31] (Rwanda) - Teamed with AlphaSoft employees, Mr. Smith will be helping design database software for the Gacaca project. Gacaca is a traditional form of Rwandan justice currently being used to try those accused of genocide and other war crimes. [**Status:** Start-up ; **Maintainer:** David Smith]

- Vim in Uganda[32] (Uganda) - Vim is Charityware. You can use and copy it as much as you like, but you are encouraged to make a donation to orphans in Uganda (In vi, type :help Uganda for more info). [**Status:** Mature ; **Maintainer:** Wayne Marshall]
- There are also indications that the Mozambique Police make use of Linux, but we could not find any references on the web about this yet.

A key aspect of the success to FS/OSS in Africa must surely be communication. Most of Africa's inhabitants are illiterate, even to the point where they never attended any form of formal education. If any kind of technology is to succeed in Africa, it will rely on communicating in the language of the people. Someone who took up this challange is Dwayne Bailey from translate.org.za who gave us a very interesting interview[33] via e-mail. Some Interesting facts came to light during this interview:

- Translate.org.za is committed to the completion of the translation of all 11 official South African Languages for the Linux OS, in particular with regards to the K Desktop Environment (KDE), OpenOffice and Mozilla.
- Although they received funding, they require additional sources to guarantee sustainability.
- A major obstacle in the Mozilla and OpenOffice translation efforts seems to stem from the fact that no easy to use system exists to add additional language modules. In fact, neither Mozilla nor OpenOffice make use of Language modules, and all the language specifics are hard coded as part of the source code.

Often we forget that older PC's can also help with the deployment of FS/OSS solution. That is exactly what the people at Netday[34] does. We recently had an interview[35] with them, and realised just how easy it is to get some new life out of older PC's. Combined with the Linux Terminal Server Project (LTSP) and OpenOffice, they provide all the necessary tools to enable the teaching of computer literacy in schools.

Interesting also to see how the Translation Project may later "integrate" with the LTSP in Schools project (Openlab) as it will make only sense to deliver solutions in the mother tong of the learner. There is a lot of potential here and it seems it's only matter of financing in the way of a brilliant possible partnership.

Some interesting projects in Africa, in general include a wireless communications project in Africa run by Italians from The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy. Another fine example to drive OSS in Africa comes from Kenya where Githogori wa Nyangara-Murage holds free computing seminars to young programmers in his office. Although it is not a "project" in the true sense of the words, he is planting the seeds in programmers of the future about the why's and

how's of FS/OSS development in the future. It is easy sometimes to miss these contributions, but they are never the less equally important to develop and encourage the use of FS/OSS as a viable alternative to expensive commercial software.

There is also increasingly more people "trying" OSS, especially when it comes to the Linux OS. It would truly be amazing to have a resource that tracks all the FS/OSS projects in Africa.

5. Projects that can benefit Africa

Over the last 4 chapters a lot was said. For this chapter we will give names to each individual challenge and then talk about priorities of each of these challenges. This chapter is divided in two parts. Part I deals with the possible FS/OSS projects that may benefit socio- economic development in developping countries. Part II examines the role these projects may play in socio-economical development.

To summarise the individual challenges:

- ICT Infrastructure
  - Internet Exchange's
  - POP Sites
  - Bandwidth
  - Hardware
  - Software
- Communications
  - Language
  - Support
- Education
  - Facilities
  - Electricity
  - Hardware
  - Software
- Applications
  - Government Requirements
  - NGO Requirements
  - Education Sector Requirements
  - Private Sector Requirements

At this point it is also important to realise that this framework may also be applied somewhere within the broader framework for NEPAD[36], which aims to develop Africa economically and technologically to address the issues of poverty, infrastructure etc. All efforts will be fruitless if there are no infrastructure to build upon. The greater part of Africa, North of South Africa, does not even have electricity except in major cities. Building an ICT infrastructure should be at the top of the priorities list. Added to this is the establishment of much more POP sites from where centers can connect to the Internet. As far as Sectors are concerned, the individual Governments of each country should be encouraged to develop the Infrastructure and the Developed countries and other organisations should support these efforts financially as well as technically.

The main benefits in the earlier terms of this effort will be two fold:

- Governments will be able to drastically speed up internal communications throughout their geographical region. Earlier access to information, will lead to earlier actions, thus creating a snowball effect to make day-to-day governance more practical and people/problem focused.

- Private sector will have a basic infrastructure to support the newer technology based business processes. This will eventually lead to reduction in operating costs. Another spin off is that business can now operate in locations previously impossible, and therefor create jobs.

There is a warning sign in this early stage though: we should prevent Africa becoming a dumping ground for old technology no longer required in developed countries. If this prevention mechanisms are not in place, the digital divide will never be bridged. When the mechanisms are in place, also the developed countries will benefit in the long term, as the requirements should taper off, as the technology gap closes.

Software requirements in this stage should include:

- Sufficient Database applications to help Governments with:
  - Population Data (census)
  - Geographical Data
  - Criminal Records, Legal and related Data
  - Environmental Data, including weather, dams, rivers, game etc.

- Data sharing applications to enable all sectors to share information. Many of the software requirements can be fulfilled now, pending the ICT infrastructure. These applications include:

  - Web server (Apache)
  - Mail and News (Various available)
  - Voice over IP (VoIP) which can reduce communication costs.

- With the above two main points, lies a third very important point which is security. Not only must the software be available, but people need to be educated in doing their work securely, and at the same time not holding back on sharing information.

The software should be available in the relevant language, and as seen from an earlier chapter, the key design issue for software developers will have to be to make it as easy as possible for additional Language "modules" to plug into the various software components.

To this regard, many PHP Content Management Systems, like phpNuke[37] gives an excellent example of how a Language module system works. Translators can then focus on translation, rather then programming.

The last two paragraphs to some extends also address the second area in the framework, namely communications. Added though is two additional components:

- Communication channel to the project leaders
- Communication channel to the application support staff

Once again, the communication channels will rely on the progress of the ICT infrastructure for success.

Education is THE challenge in Africa. The only way Africa will become economically self sufficient by any measure is if the people receive formal education. There are several problems contributing to the lack of proper educational programmes in Africa, including lack of Infrastructure, lack of qualified teachers/instructors and a non-existent support structure. There is also very little libraries, and access to libraries is a problem.

In South Africa there are pilot projects that are looking at ways to address access to libraries issues. It is to early in this stage to have a sufficient measurable analysis, but it is definitely an area worth looking into.

It will probably take some time to get children committed to programmes where they can learn to read and write. Once this hurdle is passed, however, the next challenge will be to build on their knowledge. The use of computer centers can be of a great help in this area. Hurdles in this phase include lack of electricity and computer hardware and software.

If we assume the infrastructure challenges, including electricity supply, have being met, the next phase will logically be the installation of computer hardware and software.

Computer hardware in combination with FS/OSS may not be as big a problem as many might think. It has being demonstrated at several instances that especially the Linux Operating System is ideally suited for running on older hardware via the Linux Terminal Server Project. There are also efforts from several individuals to produce a "cluster"[38] like environment within LTSP - In other words, although all machines are low spec, they all participate in CPU cycles and RAM pools.

Software that the schools are actually going to use is another point to look into. In general the big challenge is to have local language support built into the applications. As you might remember, this is closely related to the translation project at translate.org.za. The ideal situation will be to have applications that make use of a pluggable language system. This is rather broad, and ideally we recommend that there should be a working group formed to develop a pluggable language module protocol. This protocol can then be used in any future application development process and in theory should also be platform independent. A great example of how such a system can work, is to look at PHP based websites, like phpNuke (also mentioned earlier in this document).

Moving on to the applications them selfs. Various sectors have common and individual needs. If the FS/OSS community can understand the needs, better applications should follow suit. We belief the base FS/OSS applications required by all sectors already exists, although not yet well known. The major application groups covered are:

- Office Suite - OpenOffice
- Internet Suite - Mozilla
- Graphics Applications - The GIMP
- USB Device Support - There are sufficient support for cell phones (especially Nokia phones), digital cameras, web cam's and scanners.
- File and Print Sharing Utilities - The KDE Desktop Environment has integrated File and Print sharing to a very high level of efficiency and ease of use.
- Backup and Recovery tools - KDE has ark, which understand almost all archiving formats. There are also several other utilities available to assist in creating and restoring backups.

Per sectors, some special needs that may arise include:

- Government Requirements:
  - Large database application to handle the various data sources for population etc. (also mentioned earlier).
  - Applications to assist in voting. As many already know, Africa is well known for corrupt elections, and a proper election system based on IT, with strong audit facilities built in would be a great benefit to aid free and fair democratic elections. To some extend, South Africa[39] has shown what help IT[40] can be in elections, although the effort was not a FS/OSS project.
  - Health Management System to help with the associated administration of hospitals.
  - Criminal and Justice Database Applications can contribute a lot to more effective law enforcement in Africa. Many countries in Africa have poor record keeping for criminals, and corruption is also in the order of the day.
- NGO Requirements:
  - General Management software, including financial applications designed to fit the needs for the various types of NGO's
- Education Sector Requirements:
  - Again, management systems is a great requirements. One project exists in South Africa, namely the SchoolTool[41] project, but unfortunately it seems the project has being suspended in it's current format. It is unclear what the direction in the future will be.
  - Educational software on the various grade levels and learning area specific. There is PLENTY of work to be done here.
  - Examination, Reporting and results/progress database system. A big problem in Africa is corruption with regards to qualifications, especially Matric qualifications. Some countries have a system implemented, but a FS/OSS solution might encourage other countries to join the effort. Cross reference and verifications can then be also done more reliable than what currently is the case.

- Private Sector Requirements:

  – To start a business in Africa is not easy. To aid in lowering costs, businesses needs low cost financial applications. Some software exists[42] but is not yet on par with the competing commercial software. A lack of standards in database formats also give rise to compatibility issues between packages, and this should also be addressed.

  – Affordable point of sale software, integrating with a variety of financial back end applications.

The greatest challenge is to let the FS/OSS developer community know about the various needs. Another project that could also greatly benefit Africa is to concentrate on the education of IT students at tertiary level on the OSS philosophy, and to encourage them to use FS/OSS tools in the application development process. The spin off could be that Africa will eventually create it's own FS/OSS software to fulfill the needs, boosting in turn sustainable development.

But an even greater question may be to ask what all this projects will eventually achieve? Why do we need to drive FS/OSS in the developing countries? It's the answer to these questions that will serve as motivation for many developers and project leaders around the world. To put this into perspective, let's start with the influence FS/OSS projects may have on governance.

Many African governments are well known for corruption and lack of accountability. The deployment of Information Technology can to a great extend address these issues. Of course it can be argued that the government's IT department can still manipulate data. This is true, but there are also other types of data the government may not want to manipulate. There is a vast amount of data that can be stored on databases and there are several ways in which to retrieve and represent the data. Countries like South Africa already has a capable and technically advanced IT infrastructure in it's government departments, but other African governments rely still on paper based systems for even the trivial types of data for example voter roles.

Deployment of IT solutions in government is not only about control of data, but also about accessibility of data. Leaders today always require the latest information before they can make informed decisions.

All in all, FS/OSS can already deliver a vast amount of solutions to cater for government's IT needs. From database solutions to web servers to e-mail. The net results will probably lead to a more organised system of government and leaders capable of making better choices based on better quality information.

Coming back to more economical terms. A great desire for many Africans is to live on the same high standards as many Americans and Europeans do. Unfortunately this has alluded millions of people for very long. The question of whether FS/OSS can help elliviate poverty in developing countries, specifically Africa, can be addressed from various angles. Probably the best way to approach this scenario is to understand what can be done in general to neutralise poverty, and then see how FS/OSS can play a role in this process.

A great contributer to poverty in Africa is a lack of jobs. No jobs means no income for the most of Africa. Yet, Africa does have a lot to offer. The question then arises as to why there is so many potential, but nobody is taking it up? In this case it boils down to poor educational systems in most parts of Africa. Children should be taught to think like entrepreneurs. They should develop life skills and for those who have very specific talents, there should be resources available to help them develop their special skills.

Unfortunately the above scenario is further hampered by a lack of infrastructure in terms of Electricity supply and telecommunications - especially in rural areas. Given Africa's fast spaces, this is really a big challenge.

So, the solution it seems then lies in developing infrastructure, open learning institutions and start providing the support structures to get the children educated. FS/OSS can help in every aspect. We have already seen how the lack of infrastructure can be addressed. With the help of other "wireless" technologies, it seems that in the near future cables will be something of the past in any case. Next is the physical IT equipment in the schools, which again has being demonstrated to have viable solutions in terms of terminal servers running LTSP and OpenOffice. Since any older generation PC can be used (486's in many cases), the rich countries can easily supply the bulk of the "unwanted" older technology. Even newer PC's will also be welcome, as was proven in Nigeria.

Of course the supply of infrastructure, the building of learning institutions, supply and support of IT solutions and all other hidden little aspects all have one thing in common: it creates jobs. At first, probably a lot of assistance will be required from western countries in terms of skills. One of the aims of the newer projects should be to carry over those skills to the local people. This empowerment will eventually leed to to a sustainable job market in the various sectors.

With job creation, a number of other markets will arise naturally. As people start to earn more money, they would want to uplift their status. This brings us to the commercial applications of FS/OSS. Some tools exists today to help the small business owner to manage his business. There is some room for development though, and many opportunities exists in this market.

It is also interesting to note that FS/OSS can be used from basic schooling, right into the market place and government arena. This was an old tactic of especially Microsoft Corporation in the eighties, and it payed of well. The idea is that people who learn about tools/technology at learning institution will naturally be more comfortable with similar tools in their professional capacities later in life. Unfortunately there are certain guidelines that need to be in place to guarantee flexibility and growth. A typical guideline should be the early adoption of Open Standards, even if certain groups decide to go a full commercial path. Sticking to open standards will ensure a number of things, including:

- Backward compatibility
- Inter systems compatibility
- Transportability

This is especially true in an era where information can be accessed via computer, cell phone and PDA.

6. The use of FS/OSS in lowering TCO

When looking at FS/OSS solutions as a method to boost or help develop developing economies, an obvious question should be if FS/OSS does in fact reduce TCO. There are many theories and FUD about this issue, but very little real life examples. From a developing Country's perspective, the best example I could find was from the University of Zululand, South Africa. Soren Aalto gave a interesting presentation in this regard at the first Linux User Association (LUA) meeting[43] held on 8 November 2002.

In his presentation, Soren showed how Linux was saving the University about ZAR300000 per year, which is huge taking the total student count of the University is only around 6000.

Question is how can OSS save on TCO? The first obvious area is in percurement costs. You can not really go less then nothing! Other reasons include:

- Better use of resources through QoS (Class Based Queuing) and Proxy Services
- Linux runs on cheaper hardware to produce the same performance (in this case, a HP-UX system was replaced with 4 Dell Servers)

- Maintenance contracts are expensive. By harnessing the power of the OSS community and it's ability to provide high quality help in short time, the University saved ZAR70000 per year on the HP-UX maintenance contract.

- By making use of OSS and adding own custom features, the University created additional revenue streams in terms of a "pay-per-use" Internet service. This service is currently available to all 6000 students and can be accessed through the 400 PC's in the various computer labs.

It is unfortunately not only sunshine and roses all the time. Some hurdles remain at the University, including:

- The lack of a local hot line for even faster solving of problems

- Trial and error approach to some projects give rise to LONG development cycles

- The state of IT Security is questionable, due to lack of an understanding and knowledge on the subject

It seems that although the implementation of FS/OSS can reduce TCO, it is not without problems. We are still of the opinion however that the use of OSS, especially Linux, should be encouraged. As the use of Linux rises, more companies are offering services. These services are not always free, but do come at a cost still far below what other commercial applications costs.

One of Soren's remarks sums it all up: "[it is] not about technology but about solving problems. [in certain cases] saving money is a secondary factor."

In all their examples, OSS could solve the "problem" better then the commercial alternative, and as an added bonus do it cheaper.

7. Conclusions

A lot of evidence exists to demonstrate the success of FS/OSS implementation in Africa. Unfortunately it is also true that a lot of hurdles remain to expand FS/OSS projects on the continent, including ICT and general infrastructure.

Examples of projects that really impact the FS/OSS use in Africa was also find, namely the efforts of the Zuza Software Foundation that include translate.org.za and LinuxLab.

The use FS/OSS in sponsored projects in Africa should solve problems. We have

demonstrated how current FS/OSS projects does solve everyday problems and promote good governance, job creation, poverty relief and in the end contribute to the develloping economies of Africa. One of the focus areas should be to create an IT environment that will help Africa cator for it's own needs.

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A special thanks to:

- Niranjan Rajani who guided me in the right direction from time to time and who organised the flight tickets etc.
- Cesar Brod & Frederick Noronha which were always eager to give advice / input
- The Finish Government who sanctions this research
- My wife - who stood by me through all the hard work.

1 Definition of colonialism: http://www.dictionary.com/search?q=colonialism&r=67
2 http://allafrica.com/stories/200210250200.html
3 http://www.cellular.co.za/stats/statistics_south_africa.htm
4 http://www.cellular.co.za/stats/stats-africa.htm
5 http://www.ntia.doc.gov/reports.html
6 http://www.itweb.co.za/sections/internet/2000/0011281102.asp
7 Http://www.netcraft.com
8 http://www.isc.org/ds/WWW-200207/index.html
9 http://counter.li.org/estimates.php
10 http://www.oss.gov.za/
11 http://www.oss.gov.za/docs/ossreportv2.pdf (Attachment B)
12 http://allafrica.com/technology
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28 http://www.tsf.org.za/
29 http://www.linuxjournal.com/article.php?sid=6299 & http://www.bushmail.co.za/
30 http://www.linuxjournal.com/article.php?sid=6017
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33 Attachment E
34 http://www.netday.org.za
35 Attachment F
36 http://www.nepad.org/
37 http://www.phpnuke.org
38 http://www.ltsp.org/contrib/ltsp-om5r3c.html
39 http://www.elections.org.za/
40 http://www.elections.org.za/Achievements.asp
41 http://www.tsf.org.za/projects_schooltool.html
42 http://www.linuxcanada.com/quasar.html
43 Attachment G

Liberation Technology for the Lands of Diversity?

Free Software in Asia
By Frederick Noronha

"If the current stylistic distinctions between open-source and commercial software persist, an open-software revolution could lead to yet another divide between haves and have-nots: those with the skills and connections to make use of free software, and those who must pay high prices for increasingly dated commercial offerings."

— Scientific American

AS THE PLANET'S largest continent (44,579,000 sq km or 17,212,000 sq miles and occupying some 30% of the Earth's land with a poulation of 3700+ million), Asia includes 47 countries and assorted island dependencies. It is home to the world's tallest mountain, Mount Everest in Nepal, at 29,035 ft (8,850m), and the world's most populated countries, China and India. The continent's lowest point is in the Dead Sea, Israel/Jordan, at 1,286 ft (392m) below sea level.

THE ASIAN REALITY

This is a region where resources are scarce and infrastructure weak. Hints of this reality come out in essays like http://www.bytesforall.org/2nd/shahidul1.htm. This was written some three years back (April 1999) by Dhaka-based renowned photographer and Bangladeshi campaigner Shahidul Alam. Modem prices may have since declined — quite drastically, in some cases — but the overall reality remains.

"(In Bangladesh and South Asia) there were two basic tools that have engineered and enforced this domination, technology and language.... With technology and language both being owned by the wealthy, class divides are intrinsically linked to this hegemony. How then do we see the most dominant of modern cultures, the Internet? The ownership of the Net is almost entirely Northern globally, and exclusively urban and elite locally. The hype surrounding the Internet and the top down approach with which it is meant to provide deliverance, hides the politics of corporate ownership, the way in which this media is controlled, and the simple fact that for the majority of the world the Internet doesnt exist, and for many others in the South, it is barely effective," Alam has argued.

He points out that language forms the biggest barrier to computer literacy in Bangladesh, and "when less than 15% of the population has access to electricity, and a far smaller fraction owns computers, it is clear that only the wealthy will have access to this technology. Here, a modem costs more than a cow."

But his was not a message of hopelessness and pessimism. As he put it: "Yet this technology and this associated language both exist. We must stare this dual hegemony straight in the face, but we cannot, dare not, let this technology pass us by. To find creative routes to turn this technology to our benefit is our greatest challenge."

"The Internet can be a subversive tool. It remains the only medium which gives scope — relatively inexpensively, and without the support of the gatekeepers for a lone voice to be heard," was his argument.

The Asia-Pacific Internet Handbook by Dr Madanmohan Rao (see <http://www.tatamcgrawhill.com/digital_solutions/madan%29> gives a snapshot of the Internet economies of Japan, South Korea, China, India, Australia and Singapore. For each, it seeks to "flesh out" the shape of the regional Internet economy via the following "Eight Cs" of the Internet economy (parameters which all begin with the letter "C"): connectivity, content, community, commerce, capital, culture, cooperation, and capacity.

Rao traces the growth of the Internet in Asia in four episodes — the birth of the early computing infrastructure in Asia (1960-1980), the rise of the early Internetworks, the academic Internet, and the Asia-Pacific Network Information Centre (1980-1995), the rise of the commercial Internet and datacom deregulation and early wireless networks in Asia (1995-2000) and the rise of emerging Internet powerhouses of Asia, including the countries covered (starting c. 2001).

"With a population of over three billion people, the 23 countries comprising the Asia-Pacific region represents a rapidly growing and lucrative segment of the global Internet market," argues Rao. But there are questions over how evenly spread the potential is. Can Japan — leading the West in a number of trends — be treated in the same basket as other lagging-behind parts of Asia?

There are signs for both hope and pessimism. Take the case of India itself:

- India is an extremely content-rich country with a very free press climate, unlike some of its other Asian counterparts: the news, culture, entertainment, sports and medical knowledge base of this country can easily sustain dozens of portals and vortals for a content-hungry consumer marketplace consisting of domestic users, NRIs (non-resident Indians, numbering 20 million in over 120 countries around the world), international businesses, and enthusiastic Indophiles.

- For a country of a thousand million-plus, just 0.7 million modems were sold in 2000-01.

- India is likely to experience, perhaps as no other country has, an explosion of cybercafes in the new millennium. Many people can afford Rs 30 (around 70 cents — now the figure is one-third that) to check their e-mail for half an hour every few days in the local cybercafe instead of owning their own PCs and Internet accounts.

  (The Asia-Pacific Internet Handbook Madanmohan Rao (Ed.) Tata McGraw-Hill 2002 ISBN 0-07-044519-2 Pp 370.)

Floss, a Natural Fit?

In this setting, GNU/Linux is achieving some interesting — if recent — growth. Unfortunately, this is not widely being reported across the rest of the global Free Software community for a variety of reasons, some discussed below.

Clearly, this talent-rich, resource-poor region is finding Free/Libre and Open Source Software to be well suited to their varied needs. Not only is it affordably priced in most cases (except for highly customised industry-oriented solutions, which could be as costly as their proprietorial software counterparts) but FLOSS enables speedy learning, the ability to deploy across a number of computers without facing any restrictive 'copyright' restrictions that block even purchasers of software from copying a software solution from one PC to another in the same establishment.

Michael Dunham (http://weblog.kestrelworks.com/archives/000102.html) argues that there "is no question that Linux is a natural fit for developing countries with educated, talented entrepreneurs but limited capital".

He also argues that FLOSS licensing has presented a wealth of adaptable software that with localization and enhancements can drive technology adoption in business and homes" and that Asia has taken GNU/Linux to its heart and a great deal of innovative work is being done to simplify installation, reliability, and desktop acceptance. He offers specific examples from countries like China, andn its Shaolin Microsystems.

Contributions Coming in

Not just that, Asians are beginning to contribute to GNU/Linux in an increasingly significant manner. In the next few years, the contribution of Asians to GNU/Linux is going to become increasingly apparent.

In the runup to the 2002 Free Software awards, there was a discussion on this issue, with some pressing for the need to recognise this contribution. Suresh Ramasubramanian https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Csuresh@hserus.net%3E points to the contribution coming in from the Japanese — Itojun for ipv6, Yukihiro "Matz" Matsumoto for Ruby, Hiroyuki Yamamoto for developing Sylpheed. Then, there are also some Chinese though not necessarily located in China — such as H.J.Lu (libc, gcc, etc). Ariya Hidayat from Indonesia is known for his work on KDE. Currently, there are more Japanese contributions being noticed, but this is likely to changed as Intenet penetration and possibilities for collaborative functioning grows elsewhere. (See http://linuxinindia.pitas.com/ for an illustrative example of contributions coming in from India.)

GNU/Linux is already reporting some interesting deployments in the populous cash-strapped countries of the region. In India, it is no coincidence that a number of low-cost PCs hitting the market are now opting for Free Software-based solutions. China has already worked out national 'distros' of GNU/Linux, that are in the local language and also meet national concerns in terms of security. Pakistan has seen government initiatives to boost the role of FLOSS, so as to become less dependent on proprietorial software, with it accompanying allegations of 'piracy' against countries with low incomes and poor conversion rates against the dollar. Thailand is finding GNU/Linux a useful solution in its Schoolnet program.

There are some interesting facts about where diverse GNU/Linux 'distros' (or 'distributions', as the uniquely combined set of programs with differing qualities) come from.

Distrowatch.com, the site offering a whole lot of information on varied 'distros' available, points out that while nearly a quarter of all distributions were initiated in the US, with Canada coming a close second, some Asian countries were also making it to the big-league in terms of distro releases.

"Slightly more unexpected is to see Japan on the third spot, but other nations in the Far East, especially China and Korea also seem very keen on creating Linux distributions," it pointed out.
(See http://www.distrowatch.com/stats.php?section=origin, accessed 23 Dec 2002)

In all, some eight 'distros' came from Japan. These included Holon, LASER5, Media Lab, Miracle, Omoikane, Plamo, Turbolinux, and Vine. China had six — Blue Point, Cosix, Dynasoft, Red Flag, Red Office, and Xteam. Four came from South Korea — Hancom, MIZI, NuxOne and WOW. Hong Kong had two, Chinese 2000 and Thiz. Even India had as many, Atomic and ELX. Indonesia (Merdeka and WinBi) and Taiwan (CLE and Linpus) also came up with two distros each.

Of the 10 major distros (www.distrowatch.com) only four however had 'Asian language support', and that too limited to four languages — Chinese, Japanese, Taiwanese and Korean. See http://www.distrowatch.com/top.php?1

According to David Legard of IDG News "The open-source Linux operating system is being enthusiastically looked at by companies in Asia's developing nations like India, China, Korea and Malaysia, but is less popular in wealthier countries such as Japan and Singapore."

Different Regions, Diverse Roles

Different regions in Asia seem to be playing diverging roles when it comes to fitting into the global partnership that is GNU/Linux. Web-sites of LUGs in countries like Singapore and Pakistan suggest that users in these networks seem to be currently seeing themselves more as 'consumers' of internationally-generated information coming out of the international FLOSS 'market-place'. (See, for instance, www.singalinux.com or www.linuxpakistan.net.) Such a positioning could be dependent on the software base of the country involved, maturity of GNU/Linux skills, or even the number of years for which countries involved have had widely-available access to the Internet. Some countries like India, have grown significantly in terms of their contribution to GNU/Linux since Net access first became widespread as late as in August 1997, i.e. a little over five years ago.

In the Middle East, GNU/Linux is reported to have recently caught on with major universities in Jordan, Egypt, Saudi Arabia, Bahrain and other countries adopting it. Also in business, oil and gas companies in the Gulf, some banks and other companies are adopting it, according to reports by Zeid Nasser. The Arabization of Linux will drive this growth. IBM recently finished Arabizing the major components required to run GNU/Linux on the client side and is also working on Arabic support for Motiff and X-term, the Word component of Open Office and the web browser, Mozilla.

Among GNU/Linux fans there have also been Arabization efforts. A grass-root development group, called Arabeyes, has been developing Arabic support for KDE and users can already read/write in Arabic, adds Nasser. (Source: Nasser, Zeid. "The Penguin catches on in the Middle East". The Star 20 July 2002. http://star.arabia.com/article/0,5596,179_5119,00.html%29

Arabeyes is a meta project that is aimed at fully supporting the Arabic language in the Unix/Linux environment. It is designed to be a central location to standardize the Arabization process. Arabeyes relies on voluntary contributions by computer professionals and enthusiasts all over the world.

Recently, Arabeyes announced the release of Katoob version 0.3.0 Katoob is a small text editor for *NIX operating systems, based on the GTK+ library 2.0. It is pointed out, for instance, that Mohammed Damt imported his 'gnomequran' application to the repository, which is based on Gnome libraries and headers. (See http://www.arabeyes.org/%29 Nadim Shaikli of the Arabeyes project has been featured as an 'Arabization Contributor and Evangelist (ACE)'.

In a recent Jordan-conference Isam Bayazidi, of the Arabeyes Project, made his impact by underlining the goal of their work. Arabeyes is a group that provides Arabic support for a growing number of FLOSS projects. "Isam is your basic Linux user and Open Source project leader, same as others of his ilk all over the world: young, smart,

dedicated, and happily building a productive international development team and user base without any help, pay or recognition from government, academia or business," comments Robin Miller. (See http://newsforge.com/article.pl?sid=02/12/24/0349250&mode=thread&tid=19 accessed on December 25, 2002)

In a comment on Newsforge, responding to the above article, Isam points out that the while he himself is Jordanian, the Arabeyes project has members who are "spread all over". As he put it, "until now, Arabeyes is no-land based".

The State of Open Source (SOS) website seeks to give an update of "Open Source activism around the world". Some of the countries it covers in Asia include Cambodia, China, India, Korea, Malaysia, Pakistan, Taiwan, Thailand and Vietnam. See http://www.gnacademy.org/twiki/bin/view/SOS/WebHome

Issues this site talks of include activism, education, gender, hardware-recycling, health, public administration, science, software localization, and Third World develoment, among others. This gives a hint of the relevance of FLOSS to the majority world.

Not Too Visible

Free Software in Asia doesn't get much written about, but slowly it is getting noticed globally. In a recent column, the Brave GNU World focussed on this issue. (See http://www.gnu.org/brave-gnu-world/issue-45.en.html%29

It noted that on July 10, 2002 the "Free Software Initiative Japan" (FSIJ) was founded, to promote Free Software in Japan and "create the basis for a future FSF Japan or FSF Asia". FSIJ's chairman is Prof. Masayuki Ida, who was acting as the "Vice President Japan" of the Free Software Foundation North America for a long time.

To provide an impulse for Free Software in Japan, the FSIJ organized the "Free Software Symposium 2002" in Tokyo on October 22 and 23. It is considered as the first event of its kind in Asia, and speakers from China, Thailand, Japan, Singapore, Germany, Italy and the USA were invited.

Besides the more technically oriented presentations about Debian, the HURD project or RedFlag Linux, the Chinese GNU/Linux distribution, there were also speeches about the larger issues of Free Software and the situations in Asia and Europe. Also discussed were issues of better international cooperation for internationalization of programs and documentation as well as the possibility of a solution oriented database for Free Software. Even though these issues would certainly not be solved in two hours, some practical ideas were found that are now being pursued by mail. A follow-up event is being planned sometime in early 2003 in Thailand.

Contrary to the presumption that GNU/Linux is "almost unknown" in most countries of Asia, the facts could be otherwise. Generally, FLOSS takes on the shape of a 'silent revolution' — spreading across modems linked to cyberspace and small brotherhoods (the lack of women participation is an issue yet to be seriously addressed, more so in Asia).

One such example is narrated by Robin 'Roblimo' Miller during his visit to the Hashemite Kingdom of Jordan in 2002 for a workshop. Miller was told by the workshop's organiser bear in mind while preparing the presentation "that Linux and Open Source were almost unknown in Jordan."

Narrates Miller: "I told them this was not so; that the only two major countries in the world from which I had not gotten email from Linux users were North Korea and Afghanistan, and that there was a small but rapidly growing group of Linux and Open Source devotees in Amman, the Jordanian capital city where the conference was held." Before departure from the US, he was already in touch with several Linux users. They were in the process of organising a local LUG (Linux Users Group). "Linux use is not always visible to officialdom," notes Miller. (See http://newsforge.com/article.pl?sid=02/12/24/0349250&mode=thread&tid=19 accessed on December 25, 2002)

Difficult to Notice, Hard to Understand

Like the legendary story of the six blind men and the elephant of 'Hindoostan', understanding the role that GNU/Linux is actually playing is both difficult and hard-to-notice. There are hints coming up from all over that GNU/Linux has excited the imagination of a generation — who are suddenly finding the rules of the software game drastically being changed. For a change, in their favour.

(In http://www.ecademy.com/node.php?id=2882 Doc Searls points out that GNU/Linux is "about the end of the software business as we know it, and the beginning of whatever replaces it". He says the "business we knew wanted software to be expensive, high margin stuff. It wanted to lock customers into dependencies. And it wanted to hold on to its position as the paradigmatic hot business category, the kind of business high-rolling investors would help drive to huge successes in the stock market.")

One could argue that GNU/Linux's impact — in Asia in particular — is difficult to gauge primarily (though not solely) due to the following reasons:

- Change is coming up at the grassroots. This is scattered and difficult to report. It doesn't fit into the typical paradigm of what makes 'news'. Yet, in examples where efforts have been made to document the impact of GNU/Linux, such compiliations have suprised many. (See this author's http://

linuxinindia.pitas.com./ Just before this exercise was undertaken, it was assumed that nothing much is happening in India. Documenting this effort has, arguably, itself proven to be a self-fulfilling prophecy, because it has emboldened others on seeing how much is happening, and also encouraged more to try their hand at it.)

- In many cases, countries which are seriously into GNU/Linux may not be inclined to package their successes. This could be because their primary mode of communication is in languages other than English. For example, a lot is happening in countries like China, Republic of Korea, Thailand, etc but very little seems to be reported on this at an international scale.

- For a continent where survival issues are still to be successfully vanquished, questions of communication remain a distant priority.

- Impact of the change could also take time to be felt. A generation of young techies is just now discovering the potent combination of low entry-barriers into technology, sharing across what has been called one of the largest collaborative projects of humankind, and the possibility to share in (utilise from and contribute to) the skills of other coders. In countries like India, the recent visit of proprietorial software world leader Bill Gates, and the attempts of companies like Microsoft to win over students to their products, indicates the seriousness which this 'threat' could shape the world of software in the years to come.

We are already seeing hints of how the birth and spread of GNU/Linux could positively impact the region of Asia, specially in a developmental sense. Below are some surmises, based on guestimates of where the trends are taking us. While there is no hard data to currently substantiate the same, it could plausibly be argued that these indicators are more than clear from the experiences that we've seen (outlined in the earlier-submitted India report and also below). Some of the lessons we could draw are:

- Free/Libre and Open Source Software will drastically make software and computing open to a far wider segment of the people. While 'free' does not refer to the price of software (but rather to the 'freedom' aspect), it is inevitable that the very structure of the GPL licence would ensure that free copying and improvements to the software would make prices become far more affordable compared to phenomenally priced proprietorial software. (1)

- Because of its not-for-profit-alone orientation, GNU/Linux is already spurring off initiatives in which there is simply no money, but which are vital for Third World development in the long run. Take the case of GNU/Linux's involvement in education and localisation — two very critical issues for the Third World. There are interesting examples from Thailand, India and elsewhere. More significantly, the lessons learnt and ideas are being increasingly replicated in other regions. Such initiatives have spurred proprietorial software companies to look closely, and promise funding, to fields like education, where till the late 'nineties they were reluctant to even offer discounts for school software purchases. (2)

- Ideas of sharing knowledge and skills have a subversive way of spreading to other areas, apart from software. We are already seeing this happen in the field of education (where the talk of sharing educational resources is catching on), and also in fields like journalism.

Free Software Foundation founder Richard M Stallman puts it aptly when he says: "The most fundamental way of helping other people is to teach people how to do things better, to tell people things that you know that will enable them to better their lives. For people who use computers, this means sharing the recipes you use on your computer, in other words the programs you run."

- Free software products like Mailman have helped social campaigners to network and raise concerns of developmental importances. Other tools like PostNuke or PHPNuke have shown their ability in giving non-technical but socially aware citizens the chance to communicate and share their ideas.

- At a technical level, the low entry barriers for entry into a 'transparent' OS like GNU/Linux makes it easy for a wider segment to equip themselves with the required skills. Even in countries like India which have earned bulk of their software earnings from proprietorial software exports, the potential from this field is seen as a largely positive tradeoff.

As the impact of FLOSS spreads, new aspects are emerging. As Geert Lovink https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Cgeert@desk.nl%3E recently argued in the context of an e-mail discussion, "free software potentially only gives freedom to those users who are capable of programming, who know how to write code and want to change the source code of a program. For non-technical users this freedom is a nice idea but meaningless. With the rise in users,

coders are a diminishing group of people. Normal users may expect other 'freedoms' or values."

Lovink believes it might be misleading to interprete the 'Free' in 'Free Software' by using the metaphor of 'free speech not free beer'. Says he: "These metaphors are not only confusing but also running out in a time when free software really becomes popular and transcends its original scene where every user by default was a programmer. It is time to take the non-technical user into account. That's the 'cultural turn' the free software movement is heading towards."

There are other issues which come up. Free Software talks about four freedoms. Freedom 0, 1, 2 and 3 (the freedom to run a program for any purpose, to study how a program works and adapt it to your needs, to redistribute copies, and to improve the programe and release your improvements to the public, See 'Free as in Freedom: Richard Stallman's Crusade for Free Software', p 121). Perhaps it would make sense to include a fifth freedom, more so from a cash-strapped Asian perspective. This could be roughly put as below:

Freedom of users to get access to computing power at a price that does not exclude them simply because they don't have the resources to pay.

Of course we need not misconstrue the word 'free' to mean zero-price here. But the fact that GPL'd software is copyable without unfair restrictions on sharing it with your neighbour, surely means that it mostly cannot/will not be priced at astronomical prices, as in the case of proprietorial or non-free software. This may not seem important from a programers point of view. But from a user's point of view, it is. More so in the price-sensitive countries which we live in.

It is great that the idealism of the Free Software programmers eggs them on to write world-class software, often (or in many cases) without thinking of financial returns alone. That they share the fruit of their work with others is also great. So is the fact that this helps spread the process for creation and sharing of knowledge. But, given the involvement of Asia so far in the Free Software campaign (largerly still as users, but hopefully increasingly as producers) the question could be asked: where does the user fit into this whole project?

On another issue, one could argue that the ideals of Free Software need to be extended to other fields too (including journalism, where the potential for earning has increased vastly in some countries of Asia in recent years, but increasingly journalists are feeling choked by their inability to express themselves freely).

International Organisations

International organisations are increasingly looking at the potential of FLOSS for development. At the time of compiling this report (late 2002) there is currently a specific proposal being worked on to set up a Free/Libre and Open Source Regional Resource Center (OSRRC), that could act as a centre of excellence for FLOSS in the Asia-Pacific. This is being suggested by APDIP, a section of the UNDP.

APDIP feels that there are a great number of people working on all these questions and issues and that what is simply needed is to find out who these people are, what are their primary interests and strengths, and to help some of them get on with the job. They have voiced an interest to facilitate this, coordinate, share info, help with networking people.

For this, they are proposing a small secretariat of sorts, within the UNDP.

In early December 2002, Steven Sy https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Cssy@ph.greenpeace.org%3E wrote in (personal email) about Greenpeace-Asia's shift over to Free Software. (See interview in annexure). Groups like Oneworld.net are open to convincing about the need to spread the ideas of Free Software among NGOs in India (personal email, January 2003).

International organisations like the Samaritan office have shifted to Free Software. This both gives a hint of the acceptance of the value system of Free Software in the alternate/development world, and also the potential for cutting costs with this tool. It could be argued that the donor dollar, Euro or Yen saved on proprietorial software, could go towards the core function of such organisations — i.e. development, howsoever defined. See http://news.bbc.co.uk/1/hi/technology/2543173.stm (accessed Dec 6, 2002)

It has been argued that "for charities such as the Samaritans new technology can be a vital part of the service it offers but there is little money to spend on it." As Mike Hermon, Information Systems Manager at Samaritans has been quoted saying, "One of the great challenges for computing in any charity is to provide more for less". Currently 80 of the Samaritan's 203 branches across the UK and Republic of Ireland offer an e-mail service for people wanting to talk about problems in their lives. It is vital that the e-mail system is reliable, safe and maintains total confidentiality. The charity chose Linux vendor Trustix alongside IBM to provide network security. What applies to a Western charity could apply to many development organisations and others working in the Third World.

Organisations like the SDNP (in Bangladesh and elsewhere) have also been using FLOSS for their work. See http://www.sdnp.undp.org/ (accessed on November 11, 2002)

Increasingly, global organisations have been paying attention to the potential of FLOSS. UNDP's APDIP (Asia-Pacific Development Information Programme) is currently working to finalise a project centered on FLOSS. UNDP (together with infoDev, the Cyberspace Policy Institute of The George Washington University) was one of the parties that organised a conference on Open Source for E-Government, held in Washington, DC on October 17-18, 2002. See http://www.egovos.org/

Unesco's Free Software portal is another good example, at http://www.unesco.org/webworld/portal_freesoft. In Finland, a project supported by the Finnish Foreign Ministry is underway. This will be looking at the "Significance of Free/OpenSource Software for Developing Countries". This project's goal is to find out, evaluate and analyze the extent of use of FLOSS, especially some of its most significant and popular projects; GNU/Linux, Apache, Mozilla, OpenOffice etc. in the developing or Third World countries. It will also look at its possible impact on economies, societies and lives of these countries.

Regional Initiatives

Prof. Jin Hyung Kim https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Cprof_jkim@joins.com%3E in a personal mail says: "It is very timely to organize an Asian Forum to promote Open Source. We are also seeking international collaborations, particulary with Asian friends." He recently spoke out to support the proposal of forming Asian Open Source Forum as suggested by Niibe Yutaka https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Cgniibe@m17n.org%3E. Kim is professor in computer science department at KAIST, and serves several Korean organizations and committees related FLOSS. He is chairman of Free and Open Source Movement, a member of Open Source Forum, a vice chair of Korea Linux Association. "For the last three years, we have runned a valuntary training program teaching Linux to high school teachers," he adds.

In Korea, according to Prof Kim, there are several forum and associations promoting FLOSS activities, and working together to foster FLOSS practice. "Some government supported research institutes studied the potential advantages of Open Source. We are holding many seminars and meetings annually. Most of our activities are local, except some congress and conference participations. Documents are written in Korean," he adds.

Niibe Yutaka https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Cgniibe@m17n.org%3E explains that in July 2003, The Free Software Initiative of Japan was established as a non-profit organization under the Tokyo Metropolitan Government. In October 2003, a seminar on Free Software was organised

(http://www.fsij.org/press/release-021111.txt). Says Niibe: " I work for Japanese Government, specifically, METI to deploy Free Software, but this is just a small and weak activities (not yet decided for the budget). You can see our survey to persuade people to deploy Free Software at (in Japanese): http://oss.mri.co.jp/

> "There are many domestic Linux (unfortunately they say "Linux" as the operationg system name, which should be called GNU/Linux) users groups here and there (I think it's more than 20 in Japan). You can see the activities at (mostly in Japanese): http://jla.linux.or.jp/ The central one is Japan Linux Association, it's web site is at: http://jla.linux.or.jp/

In addition, Japan has a non-profit organization called CICC (http://www.cicc.or.jp/). There are some plans for CICC to hold a symposium in Thailand on "Open Source Software" together with NECTEC in Thailand.

Asia and the Desktop

Jack Bryar, writing on Newsforge at the site below http://newsforge.com/article.pl?sid=02/05/01/150201&mode=thread&tid=23 makes an interesting argument about the role of Asia in the FLOSS world of the coming years.

He argues that as commercial Linux vendors in the United States and Europe refocus their businesses on enterprise software and back-end systems, they are ignoring a potentially huge desktop marketplace starting to gather serious momentum in much of Asia and the Third World.

"(Focussing on enterprise software and backend systems) generates a revenue stream for companies that badly need it, it may be a strategic mistake in the long term. This is because outside of Europe and North America, Linux is beginning to emerge as a serious desktop alternative. As I've noted in a number of previous columns, countries in Africa and Asia are adopting Open Source with a speed that could eventually have important consequences for domestic software and systems vendors.

"Countries such as Malaysia, Singapore, and Taiwan are important hardware equipment makers, but with a few exceptions they have not had much of a foothold in the software business. That could change, and desktop Linux could be the vehicle that allows these countries to emerge as Linux powerhouses in a few years.

"In Malaysia, a number of universities are trying to lead a major initiative toward nationwide adoption of Linux and away from a dependence on bootlegged proprietary software. Malaysia's National Computer Confederation has developed a plan led by its Open Source Special Interest Group that includes programs for the country's end users, systems administrators, developers and company managers. Planners recently concluded a forum that attracted local representatives of high tech companies such as

Hewlett-Packard, Sun Microsystems, as well as local technology developers and the Malaysian Academy of Science.

"In China, Taiwan and Singapore, the widespread use of computers has lagged well behind a number of western countries, in part because of the complexities of typing thousands of Chinese language characters. Chinese keyboards are far more complex than their western equivalents and developers have struggled with a variety of alternatives including pen-based systems, speech-to-text, or requiring typists to key in transliterations of Chinese words using the roman alphabet. It has been an area where Microsoft and other proprietary systems developers could have taken an important lead, but haven't.

"One of the best input systems is called ChangJie, a Chinese character input system created by Chu Bong-foo, a prominent figure in the East Asian IT community. Recently Chu demonstrated that he had adapted ChangJie for China's Red Flag Linux distribution. The resulting platform, nicknamed Chinese 2000, is being promoted in both mainland China and Taiwan as the first really viable alternative to Microsoft on Asian desktops.

"In much of Asia, the only real competition to Linux-on-the-desktop comes from bootlegged Microsoft products. According to the Business Software Association, over 50% of the software used in Taiwan is pirated. Estimates in Hong Kong and mainland China run as high as 80%. In Malaysia, a prominent government department involved with enforcement of copyrights recently revealed that many of its desktops were running on bootlegged software.

"This is starting to change. Local governments are struggling to rein-in illegal versions of Windows products. And as easier-to-use desktop applications-based programs like ChangJie start to come on stream, the price of these localized applications may prove to be irresistible. Sources claim that Chinese 2000 with Kai Office 6.0 applications will sell for around $50. A legal package of equivalent software from Microsoft will sell for about $725.

"Widespread adoption is still some years away. According to a spokesman for Malaysia's Open Source Special Interest Group, Linux faces a number of perceptual barriers. Microsoft's disinformation campaign about Open Source's reliability and consistency has been particularly effective in discouraging early adoption by many local companies and government agencies. In addition, many companies in the region have yet to wake up to Microsoft's vulnerability to hacking and viruses. A recent poll by NISER , Malaysia's Information and Communications Technology Security and Emergency Response Center found that over 70% of the companies surveyed had not conducted any formal evaluation of the security of their IT systems, and according to NISER spokesperson Raja Azrina Raja Othman, the few who have conducted security audits conducted them as a result of government mandates.

"Observers have warned that the lack of security awareness is at odds with the country's announced ambitions to become a global Internet banking center and service bureau for the financial services industry. As security awareness grows, however, this sector is expected to become a critical adopter of Open Source. Linux has already gained a prominent toehold in Asian academic circles. Important parts of the Malaysian and Chinese economy, notably the healthcare sector, have become prominent early adopters of Linux. The region has begun to develop an vibrant, if embryonic software development and service infrastructure based on Open Source technology.

"And, if it succeeds in Asia, both Linux-on-the-desktop, and the companies that have developed it, could show up in the West in a few years. Will European and American Linux vendors be ready to compete for the desktop? Or will they continue to be focused elsewhere?

Earning from FLOSS

An Indian firm, Sanisoft, run by paediatrician-turned-software guru Dr Tarique Sani has propounded its own model for doing "open source business". It says: "Having an open source business model does NOT mean that we will give away/open the code written for our clients, nor does it mean that we will do your work for free."

It says Open Source developers can make money by being selling support, earning from 'accessories' that go with the software, selling a product initally and then making it free, among a total of eight ways in which to earn from Open Source. See http://www.sanisoft.com/openmodel.php

Needless to say, such perspectives and approaches have implications for countries seeking to earn out of software, the software producers themselves, and also so-called developing societies hoping to benefit from affordably-priced software.

Asia, Next Hotbed?

Robin 'Roblimo' Miller suggests, quite confidentaly, that Asia will be the centre of (GNU)/Linux development in 2003. (See http://newsforge.com/newsforge/02/12/27/0259244.shtml?tid=11 accessed Dec 29, 2002.) He points out sometimes to episodic evidence which however could be telling. In Amman, Jordan he found a computer store displaying a laptop loaded with the ThizLinux distribution from Hong Kong. It had an Office Suite called Hancom Office, coming out of South Korea — including an Arabic version, which neither StarOffice nor OpenOffice were ready to offer.

"Asia is the next Linux hotbed," argues Miller. After its birth in Finland, growth with KDE in Germany and close ties to the Norwegian TrollTech, France-based Mandrake, SuSE from Germany and the US-based Red Hat, with a high percentage of Europeans developers writing FLOSS software, Miller sees the centre of gravity shifting possibly to Asia.

Says he: "But a growing number of "next generation" Linux development is taking place in Asian countries, ranging from South Korea at one end of the continent to India diagonally across the continent's map, with China rising hugely — in the Linux sense — right in the middle of it all.

"Africa and the Middle East are discovering Linux in a big way, but don't have nearly as much computer/IT infrastructure or as much computer-oriented education available as (some parts of) China or India — or South Korea or Vietnam or Malaysia. Or Japan, where it looks like Linux will soon be adopted as a preload operating system by computer manufacturers on all kinds of gear, not just on the server and workstation levels as we see 99% of the time in the U.S. and Europe."

Miller reports seeing an "increasing amount" of FLOSS development and related activity coming out of Asia, almost all of it in Chinese, Japanese, Korean, and other Asian languages. He also refers to the "increasingly amount" of activity coming out of India "most of which is in English rather than in one of the many local Indian languages". Considering that middle-class Indians, in a sub-continent sized country which has 18 official 'national languages', often opt to speak in Hindi or English among themselves (the latter is predominant in higher education and outside of North India where Hindi or some variant of it is a 'lingua franca') this is not very surprising. At the regional level, of course, most discourses would be in the regional languages, though in the field of technology, this often switches to English.

"(T)his is my one and only NewsForge prognostication about Linux and Open Source in 2003: That some of the biggest advances we're going to see in the next year will come from Asia, not Europe or North America," says Miller.

But others have differing perspectives. One 'anonymous reader' challenged this view on Newsforge, commenting: "It is simplistic and patronising to lump Asia as a whole in one unfounded prediction. There is little in common to Japan and Jordan, China and Turkey, or India and Taiwan - culturally and economically. The significance of Linux adoption in different countries in Asia depend on their influence and size (as an economy). If Japan goes Linux, that's a huge, revolutionary change. If Jordan goes Linux, it's like a small school district in the US going Linux. I.e., an interesting tidbit and nothing more (and the same applies to Syria, Egypt and other backwater dictatorships in this region)."

Commented another reader: "You're generalizing too much...

"The main parts of Asia you're looking at are Japan, India, and maybe Russia. The

others aren't any real players. Why? Simple. Japan has always been booming in the tech sector. Information technology is one of their specialties. They teach basic English in their schools, so the language gap isn't really much of a problem. India has a culture of high standards and discipline. Many great thinkers have come out of there, and the ones I've seen in computer-related fields are extremely adept in mathematics and algorithms. Russia has always had extremely ingenious people in informational technology. The fact that most of them use lower-end systems compared to the rest of us because of the huge difference in cost of having a more modern computer would make them ideal candidates for open source programming. As for the rest of the other places, forget it. You'll have people USING Linux, but it doesn't mean they'll CODE anything for open source. China -> forget it, most of those people are more concerned with using the freebies, not actually writing them. It should be noted that since Chinese is such a different language from English, language has ALWAYS been a huge barrier in preventing people from learning. Korea -> possible that some people will code there, this area is rising in the technology sector, but there isn't any large amounts flowing out of there yet... (potential, but I wouldn't count on it for this year). Middle East areas, Arab nations -> forget any of the middle east areas. If they're smart enough and motivated enough to code, they already left that general area. They might use it, but that's about it. Then the rest of the other areas are pretty much on the low end of the technology scale and are more concerned everyday life than computers." (See http://newsforge.com/comments.pl?sid=28543&thres hold=0&commentsort=0&mode=thread&tid=&pid=37987#37992)

GNU/Linux,

A Countrywise Survey of Available Information

Attempting a survey of this kind is a hazardous task, not the least because of the disparate nature of Asian society, the wide use of languages other than English, and the lack of international reporting on this region (more so on technical issues such as Free Software). Within these limitations a profile of Free Software in some countries of Asia — depending on the availability of information — is undertaken below.

Countries for which information was not available included Armenia, Azerbaijan, Bahrain, Bhutan, the British Indian Ocean Territory, Brunei, Cyprus, Indonesia, Iraq, Kazakhstan, Kuwait, Kyrgyzstan, Laos, Lebanon, Maldives, Mongolia, North Korea, Oman, the Russian Federation, Qatar, Syria, Sri Lanka, Tajikstan, Turkey, Turkmenistan, UAE, Uzbekistan and Yemen.

Below are some cases that indicate the prevalence of GNU/Linux in Asia:

Afghanistan

Afghanistan, till recently, was listed with North Korea as one of the few countries in the world with no known FLOSS-related activity.

The recent war over Afghanistan brought the issue to the fore. Interestingly, the FLOSS issue came up as a conflict between proprietorial and non-proprietorial software. (See http://www.dclug.org.uk/archive-Nov01-May02/msg00213.html)

The Cold War over software resulted in reports alleging that while the Taliban "prefer" products of the Microsoft giant (the official Website www.talibanonline.com was reported to run under Microsoft-IIS/5.0 on Windows 2000) the emerging 'good guys' in the battle, then ran their Opposition website www.afgha.com on Apache 1.3.20 on Debian GNU/Linux.

In another debate, a Microsoft news release (http://www.microsoft.com/windows/Embedded/community/experto/authors/voxtec.asp) argued in October 2002 that a useful product called the VoxTec Phraselator was built and deployed in Afghanistan in some 135 days, based on Microsoft technology. Said the release by Ace Sarich, CEO of VoxTec: "

This came about as (US) Navy medical doctors treating non-English speaking patients, such as refugees and allied troops during Desert Storm, first identified the need for a translation device. This ruggedized, weather resistant device was to have superior audio performance with both microphone input and speaker output; good battery life; and be capable of functioning as a pocket-sized PC.

"Although we briefly considered Linux and Java options, it became clear very quickly that Windows CE was our best choice. At first, I thought Linux could be a cheaper option, but when I saw the considerable development work needed to bring the operating system to the level of what already existed with Windows CE, it wasn't a cheaper option at all," says the press release on the Microsoft site.

These examples, in themselves, are not indicative of the relevance or spread of FLOSS in Afghanistan. What they do show however is that this software battle takes on resonances of good-versus-evil (each defined depending on one's perspectives) in the battle for mindshare and more.

Bangladesh

Local language solutions, like in other parts of South Asia, are a major issue in countries like Bangladesh, as emerges from debates in GNU/Linux networks and elsewhere.

Sajed Chowdhury https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Csrc@ acm.org%3E of Bangladesh notes that the most popular method of writing Bangla text runs only on Windows, and when someone refers to a "Bangla file" they are actually referring to a Microsoft word document embedded with a (copyrighted) Bangla font. Says he: "As such it is impossible to work with such a "bangla file" under Linux (without resorting to vmware or codeweaver crossover plugin). I would identify this to be the most significant road-block relating to more widespead adoption of Linux (or any other non-Windows OS for that matter) on the desktop in Bangladesh."

But others like Taneem Ahmed https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Ctaneem@ eyetap.org%3E have a differing perspective. Says Ahmed: "For Linux we already have support to create Banga documents using a world wide accepted and recognized standard, yet we won't use it. Anyway, from the limited experience I gained trying to help support Bangla on linux I am just amazed to see that one person is holding a nation hostage, and all everyone can do is agree with whatever propaganda is being spread. And this is not only for Linux. Even for Windows I have seen programs that uses Unicode standards, but we just won't use it.... I am sorry I don't agree with that at all, to me the *only* road-block we have is not knowing what is out there. Maybe we should first start with the fact that *Microsoft Word* is not the only way of creating documents." (Source for the above, discussions on the BDLUG, mailing list of GNU/Linux enthusiasts in Bangladesh, November 2002).

Bangladesh's LUG (http://www.bdlug.org, accessed Dec 23, 2002) and its mailing list has a mdoerate level of activity. Some of its plans include a 'Linux fair in Bangladesh'.

This site appears fairly well maintained, and with a number of interesting inputs and arguments. It aruges:

Linux (Unix) is not only an OS, it is a large world. A system administrator knows about the admin utilities, but there is a lot to learn in TeX. A programmer knows C and other languages, but he can learn a lot about the workings of Linux from an admin. A writer knows about emacs and TeX, but there is a lot to learn in sed and awk that will help him. So, no matter in what field you are working, this group can help you.

Interestingly, Bangladesh FLOSS enthusiasts "thank" magazines from nearby India — such as PCQuest and Chip (now called Digit) — for promoting awareness of GNU/Linux.

Burma (Myanmar)

From Myanmar comes the PeguNC-Linux Distribution, which its promoters say will encourage native data processing. It is argued: "PeguNC-Linux is to introduce Linux to programming students, application programmers and development programmers to implement data processing in native language. If PeguNC-Linux is the development system that is setup so that very little linux system knowledge is required but with experience in programming language C or C++ will be able to write an appliciation and market it." http://www.myanmarlug.org/ NOTE: As of November 19, there were difficulties in reaching the link to the PeguNC site.

Myanmar LUG also has set up other Special Interest Groups (SIGs), focussing on computer control systems, databases, e-commerce, GIS, Internet, IT professionals, Java, language technology and standardization, multimedia, software engineering and web technologies. While it is difficult to get to know the level of activity of these SIGs from a distance, nonetheless the issues on which these focus give a hint of what are the interest issues in this country near the South Asian region.

Cambodia

Norbert Klein https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Cnhklein@gmx.net%3E of the Open Forum of Cambodia http://www.forum.org.kh/ says their e-mail system — the first connection to the Internet from Cambodia set up by him in 1994 initially on a DOS/UNIX dial-up program — has been running on SuSE Linux since 1996.

The Cambodian government-sponsored national working group on Khmer/UNICODE after quite some struggle has reached an agreement with UNICODE. Klein is hopeing for a GNU/Linux implementation. (The Khmer script was developed almost 1000 years ago from Devanagiri, the script used in north India. But it has some very specific structural differences developed in the meantime.)

"The problem is, of course, not just to have the glyphs, but to have an 'intelligent' input and display engine which puts the many different glyph parts together," according to Klein.

China and Hong Kong

In China, FLOSS is an issue which the government sees promising for reasons of coast and also 'security concerns'. In 2000, the Chinese Academy of Sciences Software Applications Institute developed Redflag Linux, which is suited to local language and other needs.

Another distro that is available from China is Blue Point. To cater to local needs, it promises a "small-footprint" with "the resource requirement of the applications (being) reduced to a minimum. It also promises to keep in mind the fact that set-top boxes fall in a very price-sensitive market, and promises time-to-market advantages. It says that its MiniGUI product can be used "anywhere Windows CE can be used". See http://www.bluepoint.com.cn/english/product/index.htm

BluePoint Linux 2.0 says it is optimized for the Chinese user and Internet.

Phil Hochmuth https://www.itfirms.co.za/webmail/index.php?action=newmail&addr= %3Cphochmut@nww.com%3E of Network World (Network World Newsletter, 11/11/02) reports that a recent study found that developers in China have been increasingly "embrac(ing) Linux".

The survey asked 1,000 applications developers based in China questions on trends in programming and technology being used there. It was found that 44% of the developers said they had written code for the Linux operating system, while 65% said they expected to write a Linux application in the next year.

Reports suggest that the Chinese government "has moved" to install versions of FLOSS provided by Red Flag, to "avoid reliance on US companies, particularly Microsoft". See Festa, Paul. "Governments push open-source software". CNET News.com (29 August 2001). http://news.cnet.com/news/0-1003-200-6996393.html.

"Research outfit Gartner has noted an ominous development for Microsoft and other non-indigenous firms operating in China. On 28th December 2001 the Beijing municipal government awarded contracts to six local software vendors, and rejected the seventh bidder — Microsoft. The contract covers office automation, antivirus and operating software, one of the winners being Linux OS vendor Red Flag. " Source: Lettice, John. "Red Flag Linux beats out Windows in Beijing". The Register (4 January 2002). http://www.theregister.co.uk/content/4/23548.html.

Reasons for China taking to FLOSS is its ability to reuse software on any number of machines, without being penalised for so-called "software piracy". This helps keep cost down, more so in countries where financial resources are limited.

Hochmuth argues that another driver of Linux in China is the fact that the country has its own homegrown brand — Red Flag Linux — which was created by the Chinese Academy of Sciences. The PC Linux flavor is said to be a staple on the desktops in many Chinese government agencies.

FLOSS is also making inroads into servers in China. According to Evans Data, 11% of Chinese developers said they will use Linux servers next year, as opposed to only 4% who use GNU/Linux servers now. (See <http://www.evansdata.com/> and http://www.redflag-linux.com/)

In June 2002, IDG news reported China Post Office had struck a deal with IBM to run GNU/Linux at 1,200 branch offices. See: Berger, Matt. "ANALYSIS: Microsoft vs. open source gets political". IDG News (10 June 2002). http://www.idg.net/ic_874742_1793_1-1681.html.

Hong Feng https://www.itfirms.co.za/webmail/index.php?action=newmail& addr=%3Cfred@mail.rons.net.cn%3E who publishes the Free Software Magazine's international English-based edition out of China, suggests the following links for more China-related GNU/Linux sources: www.redflat.com.cn, www.cosix.com.cn, www.cosoft.org.cn (email correspondence, 2002). Language does remain an issue in understanding the full potential of GNU/Linux in China however. Hong Feng has his own site at http://www.rons.net.cn/hongfeng.html

Xiaofeng Cai , a student at the Shenzhen University (www.szu.edu.cn), points to links such as www.linuxforum.net and www.gnuchina.org. (Email correspondence, 2002)

There are also some interesting FLOSS products coming out from China.

Michael Dunham (http://weblog.kestrelworks.com/archives/000102.html) reports on Shaolin Microsystems, which offers two products, Aptus, a network-based GNU/Linux middleware for desktops and CogoFS, a compressed file system for GNU/Linux.

To separate it from server-based thin clients and fat client desktops, Aptus is termed a "fit client." At startup, the GNU/Linux kernel and services are loaded from the server onto the client and booted from there. Changes in the setup and services available to each client can be administered centrally. Because it is a middleware system, it is compatible with most GNU/Linux distributions and standard hardware platforms including standard PC architecture.

CogoFX is a kernel-based compressed file system that can operate locally or across a network on a server. Files are individually compressed and both files and volumes are presented normally and without having to directly access disk blocks. On a server, files are presented to clients compressed so while the client needs to have a decompression agent installed, the server and network do not carry additional loads for decompressed files.

Some cases of FLOSS being taken to education are also emerging, though it is clear that if more news is not coming out, it's not because things are not happening.

Here's one example: "Take a look at www.enetedu.com. It is in ChongQing, its product is PHP, and it has many successful implementations on Linux," wrote Jay Sun https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Cjs9s@lycos.com%3E to the School-Discuss mailing list (part of the Schoolforge.net network that looks at FLOSS in education). Sun was replying to a query about FLOSS in Chinese schools.

East Timor

Even the tiny country of East Timor, the newest to emerge on the global map, has some FLOSS link.

A posting on the Global Knowledge for Development Digest (Dec 20, 2002, Vol 1, Number 625) from Don Cameron mentions that the not-for-profit organisation called ComputerBank Asutralia is undertaking work of donating computers preloaded with the Debian distribution of GNU/Linux to East Timor. Archives of previous GKD messages can be found at:

For more on ComputerBank, see http://www.computerbank.org.au/

India

http://linuxinindia.pitas.com/ (accessed Jan 24, 2003) contains links to FLOSS initiatives from around India. To track a mailing list that reports on this subject, visit http://www.freelists.org/archives/linuxinindia/ This list can be joined at http://www.freelists.org/cgi-bin/list?list_id=linuxinindia

Some techies are promising to build an "Indian" Sourceforge at http://sarovar.org/, which is still in a preliminary stage.

Software firms making a living out of Free Software include http://www.linuxense.com/ and http://www.sanisoft.com./ See also http://www.deeproot.co.in/ (DeepRoot Linux, incto server appliances and GNU/Linux support and services) and http://www.exocore.com/

In various parts of India, small firms — often comprising small-teams made up of college students — have set up their own outlets to sell distros of GNU/Linux. This includes www.lincds.com (run by Yashwanth and Swaroop, two collegians from Bangalore), www.linuxplaza.org (run from Mumbai), http://lincdz.2ya.com/ (from the former colony of Pondicherry, run by seventeen year old Sukrit), among others. Other firms like GTCdRom, run by former navy officer Taranath in Bangalore, attract huge crowds at IT events such as IT.Com held annually in that city which some consider the 'Silicon Valley of India'.

Governments, both at the federal and regional level, are slowly looking at the potential of FLOSS, though critics accuse some quarters of succumbing to commercial pressures in taking decisions. One recent seminar (November 2002) was held in Thiruvananthapuram, South India. It was projected as an "attempt to expose the nuances of policy framing, software protection and licensing and consequently the issues related to the use of the open software by end users and developers". See http://salis.ece.iisc.ernet.in/workshop/

For a country that prides itself on being a 'software superpower', but still has

difficulties in making the power of software available to most of its own citizens, FLOSS could throw up some interesting solutions.

Take the case of Freed. Using it, educationists are being urged to to create an account for themselves and "upload, browse, comment on or rate content available on this site". While the technical solution has been up and running, participation needs to improve. See http://free-ed.org:12080/Freed/

Efforts in the late 'nineties, partly spearheaded by expat Indians based in the US, lead to the formation of the Linux-India network. See http://www.linux-india.org/ This site lists nearly five dozen LUGs, or Linux User Groups, scattered across India. Some are less active than others. See a list of Indian LUGs at http://www.linux.org/groups/india/

Indian language support for computing is one area which is being eagerly looked forward to. See G Karunakar's bookmarks on Indian language computing. http://indlinux.sourceforge.net/bookmarks.html

Young students excelling in FLOSS (see http://nagendra.com/%29 and Indian expats contributing to global initiatives (for example, Bharat Mediratta's http://gallery.sf.net/%29 are also visible in India.

Sayamindu Dasguptan is a "17+" Class 11 South Point High School student in Kolkata. Says he: "I am a Linux enthusiast, and at present I am writing some technical documents on linux.... The linux section will be the largest section in my website. I am writing a few technical help documents for linux-users, and the first one is about configuring a PCTel HSP MicroModem under Linux...At present I am working on a Linux PC Buying Tips and Tricks HOWTO... The notes for this HOWTO can be found here. This is a huge job, and will take some time to finish. I am also working as an Bangla editor cum translator in the Linux Localisation Initiative."

The struggle to complete and market the Simputer (www.simputer.org) — a commonman and -woman's computing device based on GNU/Linux is also keenly being watched. As of now, the product is being marketed, though in small numbers rather than off-the-shop-shelf. It is the economic challenges and high taxes that are proving to be a more difficult challenge to beat for the Simputer, rather than the technological difficulties.

Indian tools of global relevance are slowing making it.

MayaVi is a free, easy to use scientific data visualizer. It is written in Python and uses the amazing Visualization Toolkit (VTK) for the graphics. It provides a GUI written using Tkinter. MayaVi is free and distributed under the conditions of the BSD license. It is also cross platform and should run on any platform where both Python and VTK are available (which is almost any *nix, Mac OSX or Windows). Mayavi is Sanskrit for 'magician'. Prabhu Ramachandran's initiative from Chennai. http://mayavi.sourceforge.net/

Kaai is a inadequately-noticed-in-India GNU/Linux-based PDA. See a review of it at http://www.linuxdevices.com/articles/AT8619741565.html ELX is India's first commercial GNU/Linux-based Operating System, which claims to match Windows by every feature and provides the additional advantages of GNU/Linux's robustness and security. It has been developed by Hyderabad-based Everyone's Linux, formerly 3T solutions. http://www.elxlinux.com/

On the other hand, international solutions are also helping India.

Yudit is a free unicode text editor for all unices. It was first released on 1997, when Gaspar Sinai wanted to write in Japanese and Hungarian in one single document and realized that it did not take much effort to extend this goal and just support any script. Today it works with Indic scripts: Tamil, Devanagari, Bengali, Gujarati, Gurmukhi, Oriya, Malayalam, Kannada and Telugu. Some of these are languages spoken and written by many millions. Check it out. http://www.yudit.org/

Interesting attempts to share knowledge are also showing up.

http://mail.sarai.net/mailman/listinfo/prc is a network to put mentors in touch with students seeking suitable FLOSS projects.

In September 2002, the TUG conference — one of the world's leading TeX users/developers meet, was held at the Technopark, Thiruvananthapur in South India. This is the first time that TUG conference was being held outside Europe and US. See http://www.tug.org.in/tug2002/

Iran

Currently, the major projects being done in Iran are the ones of www.linuxiran.org (spreading the word), www.farsikde.org (localization of KDE), and some issues that arise out of www.farsiweb.info, according to Arash Zeini , personal email dated January 24, 2003.

Beside that a number of ISPs use GNU/Linux as a platform but for not much else. The Goverment of Iran hasn't shown signs of being keen on FLOSS, according to campaigners in the field in that country. So far, the attempts to use it have not focussed on the 'freedom' aspect of Free/Libre and Open Source Software, but rather the fact that it could be more secure.

There is also some work underway at http://projects.iranphp.net/ There are some PHP-related projects in Farsi for Iranians, which though new seem to be reporting some hard work, according to reports from the field. Farsi, the language also called Persian, is spoken by an estimated 36 million in Iran.

Linuxiran.org has its 'official' mailing list at bna-linuxiran@nongnu.org https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=linuxiran @nongnu.org

Israel

The Israelis are by far the most active in free software development in this region. Check out the OpenMosix clustering software at http://openmosix.sourceforge.net./ Also, Gadi Oxman was working with Ingo Molnar a while ago to have software raid in the kernel. He a lso wrote some software regarding ext2 undeletion a while ago, according to Vilmos Soti , private email Jan 20, 2003

Japan

Japan is far ahead in the FLOSS field. Being not a part of the Third World or the 'developing countries' means it would not be of prime relevance to this study. Some happenings in Japan are however cursorily noted, below.

FLOSS could get support from Japan, to help the latter keep its competence in the digital consumer electronics.

Hidetaka Fukuda, CTO for the Commerce and Information Policy Bureau, Director of IT-Industry Division, the Ministry of Economy, Trade and Industry, said that Japan's competence would be harmed if digital consumer electronic products came to converge on the same OS and applications that run on it. Fukuda made the remarks during the "Open Source Way 2002" conference was held in Yokohama on Dec. 20. Specifically, Fukuda expressed the government's planned support of open source technology and communities for open sources. "An OS should be an open-source OS such as Linux and TRON, and semiconductors should have CPU-independent architecture, otherwise Japan will lose," he said.

The reasons for supporting open source technology are: realizing low-cost system purchases by the government; reducing the burdens on engineers in keeping proprietary systems running; improving interoperability between proprietary software/systems and open source software/systems. However, he denied the idea of the Japanese government's complete migration to Linux. See http://neasia.nikkeibp.com/wcs/leaf?CID=onair/asabt/news/223762

On December 18, 2002, Associated Press reported that Sony Corp. (SNE) and Matsushita Electric Industrial Co. had announced they will jointly develop by March 2003 an operating system based on GNU/Linux technology for their digital consumer electronics products. Like computers, many high-tech electronics products like TVs, DVDs and microwave owens require built-in software to control their complex functions.

Tokyo is also reported to be looking at GNU/Linux. On November 21, 2002, the Associated Press reported that the Japanese government will study the possibility of using open-source software such as Linux instead of Microsoft Corp. products. The

public management ministry has set aside ¥50 million (50 million Yen) for a panel of scholars and computer experts, including Microsoft executives, to finish the study by March 2004, said Tatsuya Kawachi, a ministry deputy director.

There are also various GNU/Linux projects underway in Japan.

The JLA Doc-CD will collate information posted to various mailing lists and documents produced, cut them onto a CD-Rom with search tools, and distribute these among GNU/Linux users in Japan. JF (Japanese FAQ) project is for translating, writing and distributing various FLOSS-related documents. JM aims to translate software manuals to Japanese. jman-ML is the place where JM activities reside. X Windows System has its X Japanese Documentation Project. Debian JP is to provide an internationalised (formerly Japanese) environment of the Debian GNU/Linux distribution.

Software Map is a project to create a place where software information available in GNU/Linux is presented. Project Blue is to support those who want to use FLOSS in business. RC5 sents a team to take part in cryptocraphy cracking contests seeing the global mobilization of computers.

LKH-Jp (Linux Kernel Hack Japan) is a project to provide Japanese documents for those who want to hack Linux kernel. The Tips Project is for sharing GNU/Linux or Unix tips found in daily computing life. The Linux Seminar is meant for beginners who want to study and utilise FLOSS. Finally, 'Project Silicon Linux' aims at making a Linux distribution for embedded systems which is bootable from ROM is the objective of this project.

Jordan

Sometimes, the penetration of FLOSS happens in the background, leading one to overlook its very existance. One case of this kind has been described by Robin 'Roblimo' Miller who wrote about it in Newsfourge (See http://newsforge.com/article.pl?sid=02/12/24/0349250&mode=thread&tid=19).

During a recent seminar held in that country, Jordan's Ministry of Information and Communication Technology was not officially aware of the level of FLOSS deployment in use in the country. But over half of the workshop attendees who responded to a "knowledge of Open Source" survey said they were familiar with, and in many cases, already using GNU/Linux, Mozilla, Sendmail, Apache, OpenOffice and other popular FLOSS packages.

Commentators like Miller argue that FLOSS could help countries like Jordan become software exporters. Jordan, without oil reserves, is comparatively poor and has a relatively well-educated population. "Obviously, software that can be developed strictly in Jordan from an Open Source base is better for the Jordanian economy than working

with foreign proprietary software companies that demand an endless stream of royalties. Not only that, the licensing complexities that surround the use of proprietary code these days can lead to more employment for lawyers than programmers, and Jordan is interested in exporting software, not legal paperwork," he argues.

As he points out, in a conclusion that could be relevant to the bulk of other parts of Asia: The other obvious advantage of using Open Source programming tools is their low cost — usually zero or so, whether you are counting in Jordanian Dinars or U.S. dollars — that allow non-rich Jordanians (a designation that includes, conservatively, 95% of the country's population) a fair chance to learn to program competently and create useful software.

Jordan's sysadmins and programmers here typically earn between $300 and $600 per month. "(S)o if it takes a few weeks — or even a few months — longer for an admin to learn how to set up Apache than a proprietary server product, the license cost saving for one server, once, makes the extra effort more than worthwhile. And, of course, once that knowledge is gained it carries on to the next project, and so on," argues Miller.

Stepped up "anti-piracy" drives by the BSA and others in the Middle East now means that commercial and government software users are no longer able to follow the trend of simply using illegal copies of proprietory software.

Incidentally, IBM has recently sponsored a new GNU/Linux lab at the University of Jordan.

Isam Bayazidi is leader of the Arabeyes Project, a group that works out of Jordan and elsewhere in the Middle East to provide Arabic support for a growing number of Open Source projects. "Isam is your basic Linux user and Open Source project leader, same as others of his ilk all over the world: young, smart, dedicated, and happily building a productive international development team and user base without any help, pay or recognition from government, academia or business," says Miller.

Mohammed Aloqeely https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Caloqeely@ccis.ksu.edu.sa%3E has cited a report wherein IBM donated a GNU/Linux lab to a Jordanian university. Details were unavailable. (Saudi Linux mailing list, saudi_linux@yahoogroups.com) digest version Number 406 dated Dec 17, 2002) But more information is available at the regional language website http://www.bab.com/news/full_news.cfm?id=28104

Malaysia

Malaysia's education ministry is a recipient of Sun Microsystems' StarOffice software suite. "The donation, valued at RM475 million (US$125 million), is set to benefit 2.5 million students from 9,000 schools, and 500 colleges and universities country-wide", said Sun in a statement. Beyond the PR figures, it would be interesting to see the actual numbers benefitted. StarOffice 6.0 — which runs on Linux, Windows and Sun's Solaris — is a set of desktop productivity tools with word processing, spreadsheet, presentation and image editing functions. Sun had given an earlier version of StarOffice to education departments in Selangor and Penang.

This (donation) marks a first step in encouraging the use of open-source software throughout the country's education system, Malaysia's education minister Musa Mohamad has been quoted saying in press reports. The ministry is also exploring the possibility of deploying Linux-based appliance servers in schools to provide students and teachers networked access to their applications, according to Govinathan Pillai, managing director for Sun's Malaysia operations. Source: Staff. "StarOffice push intensifies in Malaysia". CNETAsia (7 October 2002). http://asia.cnet.com/newstech/applications/0,39001094,39088081,00.htm.

Other indications have also been reported about the possiblity of deploying FLOSS in public and government schools. See: "Govt studying Linux systems for public sector and schools". The Star (2 July 2002). http://biz.thestar.com.my/news/story.asp?file=/2002/7/2/business/halin &sec=business.

Malaysia also claims to be ahead of other Asian countries (excluding Japan) in terms of its compounded annual growth rate of GNU/Linux servers shipments from 1999 to 2004. This touched 81% in Malaysia, compared to India (79%), South Korea (64%) and even China (58%).

"The Star [a popular Malaysian daily] also noted that in the last few months, both the Malaysian National Computer Confederation (MNCC) and the Association of the Computer and Multimedia Industry of Malaysia (Pikom) have formed 'special interest groups' devoted to the Open Source movement. MNCC is the national body of computer professionals, while Pikom is the industry trade association. Unnamed industry sources were also quoted saying that one or two Malaysian government or semi-government bodies are studying the feasibility of developing Linux — the Unix-based operating system that many consider the flagship of the OSS charge — into a 'national operating system' like what's being undertaken with China's Red Flag project. See: Noronha, Frederick. "Open-Source Software Opens New Windows to Third-World". Linux Journal (3 May 2002) http://www.linuxjournal.com/article.php?sid=6049.

In Malaysia, FLOSS (or, Open Source, the more preferred term here) is seen as important as access to source code would encourage and promote local capabilities for software modification and redistribution. The Malaysians argue that FLOSS promotes an environment for technical and systems development, as well as the ability to learn, innovate and invent, while stimulating the local software industry. More importantly, it is seen as promoting independence from foreign software companies and reduces an outflow of funds from the country.

Besides LUGs in the metro areas like KL, there are also others in remote regions like Sarawak (see http://star.cdc.abu.com/~peterlai/salrug/ http://star.cdc.abu.com/%7Epeterlai/salrug/ accessed December 23, 2002). In its own words: "Sarawak Linux Root User Group (SaLRUG) is a group of Linux user in the city of Kuching, Sarawak, Malaysia with interests in Linux The group originally come on and off at CDC Internet to get all roblems solved since 1994." The LUG in the touristic destination of Penang is at http://members.tripod.com/penanglug/

Mimos (http://www.mimos.my/opensource/) hopes to launch a website in early 2003 to document projects in FLOSS within Asia, with links to key resources. (Email from Imran William Smith https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=%3Ciwsmith@mimos.my%3E dt November 18, 2002. He is the Project Manager for Open Source Development at Mimos Berhad, Malaysia.).

Another regular Open Source network is at http://www.my-opensource.org/ Mimos' goal is to localize key applications into the national language Bahasa Melayu, which is hoped to materialise sometime in 2003. "Some other groups have already localized some applications, we hope to build on their work," says Imran William Smith.

See the site www.my-opensource.org. This is a group of people interested to further the development and usage of open source software and the hacker culture in Malaysia.

Malaysian publications like "The Star" and "Computimes" (www.nstpi.com.my) have their finger on the pulse. They often get the news first, and in particular, Computimes, has seen a lot of FLOSS coverage recently.

One story that made it to the news in a big way in May 2000 was over how a group of computer geeks using freely distributable software and communicating via the Internet puts together an e-community system on a shoe-string budget.

The Malaysian Open Source Group has assembled for The Thalassaemia Association of Malaysia an online social community for Thalassaemia sufferers and their families. At a minimal financial cost. The aim was to build for the Thalassaemia Association of Malaysia an e-community for thalassaemic patients, their families and healthcare providers.

The plan, which materialised well, was to to set up a web based e-community with online database of patient profiles, and e-forums and e-chats to facilitate patient-doctor and patient-patient relationships. Its goal was also to collate requests for Desferal —

the main drug used in treatment — so that the association can get volume discounts from drug manufacturers.

"The plan was simple — with all the GPLed software available there was the best of the breed, a pool of solidly reliable software tried and tested by a voracious community of worldwide hackers. Why, this was the same stuff that ran more than half of the Internet servers worldwide, right? So, we're off to cook us up an e-community on the easy," comment Beh H. L. and Nah S.H (See "A Malaysian Open Source True Story, E-Thalassaemia) http://www.my-opensource.org/Articles/Article_tam.html

In Malaysia, for example, the Government has been committed to using Open Source Software since November 2001. The decision to move toward Open Source is based on a White Paper produced by the Open Source Special Interest Group of the Association of Computer and Multimedia Industry of Malaysia (PIKOM) in April 2002. Also, the Malaysian Institute of Microelectronic Systems (MIMOS) has developed Open Source solutions for government. It has also developed applications and the Linux Graphical User Interface (GUI) in the local language, Bahasa Malaysia (BM). For more information, see also, 'Green light for Open Source from PM', by Charles F. Moreira in The Star, Friday August 09 2002. (Source: Communication from Shahid Akhtar, APDIP)

Nepal

In Nepal, there the Ganesha's Project, a plan using donated machines and open-source software like Linux, in a move to cut the costs of acquiring software licenses for 'an already impoverished school system'. See the site at http://www.ganeshas-project.org/sets/contact.html

This is a explanation of how the teaching works: "The students are split in to four groups, that the students named: Six Champions, Seven Stars, Women Power and Danphe. The groups consist of seven to nine students and are represented by four captains. Each group gets 1.5 hours computer lessons a day from Monday to Friday. Saturday is a holiday, so there are no lessons; but the PC-Pool is opened from 7:00 h to 18:00 h to all interested students for free computer usage. During this time the students are supervised by 2 group captains...."

"Sundays translated revision classes are held together with Kamal. During these lessons topics that, were not understood during the week are repeated and translated into Nepali and Tharu (the two most commonly spoken languages in Bachhauli) by Kamal, to make sure that complicated and theoretical topics are understood well. Three times a week, the PC-Pool is cleaned by the students themselves. The students always complete their duties with great responsibility. The lessons consist of three different computer subjects, which always need a few weeks to be concluded. When a

subject is accomplished it is replaced by a new subject. In the following weeks the subjects are Gimp, Database and Linux Basics which are taught by Kiki, Marcus and Lenny respectively."

Pakistan

This is another country where the importance of FLOSS is being closely studied, both by senior official quarters and campaigners at the grassroots.

"Pakistan Ministry of Science and Technology advisor Salman Ansari recently spoke of the possibility of some 50,000 low cost computers are to be installed in schools and colleges all over Pakistan. These will be PII computers, each being sourced for less than $100 a piece, he said. Proprietary software for these PCs would cost a small fortune. Surely more than what the computers cost. But, using GNU/Linux ensures that the overall prices are kept low. 'Don't be surprised if we become the first country in the world to say that all (government-run) services are going to be GNU/Linux based,' Ansari said enthusiastically." (See Noronha, Frederick. "Open-Source Software Opens New Windows to Third-World". Linux Journal (3 May 2002). http://www.linuxjournal.com/article.php?sid=6049.%29

See also articles such as Miller, Robin 'Roblimo' "Linux gains ground in Pakistan". NewsForge (4 January 2002). http://www.newsforge.com/article.pl?sid=01/12/20/1532225

One interesting project that came up recently was the Video Whale Project. (See http://www.gstreamer.net/apps/vw/ The video-whale project is an implementation of video-wall which exploits the combined power of Gstreamer (www.gstreamer.net) and Xinerama.

Every group of four displays (monitors) are controlled by one machine. So there is a LAN of four machine behind the video-wall.

Say the promoters: "We plan on using these videowalls in Pakistani universties and schools to let them quickly set up videowalls for use in the classrooms when need be."

Besides the main PLUC, other regional LUGs include the Sindhis' Linux User Group (SLUG) located in Hyderabad, Sindh, which is also internationally known as Indus Valley.

Philippine

Greenpeace Southeast Asia (Philippines) web editor and systems administrator Steven Sy (27) explains a recent shift-over of their office to Free Software.

Greenpeace Southeast Asia (GPSEA, see http://www.greenpeacesoutheastasia.org%29/ was formally established on March 1, 2000 and has offices in Bangkok,

Thailand (head office) and in Manila, Philippines. It currently has 18 staff in Bangkok and eight in Manila.

Globally, Greenpeace runs "ninety percent plus" of their servers on GNU/Linux. But, so far, Manila is the only Greenpeace office to fully deploy GNU/Linux as the majority desktop, other smaller GP offices are planning to migrate in the coming months.

"The office has been planning to move to Free Software since early 2002. We made a conscious choice between migrating to Free Software or spending funds on expensive software licenses. We also did not want to get into legal troubles if ever the BSA (Business Software Alliance, the proprietorial software arm that fights illegal copying of software, which it terms 'piracy') came our way," explains Sy.

FLOSS has by now (January 2003) been fully deployed within the Manila office. Says Sy: "We've been using the Redhat distro since September 2002. At first we were using Redhat 7.3 with a Ximian desktop, then we upgraded to Redhat 8 as soon as it came out." This covers some seven desktops and one laptop. Two other laptops are still using Windows XP. Free Software is used mostly for word processing, e-mail, web browsing, spreadsheets and presentations.

The advantages are obvious: "It's free ('beer' and 'speech') and secure (less or no virus infections since migrating)." The motives for shifting over: "It's a mix of both (technical and philosophical). FS is a technically superior and morally correct technology," says Sy. All the regular staff now use Free Software in their daily work.

"Since we downloaded the software off the Internet, just the costs of blank CDs that's less than 1 USD. For the users, just time and patience in learning the new system," says he. "Free Software saved the office a lot of money, money that was better spent on winning campaigns than paying for very expensive licenses." Problems have been limited to "some minor bugs in the software. Steep learning curve for administering (for a beginner)." Source: personal email from Steven Sy, Dec 2002 and Jan 2003.

The Philippines is also the home of campaigners like Roberto Verzola, a long-time activist for extending people's participation on the Net.

The Phillipines has also seen some strong challenging of the rationale of proprietorial software. An interesting read from the University of the Phillipines. http://www.up.edu.ph/forum/2002/Nov-Dec02/letter.html accessed Jan 25, 2003.

University of the Philippines, Quezon City president of the board of regents Dr. Francisco Nemenzo — in an open letter — argues that the "big multinational software companies have local agents to smoke out users of pirated and unlicensed computer programs. Their targets are schools, companies and government offices. Those they catch are charged and heavily fined for violation of intellectual property rights. One private university is reportedly paying Microsoft millions in an amicable settlement. It would be extremely embarrassing for any academic or administrative unit of UP to be

caught because we are now taking steps to protect the technologies developed in our research laboratories."

Nemenzo says that the Board of Regents recently adopted the Acceptable Use Policy for IT Resources of the UP System. Adds he: "We have licenses for MS Office 97 and 98. But Microsoft keeps upgrading this program to line the bulging pockets of Bill Gates. We need approximately P12 million to license the new MS Office 2000 in the entire UP System. In addition, we have to pay P8 thousand per computer for the latest Windows operating system. This enormous amount might as well be used to buy more computers. I have therefore reiterated my appeal to install the Linux operating system and use OpenOffice or StarOffice for word processing, making powerpoint (sic) presentations, spreadsheets, data bases, etc., sending emails, and accessing the Internet."

Sun Microsystems has also donated hundreds of CDs for StarOffice with permission to reproduce them as many times as wished. "StarOffice and OpenOffice have all the features of Microsoft Office. Having tried both, I assure you that they work just as well. It only requires a little effort to shift from the familiar programs. If you learned computing earlier with WordStar, it is like going back to the good old days. StarOffice and OpenOffice are less user-friendly, but you can modify them to suit your peculiar work style. By contrast, a user-friendly program like Microsoft forces you to adapt to the manufacturers style, unless you have the patience to tinker with the incomprehensible codes in the registry," says the President of the Regents.

Saudi Arabia

Khaled Al-Ghonaim, Chairman of the Saudi Computer Society and one of the Middle East's best-known computer security experts, has been speaking in the region on the security advantages of FLOSS over proprietorial (closed source) software.

South Korea

Reports incidated that "the Korean government is to buy 120,000 copies of Hancom Linux Deluxe this year, enough to switch 23 percent of its installed base Microsoft user to Open Source equivalents, according to NewsForge. By standardising on FLOSS and HancomOffice, the Korean government expects to make savings of 80 percent, compared with buying Microsoft products. ..." Source: Cullen, Drew. "Korea migrates 120K civil servants to Linux desktop". NewsForge (14 January 2002). See http://www.newsforge.com/article.pl?sid=02/01/14/205204

Scott Granneman comments on the issue: "The Korean government is to buy 120,000 copies of Hancom Linux Deluxe this year, enough to switch 23 percent of its installed base Microsoft user to Open Source equivalents. By standardising on Linux and HancomOffice, the Korean government expects to make savings of 80 percent, compared with buying Microsoft products..." Source: Cullen, Drew. "Korea migrates 120K civil servants to Linux desktop". NewsForge (14 January 2002). http://www.newsforge.com/article.pl?sid=02/01/14/205204

This move was considered important enough for LWN.net to include it among the "2002 Linux Timeline". See http://lwn.net/Articles/16859/ and the Hancom press release at http://en.hancom.com/bbs/scripts/index.php?table=press_en&mode=noticeview&start=10&d=6&id=19

Meanwhile, universities squeezed by the region's 1997 financial crunch found themselves unable to purchase software. In response, the Ministry of Information and Communication last year set up training programs for GNU Linux for systems administration. Source: Festa, Paul. "Governments push open-source software". CNET News.com (29 August 2001). http://news.cnet.com/news/0-1003-200-6996393.html.

South Korea's GNU/Linux-based PDA was reported (November 2001) as having the potential to "take on (the) Palm, Microsoft". (See http://www.newsfactor.com/perl/story/14929.html) Lou Hirsh comments that though some analysts are "skeptical about Linux-based products, noting that the operating system has a distinct marketing disadvantage", the South Korea-based Gmate Co. Ltd. (http://www.gmate.com/) has been "moving confidently ahead with plans to market a Linux-based personal digital assistant (PDA)". "The advantage of a Linux-based PDA would be that there is the possibility for the developers to be able to develop thousands of applications with the free open source," Seungchae Cheong, the company's manager of sales and marketing, was quoted as saying.

Gmate argued that the Yopy has been designed to also run Windows-compatible PDA programs, which will give users access to thousands of existing applications, while the Linux platform will offer access to a wider variety of future programs. The Yopy, which has been in development for a year prior to end-2001, has a folding-type design, much like a cell phone. It has a 3.5-inch reflective liquid crystal display (LCD) panel in its upper half, and a 40-key keypad in its lower half. Gmate is based in Pundang, Korea, just outside of Seoul.

By November 2002, the Gmate Yopy was being judged the third-best hardware device (among mobiles) by a jury of GNU/Linux gurus worldwide who were polled by the 'Linux Magazine' (www.linux-magazine.com), based in Munich.

Singapore

Singapore's FLOSS website is at http://www.singalinux.com/ (accessed Dec 23, 2002).

A reasonable GNU/Linux Server installation at 'Overseas Family School' a K12 international school near Orchard Road. They have about 10 GNU/Linux servers in their pure GNU/Linux server cluster with a mixture of Fibre Channel SAN and shared SCSI storage serving 600 client Macintoshes via a multi gigabit fibre backbone running between the twelve buildings of the school. The main server cluster has four dual CPU nodes with a total of 10GB RAM setup as an active-active HA cluster connected to shared storage via 2Gb Fibre Channel. They were also the first Asia Pacific site to being running Oracle Applications 11i on Linux (not just the DB — but the full ERP suite). See http://www.metaparadigm.com/articles/20020404.shtml Eugene Teo, personal email on Dec 12, 2002. Eugene Teo is the Vice Secretary of the Linux Users Group, Singapore. See http://www.lugs.org.sg/

Taiwan

Taiwan is sometimes viewed as an example where government officials have announced intentions to pursue open source over major commercial applications in part to rein in Microsoft and preserve room for competition within the local software industry.

'Microsoft has been dominating the market here in Taiwan and we don't want this type of development to continue,' Tan-Sun Chen, a member of the Legislative Yuan and co-chairman of the Technology and Information Committee, has been quoted as saying in an interview with IDG News Service.

Motivated by the Fair Trade Commission's investigation of Microsoft's pricing practices in Taiwan, legislators are seeking ways to curtail Microsoft's dominance of the market, Chen said. One of the suggestions put forth during a June 3, 2002 meeting of legislators and officials would see the Taiwanese government allocate funding for the development of open-source software, including Linux, he said. Source: Berger, Matt. "ANALYSIS: Microsoft vs. open source gets political". IDG News (10 June 2002). http://www.idg.net/ic_874742_1793_1-1681.html.

"The Taiwanese legislature has announced plans to subsidize development of open-source systems for the public and private sectors, the Taipei Times reported. Starting 2003, the National Supercomputing Center will begin a two-year mission to encourage development Chinese-language operating systems and office applications for use throughout the nation's bureaux, schools and offices. The legislature reckons that by getting into rehab and kicking the Microsoft crack habit the government could save NT $2 billion while the private sector could save NT $10 billion in licensing fees." Source: Greene, Thomas C. "Taiwan govt pushes open source". The Register (4 June 2002). http://www.theregister.co.uk/content/4/25566.html.

Thailand

http://linux.thai.net/ (accessed Dec 23z, 2002) is the link for the mostly-Thai language website of FLOSS in this part of the globe. Some links offered on this site include Pladao (http://www.pladao.com/), the Thai Translator Pool Project (http://www.9nar.net/), ThaiLinux.com (http://www.thailinux.com/), Thai Linux Software Collection (http://ftp.nectec.or.th/pub/thailinux/software/), The Thai Linux Documentation Project (http://ftp.nectec.or.th/pub/thailinux/docs/), the Linux Thai Project (http://www.thailinux.org/).

There are also a range of Thai GNU/Linux distros showing up, such as Linux TLE (http://linux.thai.net/linux-tle/), the schools-based Linux-SIS (http://www.school.net.th/linux-sis/), Kaiwal Linux (http://www.kaiwal.com/) and ZiiF Linux (http://www.ziif.com/) among others.

There's obviously much going on in this space, though it is difficult to map it more precisely due to language barriers.

In the implementation of the SchoolNet program, Thailand's NECTEC (the National Electronic and Computer Technology Centre) developed a Linux School Internet Server (Linux-SIS). This was meant to be promoted and distributed to schools as a cheaper — meaning, more affordable — alternative to using expensive server software. It was meant for schools ready to move beyond the first phase of Internet implementation.

"Since its introduction, Linux-SIS has been very popular in Thailand due to its excellent documentatin in the Thai language, its simple-to-install CD-Rom and its web-based server management without the need to know Unix commands. SIS training courses are always in constant demand from schools looking for a reliable Internet server at the lowest cost," says a paper 'Best Practice SchoolNet Thailand', March 2002 (procured in hard-copy, but it makes a reference to http://www.school.net.th%29/

Linux-SIS was developed as version 1.0 in April 1997 and 2.0 in February 1998. Linux-SIS 4.0 with a Digital Library Tool Kit (designed to offer easy-to-use functions, that allow teachers and specially those with no knowledge of HTML to develop Net-based lessons for students) were developed in October 2000. Proponents of this suggest that latter versions of GNU/Linux "creates (a) simpler installation process and systems management".

United Arab Emirates

The UAE's Linux User Group is located at http://www.goldensun.com/linux/linuxpress.html (accessed Dec 23, 2002)

"Linux is the wonderful Free Multi-User Operating system supported by Millions of Internet users. People who look for viable alternatives to the costly bug infested Commercial Server operating systems should look into the most powerful Linux, which is available free of cost to any user. Unfortunately the Linux awareness is in its infancy in this part of the world. (The) Linux User Group will try to address the awareness issues and educating the masses in Linux. Membership is open to all computer enthusiasts in the United Arab Emirates irrespective of age, gender or nationality," said Mr. GSC Prabhakar, Organiser of Linux User Group- United Arab Emirates and the Managing Director of GoldenSun Internet Consulting & Research. Like in some other areas of the Middle East, expat workers from the Indian subcontinent settled there seem to be contributing to building up FLOSS in these areas.

Vietnam

EU official in Vietnam, Jordi Carrasco-Muñoz of the EC Delegation to Vietnam munoz@delvnm.cec.eu.int https://www.itfirms.co.za/webmail/index.php?action=newmail&addr=munoz@delvnm.cec.eu.int%3E argues that 'development' organisation in the First World should throw their weight behind Free/Libre and Open Source Software. He argues that the cost of Windows XP and MS Office is between $560 and $800 (standard to professional version).

In a country like Vietnam, where the GDP per capita is $440 per year, the cost of just the operating system would be equivalent to one year and three month's wages of the average Vietnamese. XP and Office Pro would cost one year and ten months. "The cost-equivalent for the US, where the GDP per capita is $30,200 per year would be $38,436 for just XP and Office," he argues. Therefore is it "very surprising" that the percentage of illegally-copied (or, what the corporations prefer to somewhat misleadingly call 'pirated') software in Vietnam is 97%, he notes. (Prices of the proprietorial products are from Amazon.com

Vietnamese expats, settled abroad, are also doing their bit to promote FLOSS in their language and region.

Le Hong Boi's 'Vietnamese Linux' was set up in April 1999 and has been offering local-language solutions to download.

* * * * * * * * *

FOOTNOTES: The term FLOSS, Free/Libre or Open Source Software, has been used by Rishab Aiyer Ghosh in his study. See the online version at <http://www.infonomics.nl/FLOSS/report/> Aiyer Ghosh points out in an interview that this term — which covers both Free and Open Source software — has the additional advantage of incorporating "Libre Software", a term that is unfortunately hardly in use outside the French-speaking members of the EC bureaucracy, but is a good description of the 'free' nature of this software. (Free, as in freedom, that is.)

The Free Software Movement as we know it was founded in 1985 by Richard M. Stallman. The basic tenets of free software are — freedom to study, freedom to change, freedom to share or distribute, the right to sell free software, and the principle that the software 'source' has always to accompany binaries. Linux, the kernel widely used by Free/Libre and Open Source Software, is also sometimes interchangeably used to describe FLOSS, which actually is a wider concept. — Frederick Noronha : <http://www.bytesforall.org/> : When we speak of free Freelance Journalist : Goa India 403511 : software we refer to Ph 0091.832.409490 : Cell 0 9822 122436 : freedom, not price.

Free Software in Latin America

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Revision History

Version	*Date*	*Comments*	*Author*
Draft 1	06/11/2002	First public available version before proof-reading. Expect some errors.	Cesar Brod
Draft 2	10/11/2002	Text review, proof reading	Cesar Brod
V 1.0	19/11/2002	Added text on the First National Free Software Forum for Universities in Brasil (São Carlos) Added text on São Carlos city project for free software adoption – page 12	Cesar Brod
V 1.1	23/01/2003	Consolidation of several research data on the overall ICT usage in Latin America Overall review	Cesar Brod

Table of Contents

Acknowledgements

This work have changed my view of the world and the role free software can play in changing it in a better place for us and our future generations. I could not have accomplished it without the provocation and help of a lot of people, and although I wish I could, I won't be able to name all of them here. I wish to thank all who helped with this work naming a few people who have worked close to me during the research and writing process:

Niranjan Rajani and the Finnish Ministry of Foreign Affairs and Ministry of Development Aid, who came up with this study idea and have sponsored it.

Richard Stallman, who introduced my name to Niranjan and is pretty much responsible for what free software has become.

Frederick Noronha and Nico Coetzee, my colleagues in this work, and with Niranjan we all freely shared our thoughts.

Henrique Gravina, who produced WUW – Who Uses What, a software that will allow us to produce our own customised statistics on free software usage on the Internet, and Raju Mathur who came up with the PERL script that triggered the WUW idea.

Josi Graciela Petter, my secretary at UNIVATES, who highly contributed on making my time available for this research.

UNIVATES, for allowing me to use its computer and internet resources to produce this work.

UNESCO, who sponsored my trip to the 3ras Jornada Regionales de Software Libre to present my work with GNUTECA, and at the same time allowing me to make a lot of contacts with people involved with Free Software in Latin America.

Everyone from UYLUG (The Linux User Group of Uruguay) and all other user groups I have been able to contact.

Leonel Plazaola, Georg Lehner (Nicaragua), Victor Huayllani Yllatinco (Peru), Ramsés Morales (Panama), Federico Heinz, Diego Saravia (Argentina), Rodolfo Pilas, Federico Gamio (Uruguay), Carlos Chavarria (Costa Rica), Imre Simon, Rubens Queiroz, Marcelo Malheiros (Brazil) and a whole lot of other people who contributed with their own country specific information.

The team of the UNIVATES IT department.

My wife Meire and my daughters Natália, Aline and Ana Luiza who put up with a lot more hours away from home than I expected when I took over this task just because they love me as I love them.

Executive Summary

A 2001 study sponsored by Accenture and Santander Central Hispano Investment[1] have shown Latin America has 15 million Internet users, which means the Internet is used by only 3% of the region population. Another recent study by eMarketer[2] says Latin America will have 33 million Internet users by the end of 2002, 43.4 millions by the end of 2003 and more than 60 millions by the end of 2004. Even considering the growth of the Latin American population and extrapolating the data for the upcoming years, we can easily see the number of Internet users will grow proportionaly faster than the population. The eMarketer study estimates a growth of 80% of the Internet users from 2002 to 2004 (Argentina, Brazil and Mexico will have 65% of all of the Internet users). During the same period of time, the number of Internet users in the United States will grow only 11%.

A quick analysis of this data shows the IT-based (or IT-dependent) companies are already looking at the emerging economies in order to increase their businesses, once studies by the BSA[3] and IDC predict a market growth of 18% per year (considering packaged software products only). A major concern of the BSA, of course, is piracy. Although BSA studies[4] have shown the revenue loss has dropped close to 15% from 2001 to 2002, it is still close to one billion dollars.

As the unemployment rate is bigger than the Internet users rate, one may think Latin American governments have more to worry about then software piracy only. BSA studies, however, have been effectively showing the two things are related – there is a significant reduction of jobs when software piracy increases. Using this argument, local BSA representations in all of the Latin American countries have been able to join forces with the federal police and using local "software laws" they have fought piracy by applying fines and taking to prison illegal software users.

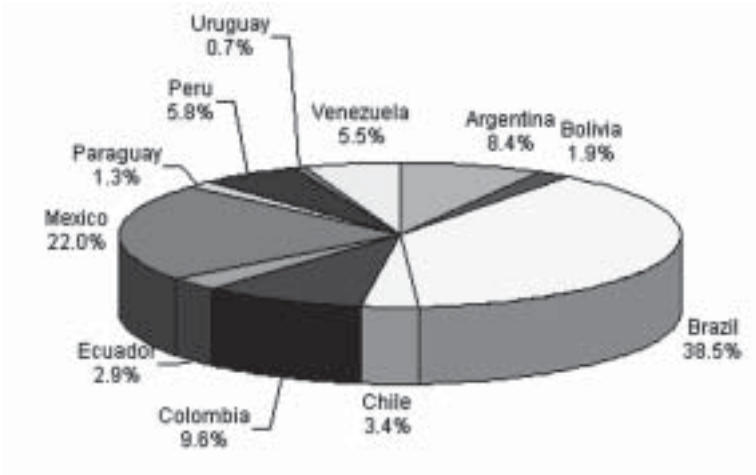
Some governments in Latin America, however, are noticing that by using and fostering free software development and usage, they can, at the same time, fight piracy, increase jobs and acquire technological independence. Free software can be freely copied and modified, thus there is no legal possibility of piracy when using free software.

In April, 2002, Peru has become the latest Latin American country to propose a bill mandating[5] the use of open source software in government organisation. Brazil, Mexico and Argentina already have similar proposals in place. Most of those proposals require that the software used by the government agencies have their source code available for auditing by the tax payers, once they are the ones actually paying for it.

Latin America Demographics[6]

	1995	1996	1997	1998	1999	2000	2001
Real Sector							
Population (million)	409.9	416.2	422.6	428.9	435.3	441.7	448.8
GDP per capita (US$)	3,864	4,142	4,482	4,427	3,801	4,166	4,074
GDP (US$ billion)	1,584	1,724	1,894	1,899	1,655	1,840	1,828
GDP (annual variation in %)	1.6	3.7	5.2	2.0	0.1	4.0	0.2
Unemployment (%)	7.7	7.1	6.9	6.9	7.8	6.8	7.7
Fiscal Balance (% of GDP)	-3.7	-2.8	-3.0	-4.4	-4.7	-2.6	-2.7
Monetary Sector							
CPI (%-change)	24.9	16.3	9.4	8.3	8.7	7.0	5.3
Interest Rate (%)	32.9	21.4	26.3	27.1	16.6	15.1	11.1
Stock Market (US$-terms, %)	-	14.1	25.9	-38.1	57.1	-16.7	-5.9
Bonds (EMBI+ Latin)	1085.0	542.0	471.8	936.6	592.7	705.8	1239.1
Exchange rate depreciation	15.0	6.0	5.7	9.8	12.5	5.0	4.3
External Sector							
Current Account (% of GDP)	-2.2	-2.1	-3.1	-4.4	-3.0	-2.2	-2.8
Trade Balance (% of GDP)	0.5	0.5	-0.4	-1.5	0.0	0.7	0.6
Current Account (US$ bn)	-34.1	-36.5	-59.3	-83.6	-49.5	-40.2	-50.4
Trade Balance (US$ bn)	7.5	8.8	-7.8	-27.7	0.8	12.7	11.4
Exports (US$ bn)	209.2	236.3	262.3	257.2	273.5	331.1	318.9
Imports (US$ bn)	201.7	227.5	270.2	284.9	272.7	318.4	307.5
Exports (%-change)	22.9	13.5	11.5	-1.7	7.3	21.6	-3.8
Imports (%-change)	11.8	12.8	18.7	5.4	-4.3	16.7	-3.4
Int. Reserves (US$ bn)	130.9	152.0	165.0	156.2	145.7	149.9	152.4
Int. Reserves (months of imports)	7.8	8.0	7.3	6.6	6.4	5.7	5.9
External Debt (US$ bn)	535.3	567.4	602.2	693.1	712.5	694.6	693.9
External Debt (% of GDP)	33.8	32.9	31.8	36.5	43.1	37.7	38.0

Distribution of Population per Country[7]

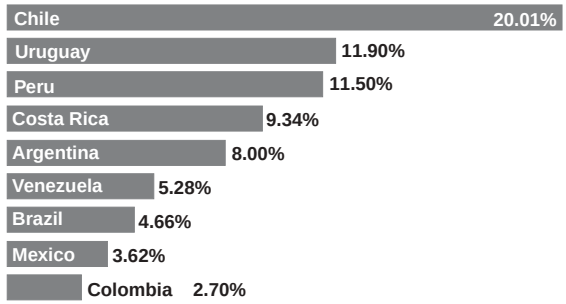


Comparative Estimates: Internet Users in Latin America*, 200-2005 (in millions)

	2000	2001	2002	2003	2004	2005
Accenture, February 2001	15.0	22.0	33.00	33.0	44.0	-
Computer Industry Almanac (CIA), April 2001	21.6	31.8	43.2	55.8	-	-
eMarketer, May 2002**	**19.3**	**26.2**	**33.1**	**43.4**	**60.6**	**-**
International Data Corporation (IDC); September 2001	-	21.8	31.0	42.8	-	-
Jupiter Media Metrix, inc, March 2001	21.0	-	-	-	-	77.0
Morgan Stanley, May 2002	15.0	18.0	21.0	26.0	31.0	40.0
Nielsen// Nietratings, March 2002	-	20.7	-	-	-	-
Probe Research, February 2002	-	6.8	9.9	-	-	18.0

*Note; *including Mexico;** eMarketer's year 2000 and 2001 baselines are from the international Telecommunication Union's estimate of internet users aged 2 years and older, who have accessed the internet within the previous 30 days*
Scurce: eMarketer, May 2002; various, as noted 2000-2002

Internet User in Selected Countries in Latin America, 2001 (as a % of the population)



Scurce: International Telecommunication Union (ITU), June 2002

In Brazil, with the election of Lula for president, it is expected a big boost for free software adoption and development[8] based on a good experience with this kind of technology in the state of Rio Grande do Sul, ruled by PT, the elected president's party. Also, as Lula is viewed as someone who can strengthen the relationships between Mercosur[9] countries, this may also contribute to a wide regional adoption of free software.

Although there are several success stories (and some not so successful stories) of the usage of free software in Latin America, there is very little "statistical" information on this issue. The adoption of free software as a replacement for proprietary software is quite new all over the world, although it has become more popular and viable with the newest versions of the GNU/Linux operating system (the basis of most of the free software solutions).

The objective of this paper is to show some existing free software projects in Latin America who have already became important to the communities using them, some with the potential of becoming important, and some who have failed, along with some reasons for the successes and failures.

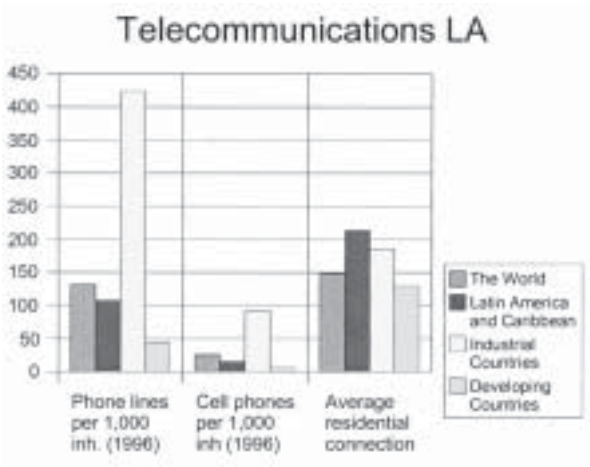
The ICT presence in Latin America

Selected ICT Indicators[10]

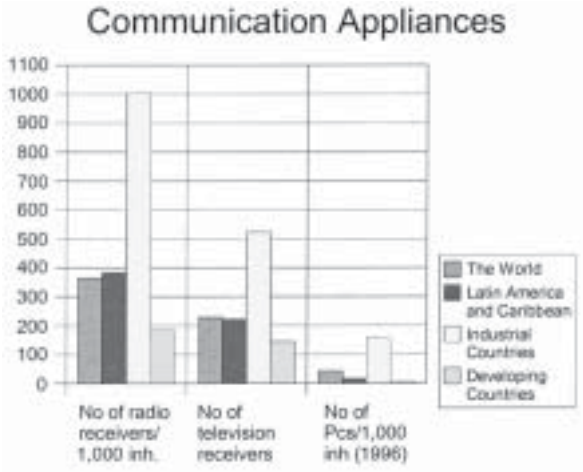
Indicators	The World	Sub-Saharan Africa	Arab States	Southern Asia	Eastern Asia	South-Eastern Asia and Pacific	Latin America and Caribbean	Eastern Europe	Industrial Countries	Developing Countries
Population in millions	5,787.40	604.90	260.40	1,337.70	1,805.70	3,516.60	484.30	343.50	1,228.70	4,538.70
GNP/capita	4,880.00	518.00	2,162.00	426.00	1,323.00	617.00	1,533.00	2,013.00	18,158.00	1,141.00
Domestic letter items/capita (1995)	69.00	6.00	5.00	Na	Na	17.00	16.00	31	380.00	Na
International letter items/capita (1995)	1.60	1.10	2.60	Na	Na	.50	1.10	1.60	6.00	Na
Phone lines per 1,000 inh. (1996)	131.00	14.00	51.00	18.00	61.00	35.00	108.00	169.00	424.00	45.00
Cell phones per 1,000 inh (1996)	25.70	2.10	3.70	.40	8.70	9.00	15.30	3.80	91.70	5.80
Average residential connection charge (US$, 1996)	148.00	96.00	127.00	59.00	Na	94.00	213.00	187.00	185.00	130.00
No of radio receivers/1,000 inh. (1996)	364.00	166.00	264.00	88.00	215.00	156.00	384.00	412.00	1,005.00	185.00
No of television receivers/1,000 inh. (1996)	228.00	35.00	138.00	55.00	248.00	150.00	223.00	317.00	524.00	145.00
No of Pcs/1,000 inh (1996)	43.60	Na	5,7	1.20	6.50	8.30	17.50	18.20	156.30	6.50
No of internet hosts (1,000, 1996)	16,253.00	104.00	9.00	4.00	135.00	77.00	164.00	246.00	15,818.00	435.00
No of users (1,000, 1996)	4.80	Na	.20	Na	.50	.60	1.30	2.60	17.90	.50
People on line (millions, 1999)	158.00	1.10	.80	Na	Na	26.60	4.60	Na	125.10	Na

It proved to be very difficult to find accurate, updated information and figures on the ICT evolution for Latin America. One of the reasons is the recent scenario of the telecommunications industry deregulation, other is the market protection policy that some of the Latin American countries applied during the 80's and 90's in an attempt to develop a local computer industry.

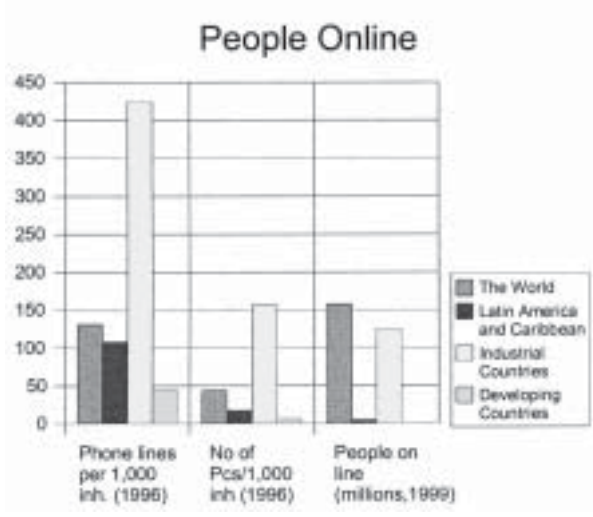
Let us take a graphical look at some of the data gathered from the UNESCO's Statistical Annex, which have been reproduced in the table above:



1. Note that Latin America has a distribution of regular phone lines and cell phones which is close to the World's distribution and better than the one for the Developing Countries, and yet, the average residential connection costs are higher than all of the other (even Industrial Countries). The cost, of course, is one of the reasons people don't have telephones. Governments in Latin America (with a few exceptions, such Cuba) have promoted a deregulation of the Telecommunications market, allowing international companies to invest in the telecommunications infrastructure and sell their services (which, of course, seemed very attractive considering the available growth space and the perception that people would gladly pay a connection fee similar to the average one in Developing Countries). What the figures don't show is that there is a lot of people living in areas where there is no telecommunications infrastructure, and the cost of building it is not considered profitable for those companies, so people will still have no access to telephones.



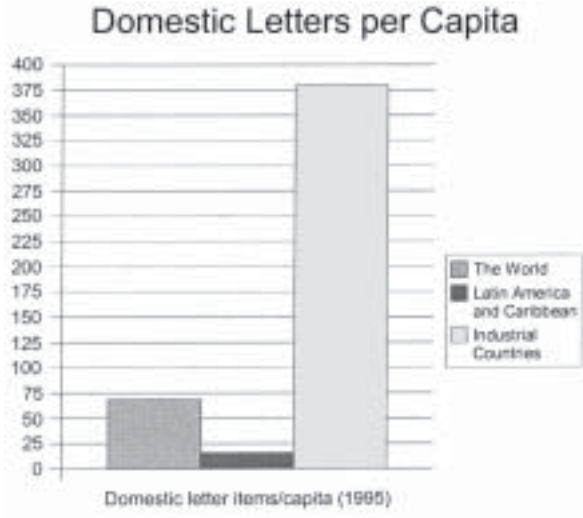
2. The number of radio and television receivers also follows the same pattern seem in the telecommunications graphic, although the number of personal computers is well bellow the World's average, but still better than the statistic for all Developing Countries combined.

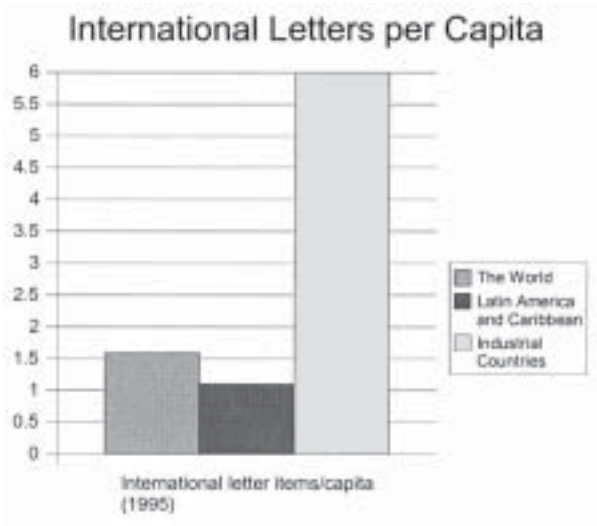


3. Considering that the minimal requirement for an Internet connection is a computer and a regular phone line, we see now that, compared to the World's average, there are very few people on-line in Latin America.

Morgan Stanley recognises in its 2000 Latin America Report[11] that "*income distribution is poor in Latin countries. The fifth quintile (top 20% of the Latin American population) concentrates almost 60% of the income, and the fourth quintile does not reach 20% of the income. By comparison, the top 20% of the US population concentrates less than half the total income and the fourth quintile receives almost 24% of the total. Latins are also significantly poorer than the average US consumer. In 1999, the per capita GDP of the four largest economies in Latin America ranged from $3,000 to almost $8,000, compared to $32,400 in the US.*", and provides some hints on how the Internet will grow in the region: "*initial Internet penetration of the top segments of Latin populations should be fast, with slower movement then to lower-income levels. (...) we expect the emergence of Latin solutions to work around such structural limitations as poor postal services or low credit card penetration. Some of these workarounds might appear strange to proponents of the virtual world, but will be pushed by the companies seeking to minimize their cost of serving clients.*"

Being a US based financial and market advising company, the Latin America Report produced by Morgan Stanley is geared to companies willing to establish business in the region. However, from a social or economic perspective, there is no way of providing advanced technology (such as Internet access) without covering some basis. Let us take a look at some more information extracted from the UNESCO's Statistical Annex:





Compared to the World and Industrialised Countries, Latin Americans seem to communicate less with each other, at least in a written way. This may point to poor postal services, but also to a low level of literacy[12] .

In an excelent study called Telecommunication Reforms, Access Regulation and Internet Adoption in Latin America[13] , Antonio Estache and others thoroughly evaluate the real costs of a telecommunication infrastructure needed to provide Internet Access for Latin America. However, even if the infrastructure is in place and access is provided will people really benefit from it? Are there other basis that needed to be covered first or the technology itself may help cover those same basis?

Geoffrey Kirkman (Information Technologies Group, Center for International Development Harvard University) points out in his paper "It's More Than Just Being Connected"[14] (1999) that we are still trying to figure out if Information and Communication Technologies can narrow the gap between developed and underdeveloped countries. Observing the effect of the deregulation and further expansion of the Telecommunications industry in Latin America and the fact this didn't cause any noticeable improvement in this gap we can conclude we have not figured this out yet.

Kirkman says "*If medical transcription services can be carried out in Madras, India for Boston doctors, then surely Russian language translations of computer magazines can be coordinated between London and Ulaan Bator, Mongolia. If the government of Costa Rica can attract mighty Intel to build a silicon-processor plant in its country, surely Mauritius can cut a deal with Microsoft. And without a doubt, many say, if only the Internet were taken to all corners of the globe, then the global economic and social inequality would be lessened. Unfortunately, translation of a utopian vision of the positive impact of ICTs on the developing world into reality is not so simple. In practice, whether or not a developing country can build an ICT-based economic or social sector depends on overcoming many of the same microeconomic and macroeconomic barriers that have long contributed to its underdevelopment – **What is the state of its educational system?(...) - What sources of investment capital are there for small or medium sized businesses? (...) - What kind of intellectual property rights protection is in place?(...)***"

Latin America is mostly an ICT consumer. Even the technology that is not imported into the region is produced by local subsidiaries of foreign companies. In terms of telecommunications, this is easily confirmed by the overall presence of international giants associated with local groups to provide access services (regular and cell phones, data lines). Before the deregulation, the local, government owned, Telecommunication companies were consumers of international technology provided by Siemens, NEC, Motorola and others. It is really very difficult and expensive to overcome the technology gap necessary to make Latin America become a telecommunications hardware producer. The investment for this kind of technology have already been put in place in other geographies by the companies owning this technology.

The benefits of producing some types of technology are questionable though, once patents are owned by international companies anyway – any derived technology produced locally would still belong to the original patent holder, meaning no real "local" knowledge would be produced. Considering the software industry example, pretty much all of the proprietary consumer software (Office productivity, Operating Systems, etc) have been localised into Spanish or Portuguese, although all of the software and translation produced are property of the company who sells the software packages.

Free software allows local development without the onus of property and patent issues. Software code produced becomes a property of the humanity and not of a single individual. This is possible because of the distribution schema of free software, mostly released under the GPL[15] or other types of Open Source licenses[16].

An overview of the presence of Free Software[17] in Latin American Countries

In order to find out how free software is being used in Latin America, this research relied basicaly in two very simple methods:

1. Google Search, using the term "Software Libre" (or "Software Livre", for Brasil) and the name of the country as spelled in the local language. All references pointing to "Software Gratis" where not considered, although references to all kinds of Open Source Software, regardless the type of the license were taken in consideration.
2. Contact with real people whenever was possible[18], person to person or through e-Mail.

Digging through the data collected, we tried to find Free Software projects that have a social and/or economical impact for the specified Country, local communities or the community in general. Along with this, we will point significant facts that somehow contributed to the free software movement or raised people awareness about it.

Latin American Countries

Caribbean	*Central America*	*South America*	*North America*
Cuba Dominican Republic	Belize Costa Rica El Salvador Guatemala Honduras Nicaragua Panama	Argentina Bolivia Brazil Chile Colombia Ecuador Paraguay Peru Uruguay Venezuela	Mexico

Country	*Number of Google pages found (November, 2002)*
Mexico	9590
Brazil	8540
Argentina	8000
Colombia	7320
Venezuela	6570
Peru	4510
Cuba	3820
Uruguay	3710
Chile	3470
Bolivia	2200
Ecuador	2140
Costa Rica	1970
Panama	1900
Nicaragua	1830
Guatemala	1760
Paraguay	1740
Honduras	1550
El Salvador	1080
Dominican Republic	200

Free Software in Mexico

GNOME

Being the country with the biggest number of hits in the "Google free-software search", one could expect the biggest and most important Latin American free software project would come from Mexico. This is possibly true. Started in 1997 by the Mexican developer Miguel de Icaza while working at the Institute of Nuclear Sciences (UNAM – Universidad Autónoma de Mexico), the GNOME project provides today a high-quality, user-friendly desktop for the GNU/Linux system.

> *The GNOME Usability Project aims to improve the ease-of-use of GNOME and make the GNOME experience as enjoyable and natural as possible.* [19]

Besides aiming to provide an enjoyable and natural interface for the user, the GNOME project also provides a set of tools for developing GUI applications. There is a complete set of office[20] productivity applications and dozens of applications[21] developed for the GNOME desktop, from development tools to multimedia players.

In 1999 Miguel de Icaza and others founded Helix Code, today Ximian[22], an open-source support and services company based in Boston, MA, US. The GNOME Foundation[23], founded in 2000 is also based in Boston.

Red Escolar Libre

A very exciting Mexican free software project was the Red Escolar Libre[24] (Free School Network), developed by UNAM and the Latin American Institute of Didactic Communication, ILCE (Instituto Latinoamericano de Comunicación Educativa). Based in the fact Mexico had, in year 2000, 120,000 schools, each one supposed to have one server and six desktop workstations, network connections, the server software would cost USD 500.00 and the desktop software would cost USD 55.00 (all Microsoft software), it seemed like a good idea to save all of the license money and use free software instead.

Problem was the huge savings on licenses purchase have made the project leaders overlook, or at least take a naive attitude towards implementation and support planning - and its costs. Unfortunately today there is no link to the Linux experience in the official site for the Mexican Red Escolar[25]. Several sites on the project (mostly on http://linux.org.mx) simply disappeared from the Internet.

Of course problems like that in free software implementation will always open space for proprietary solutions, and the Mexican government has now a partnership

with Microsoft to put the whole nation online by 2006 in a project called eMexico[26]. Miguel de Icaza has written a proposal[27] to the Mexican government suggesting the usage of free software to achieve the same goal.

Free Software in Brazil

Brazil is being very active in free software production, although most of the solutions developed in the country have not crossed its borders. The state of Rio Grande do Sul, who hosts the International Free Software Forum[28] (today the biggest IT show in Latin America) is being the most active in the country, mainly due to the local government support, who has been able to join the efforts of Universities, Companies and individuals in the Free Software Project – Rio Grande do Sul (PSL-RS[29]).

Código Livre

Brazil has its own "Sourceforge[30]-like" portal, a host for free software projects. Started by UNIVATES[31], a small University Centre in the city of Lajeado, south of the country, and now co-hosted by UNICAMP[32], the State University of Campinas, in São Paulo, CódigoLivre (http://codigolivre.org.br) has more than 2,300 users who contribute for more then 300 different projects[33].

UNIVATES

UNIVATES is recognized in Brazil as the most active free software factory[34]. Employing a team of more than 20 free software developers and support analysts, this University Centre has been producing free software since the beginning of year 2000 and have published a TCO analysis proving what the institution has saved in software licenses has been more than enough to pay the salaries of its developers. Among UNIVATES developed softwares are SAGU, an academic administration software with modules reflecting all businesses areas of an University; GNUTECA, a library administration, loan and collaboration system and MIOLO, a framework for the development of complex, database driven, free software solutions. SAGU is now used by a dozen Universities all over the country, and MIOLO is considered by several of them as a standard for software development. GNUTECA will have its English version by the end of 2002.

UNIVATES also sponsored the creation of SOLIS, a free software development cooperative, in order to increase the free software market and create jobs for the University students.

Rede Escolar Livre RS[35]

Based on the Mexican Red Escolar Libre project, and learning from its mistakes, the Rede Escolar Livre RS project is sponsored by the government of the state of Rio Grande do Sul and supported by PROCERGS, the IT government company. Rede Escolar Livre RS comprises a set of tools for distance education, web presence, computer learning, system and network administration and even a Debian customised Linux distribution who eases the adoption and learning of free software tools for teachers and students. With this project, the state government has saved more than USD 20 million dollars, and made investments in training programs and support staff.

City-based initiatives

Several cities in Brazil have implemented Free Software Projects. Some of them have approved laws making the adoption of Free Software Solutions the preferred one, and requiring thorough technical evaluations of proprietary solutions when they seem to be the only one available to fit specific needs. As an example, the city of São Carlos, in the state of São Paulo, have approved a "Free Software" law in October, 2001. The city has already installed eight free software based labs in public school libraries and a couple of "telecentres" in the poor areas of the city, where they are also providing training to the population, easing the citizens' access to technology and helping them finding jobs.

Free Software in Argentina

Although most of the countries researched have Linux and Free Software user groups, Argentina seems to be where the various groups are better organised, mostly due to the initiative of Lugar (Linux User Group Argentina – www.linux.org.ar) which provides a "virtual meeting point" for all of the groups. There is even a special group for health related free software - BioLinux[36] . Lugar in Spanish means "Place". Lugar also maintains the documentation portal AULA (which means "school class"), which is an effort to produce a localised – Argentinian specific Spanish – version of free software documents, although aligned with other documentation efforts such as LuCAS[37] and TLDP[38] . Another interesting effort is the Via Libre Foundation[39] , a NGO concerned about using free software as a sustainable development tool. Partnering with the Blas Pascal University[40] , Via Libre has been able to provide several Free Software Courses and support services.

UTUTO[41] – GNU/Linux Simple

The most important and visible project of Argentina is UTUTO, a CD-Rom based distribution of the GNU/Linux operating system tailored to the Argentinian users. Running directly from the CD-Rom driver, UTUTO does not require any installation. UTUTO is the brain child of Diego Saravia[42], an engineer that introduced Linux in Argentina in 1994 while working as a system administrator for the National University of Salta[43].

Free Software in Colombia

With several user groups organized under the umbrella of the Colibri[44] Community (Comunidad de Usuarios de Software Libre en Colombia), Colombia has a very good initiative on promoting academic adoption and development of Free Software through the project SLEC[45] (Software de Libre Redistribución en instituciones educativas colombianas). One of the components of SLEC is Structio[46], a tool set and documents that can be readily implemented in any interested Colombian school. The documents include a complete standard proposal for a hardware, software and network framework to be implemented in the schools. The SLEC web page also maintains a list of Education Institutions using free software, including their configuration and contact information, so they can help each other with the adoption of Free Software.

Free Software in Venezuela

There is a noticeable activity on Free Software in Venezuela, and even a plan[47] of the Planning Minister, Felipe Perez Martí, to develop an e-Government open source platform.

PHP-Nuke

PHP-Nuke is a web portal, content management system started by Francisco Burzi in Venezuela, which soon became a world wide adopted tool. From 2000 on, more and more sites on the web are using Burzi's tool. There is no estimate of the total number of "nuked" sites, but PHP-Nuke empowered non-specialised users with a free tool to build very professional looking web portals.

Free Software in Peru

In April, 2002, Peru has become the latest Latin American country to propose a bill mandating the use of open source software in government organisation. While the law was discussed in the congress, Microsoft sent a letter to congressman Edgar Villanueva Nuñez stating *"The project, by making mandatory the use of open-sourced software, establishes a discriminatory and non-competitive treatment at times of contracting and acquisitions by the public organisms (...)"*. Mr. Nuñez replied *"the state archives, handles, and transmits information which does not belong to it, but which is entrusted to it by citizens, who have no alternative under the rule of law. As a counterpart to this legal requirement, the State must take extreme measures to safeguard the integrity, confidentiality, and accessibility of this information. The use of proprietary software raises serious doubts as to whether these requirements can be fulfilled, lacks conclusive evidence in this respect, and so is not suitable for use in the public sector."*.

Both the Microsoft letter and the congressman response were made public[48], which raised a tremendous awareness of the issue all over Latin America, once Free Software activists reproduced and linked to the information sources in several web sites.

With pressures from the Microsoft (a donation of USD 550,000 to the Peruvian government) and the United States itself[49] (from the local embassy), the bill ended up not being approved.

Victor Huayllani Yllatinco started an ERP[50] project for small and medium businesses (PYMES – Pequeñas y Medias Empresas), implemented as a test basis in some textile industries. Due to the lack of confidence and further economic support for continuous development, the project was withdrawn and now Victor and others are trying to start an NGO to continue the project.

Free Software in Cuba

The "Proyecto Linux Cuba"[51] intends to foster the use of Free Software in the country, creating a tool set to ease this use and allow the growth of the user base.

INFOMED[52]

The telematic network of the Ministry of Public Health (MINSAP) was developed in 1992, the world's first to offer nationwide coverage and to use Linux as its operating system.

> From the beginning, INFOMED used the operating system LINUX - currently causing a crisis at Microsoft - because it was highly adaptable to the particularities of the task and, "because it isn't something packaged," allows for creativity, as well as its work philosophy based on cooperation, states its director, Pedro Urra.[53]

Free Software in Uruguay

Uruguay has a very active users group, UYLUG[54], which promotes the "Jornadas Regionales de Software Libre", an yearly event that brings people from all over Latin America and is the bigger and best organised user group event in Latin America. Free software usage is supported by academic initiatives by the Universidad de la Republica[55] and the Universidad Catolica de Uruguay[56]. Along with UNESCO, UYLUG is promoting a Latin American user groups community, in order to foster Spanish and Portuguese free software development and localization through user groups joint activities and a developers consortium.

Free Software in Chile

Very little information could be researched other than a good amount of user group activity and events organised by them.

Free Software in Bolivia

The Gabriel Rene Moreno University promotes a yearly Free Software Development competition[57], giving prizes for softwares developed in several categories (Games, Internet Software, Network Software and others).

Free Software in Ecuador

Ecualug[58] is the country's user group, and G-CTB[59] (GNU ConTaBilidad) seems to be the country's major project – an Accounting system.

G-CTB

G-CTB is a project developed by Branly Abendano, a student of the Escuela Politecnica Nacional[60]. G-CTB implements all of the basic accounting functions for small and medium businesses.

Free Software in Costa Rica

User group contacted http://www.linux.or.cr without response.

Free Software in Panama

Several projects based on free software, or relying on a free software network infrastructure were deployed during the past federal government, such as Infoplazas (telecentres) and multimedia casting servers. It seems all of them have been shut down or at least stopped by the actual government.

Free Software in Nicaragua

Four Universities in Nicaragua (UNI[61], UNAN Managua[62], UNA[63] and UNAN León[64])have put together a plan for developing an infrastructure that will consist in a system to handle Academic Registration, Accounting, Human Resources and Library[65]. This plan requires all software adopted or developed to be under free software licenses.

SAM

Developed by Georg Lehner, Denis Chavez and Leonardo Orozco, SAM[66] is a tool for hospital equipment administration and support.

Georg says "*the program is designed to be internationalised and is not restricted to Hospital Maintainance. The target "market" would be middle to big institutions, with a dedicated maintainance department, which eventually has some sub-departments, like universities, SuperMarket-Chains, Ministries, etc".*

Free Software in Guatemala

No relevant info retrieved.

Free Software in Paraguay

No relevant info retrieved. Although the UYLUG (Uruguay) is setting up a free software conference in Paraguay to help enthusiasts to get more attention.

Free Software in Honduras

User group http://www.linux.hn/honlug.php contacted without response.

Free Software in El Salvador

User group http://www.linux.org.sv contacted without response.

Free Software in Dominican Republic

The Dominican Republic hosted in the beginning of November, 2002, the country's first "ExpoLinux"[67], a Linux and Free Software congress organised by the user groups[68] and the engineering students of the Catholic University[69].

Free Software and the Latin American Academy

Latin America contributes only with 2.1% of the world's academic scientific research[70]. Considering only IT related research, this contribution goes down to 1.2%[71]. This clearly demonstrates Latin America is technology dependent from developed countries (USA, Europe and the Industrialised Asia produce more than 80% of the world's scientific research).

As Free Software is royalty and patent free, it can be used as research basis by any academic institution without the need of investment in proprietary software products. This is one of the reasons why in most of the countries researched here there is (at several levels) academic involvement with free software. One other reason, of course, is as the free software programming code is open, students have full access to it.

During the days of November 13 and 14 a group of Brazilian Universities got together in the city of São Carlos, São Paulo, in order to discuss joint actions for free software adoption for education and school administration. Along the actions defined by the "Letter of São Carlos"[72], are the creation of a web portal with description of success stories of software adoption within Universities, online training and hints and

a knowledge database. Also, the "Letter" will propose a review of all academic "curriculum" in order to avoid the hard-link of any course to proprietary software tools.

Similar actions have been already described in this document: Project SLEC in Colombia and a joint development plan for Universities in Nicaragua.

Some conclusions and ideas (trying to keep it simple)

Bringing some figures mentioned here back, as we see the unemployment rate of Latin America (almost 8% in the year 2001) being bigger than the percentage of people who have network access (3%) and the technology dependency on developed countries (only 2.1% of the world's academic research comes from Latin America) we should try to find where free software can help (or is helping) change this situation.

Education

Education plays an important role on individual independence and ability to build a better life and this research have shown a couple of examples where free software have lowered the barriers for "technology-enhanced" learning. Both Colombia and Brazil have experiences that can be shared with other geographies, and both have shown a success experience depends on proper planning, the creation and adoption of standards, ways of sharing information and (as in the case of the south of Brazil) government support (although desirable, this doesn't seem to be mandatory).

One of the tools Colombia uses in its schools is the excellent FreeEduc, released by Ofset (Organization for Free Software for Education and Teaching)[73] . FreeEduc has some localization for the Spanish language, and less localization for Portuguese.

A good amount of schools, however, are too far from being benefited by free software (or any kind of software) as some of them don't even have electricity. Data from UN's CEPAL[74] (The Economic Commission for Latin America and Caribe) have shown an advance on education access, even in the rural areas, and now more than 93% of children between six and thirteen years old are studying in schools, and trends show this is getting better. CEPAL studies still show a high number of students leaving the schools to start working, and also shows that if these students have stayed in the school longer, their average income would be better. What the study doesn't show is if some "computer technology education" would also allow the student to get a better salary or job after finishing school, but it does show the Latin American market has not been able to provide jobs for professional "graduated" people (with academic or professional training): only 82% have some kind of job, and among them, only 81% are payed accordingly.

Although there are several education problems that need to be addressed, Brazil, Colombia and Venezuela have already found if money can be saved on software, it can be applied in other areas that are directly related to the quality of education.

Job Creation

Based on this information, and also knowing the amount of people below the poverty line in Latin America is 43% (2001 CEPAL estimate), we see that not only people need to get a job, but also have a better income.

Large companies that already have access to technology and can afford it are already benefiting from free software – although this study didn't look at the usage of free software by profitable large companies, it is clear that investments by IBM, Sun, Dell and others, along with free software adoption by large companies all over the region have shown there is an emerging business model having free software as part of it.

What free software can do is leverage technology usage by small and medium companies who really cannot afford the costs of proprietary technology, allowing them to reach a better competition level and grow to hire more people (and pay better salaries).

Peru, Ecuador, Venezuela and Brazil have developed software who can help small and medium enterprises, although none of them can be considered complete, they are all targeted to the specific needs of Latin American countries. Due to the proper marketing of proprietary software vendors, most of the free software developers contacted in this research mentioned the companies "fear" the adoption of free software solutions, and lots of those companies rely on illegal copied software, although they also fear to "get caught".

Colombia, Venezuela and Brazil have already plans for adopting free software for academic administration (Brazil has a couple of success stories already), which even being different from business administration, requires the same kind of technical skills for software development.

A "regional development" program could be put together, involving University and/or technical Schools, to build – and implement – free software tools for several different groups of small and medium companies. The rural area of Peru could be used as a starting point, whose experience could then be expanded to another geographies and different set of companies. Along with helping companies to grow, the ERP-like free software development, deployment and support can also generate jobs.

One Brazilian initiative that could be considered a "thematic free software user group" could also be reproduced in other places and help finding new work spaces. The GNURIAS user group is a group that started in order to primary think of ways of women insertion in the men dominated IT marketplace. As free software has a business

model that is still being forged, the GNURIAS group thinks it may be a way of start fighting for more and better space for women in this model. Along with this, they also do some voluntary work intended to introduce people who haven't had access to technology before (old citizens, poor kids, etc) to computers by using free software.

Access and Democratisation of Information

With only 3% of people accessing the Internet in Latin America, we can surely say the Net today is not the best way of making information public. Free software can help in several ways, being the most obvious the lowering of the cost barrier for internet access which allows the creation of public "telecentres". Less obvious are the usage of free software as an instrument for making information available.

Radio covers all of Latin America through wide band or shortwaves. A small group of people with Internet access can broadcast information to a lot larger number of communities. The information can be targeted to the different kind of communities, cooperative workers, etc. Regular mail also covers pretty much all geographies, meaning that even where Internet connection is impossible or cost-prohibitive, information that can be accessed trough a computer could be used (even though the computer itself will be offline). Combining free software, radio, offline computers and regular mail a lot of information and specific community related training could be shared. As radio regulations vary from country to country, this initiative is likely to require local government support.

Publishing information on the Internet is no longer a mystery, and with tools like PHP-Nuke it is easy for non-technical people to do this in a very organised, effective and professional way. As long as some kind of communication is allowed between local communities or individuals with someone with internet access, any information can be made public. Allowing the world to know the problems local communities have is already a way of finding solutions to this problem, and also push governments to help.

Transparency

It is very difficult to ensure transparency when someone doesn't want to provide information. When this is government information, it should, in principle, be readily available for the public this government rules and represents. The several proposal of bills who are trying to push Latin American governments to use free software take this in consideration. One must admit, however, there is not enough free software tools to run a government, and a lot of developed countries are not willing to use free software as a standard tool for government administration (although, the army in several

countries are using it in the other way – to ensure privacy of critical information[75]).

If a developed country would adopt free software as a standard for public administration, allowing public inspection of information and even allowing the auditing of the code through the publication of it entirely, this would set an example that would show the world free software can be used for this mean. If a group of developed countries invest in the development of a generic, internationalised version of a government administration tool, this would probably save money for these governments and also allow the countries who doesn't have the money to pay for this development to also use the tool. It is even probable, as a couple of governments take this attitude, that companies already providing proprietary tools for government administration will be willing to open source their software.

Of course this doesn't help transparency itself, as it depends on the will of each Country. But if the tool allows several information to be viewed by the public, and the countries supporting the development of this tool make the information available, people will know if their government doesn't make information available is because it just doesn't want to, so they can better push for it.

Free software tools could also be make available for the house of representatives, allowing congressmen to easily push their proposals for public viewing and comments. PHP-Nuke allows this kind of things already. Combined with other forms of communications other than the Internet, everything published by a congressman could reach the audience through radio, regular mail, etc. So, a proposal that can help or cause problems to a specific community will reach their individuals who will be able to support or act against it. As a congressman will have its work "viewed" by a larger number of people, he/she will be carefully thinking about his actions.

1 Published in the newspaper “O Estado de São Paulo” - http://www.estadao.com.br/tecnologia/internet/2001/mai/08/272.htm
2 Published in the newspaper “Folha de São Paulo” - http://www1.uol.com.br/folha/informatica/ult124u11351.shtml
3 Contribution of the Software Industry to the Latin American Economies, by Price Waterhouse Coopers
4 www.bsa.org/resources/2002-06-10.130.pdf
5 http://www.computing.co.uk/News/1131173 – actually, most proposals “prefer” the usage of free software, rather than mandating it.
6 Source: Latin Focus (http://www.latin-focus.com)
7 Source: Latin Focus (http://www.latin-focus.com)
8 http://www2.uol.com.br/info/aberto/infonews/092002/18092002-6.shl
9 http://www.cnn.com/2002/WORLD/americas/10/29/brazil.elections.ap/index.html
10 UNESCO’s Statistical Annex (http://www.unesco.org/webworld/wcir/en/pdf_report/annex.pdf), published 1998–1999
11 http://www.morganstanley.com/institutional/techresearch/latnet.html?page=research
12 On the Conclusion section of this document we will go through some education issues.
13 http://econ.worldbank.org/files/13162_wps2802.pdf
14 http://www.cid.harvard.edu/ciditg/resources/beingconnected.pdf
15 http://www.gnu.org/licenses/gpl.html
16 http://www.opensource.org/licenses/
17 For the scope of this research, no special distinction was made when researching for Free Software or Open Source Software solutions.
18 The author wishes to thank UNESCO for sponsoring his participation at the 3eras Jornadas Regionales de Software Libre, where some contacts were made.
19 http://www.gnome.org/intro/findout.html
20 http://www.gnome.org/gnome-office/
21 http://www.gnome.org/projects/
22 http://www.ximian.com
23 http://www.gnome.org
24 http://www.mexicoextremo.com.mx/noticias/redesc-linux.php3
25 http://redescolar.ilce.edu.mx/
26 http://www.northamericaninstitute.org/articlearcive/nytimes041702.htm
27 http://primates.ximian.com/~miguel/emexico2.html
28 http://www.softwarelivre.rs.gov.br/forum/
29 http://www.softwarelivre.rs.gov.br/
30 http://www.sourceforge.net/
31 http://www.univates.br
32 http://www.unicamp.br
33 http://codigolivre.org.br/softwaremap/trove_list.php
34 http://www.univates.br/freesoftware
35 http://www.redeescolarlivre.rs.gov.br/
36 http://www.biolinux.org.ar/
37 http://lucas.hispalinux.es/
38 http://tldp.org/
39 http://www.vialibre.org.ar
40 http://www.ubp.edu.ar

41 http://www.ututo.org/quees.html
42 http://g.unsa.edu.ar/ututo/dsa.html
43 http://www.unsa.edu.ar/
44 http://bachue.com/colibri/
45 http://ingenieria.sanmartin.edu.co/slec
46 http://structio.sourceforge.net/
47 http://www.hpcd-abogados.com/es/abogados/download/e-gov1es.pdf
48 http://www.gnu.org.pe/preyres.html
49 http://www.baquia.com/com/20020716/not00001.html
50 http://fing.javeriana.edu.co/ingenieria/dep_procesos_productivos/iiccio2002/ponencias/IICCIO2002PonenciaTaipeLinuxDefinitivo.pdf
51 http://www.linux.cu
52 http://www.sld.cu/
53 http://www.cubasolidarity.net/urragranma.html
54 http://www.linux.net.uy/uylug/
55 http://www.rau.edu.uy/
56 http://www.ucu.edu.uy/
57 http://nodo.uagrm.edu.bo/congresolinux/Default.htm
58 http://www.ecualug.org
59 http://gctb.sourceforge.net/
60 http://www.epn.edu.ec/
61 http://www.uni.edu.ni
62 http://www.unan.edu.ni
63 http://www.una.edu.ni
64 http://www.unanleon.edu.ni
65 http://www.tic-nicaragua.edu.ni/pdfs/plan_en.pdf
66 http://sam.uni.edu.ni/
67 http://expolinux.linux.org.do
68 http://linux.org.do
69 http://rsta.pucmm.edu.do/
70 Although I could not find a printed confirmation of the "per-country-rate" participation in academic research, I was told when participating in SOLIES (Free Software Forum for Universities) that of this 2.1% the majority of academic research (circa 80%) comes from Brazil.
71 http://www.cgee.org.br/arquivos/abc.pdf – Memória da Conferência Nacional de Tecnologia, Ciência e Inovação (September 2001)
72 To be published in http://www.ufscar.br/solies
73 http://www.ofset.org/
74 http://www.eclac.cl
75 See http://slashdot.org/article.pl?sid=02/10/29/0233251

Free/Libre and Open Source Software (FLOSS) have recently gathered momentum which has surprised both the proponents and opponents. Simultaneously, much of the ICT hype has crashed. Much more than only the source code, FLOSS is not only about technology.

This report introduces and analyses the significance of FLOSS – the philosophy, the movement, the large variety of different software, and the expansion of the ideas into other walks of life – for the developing countries. The study is not an economy-based one, but is looking at the wider impact of ICT and FLOSS on societies.

From the Southern perspective, FLOSS makes a difference. "Even a quick look at the use of computers in the education sector, NGOs, alternative media, and civil society is enough to convince us of the potentials of FLOSS," the report states. Developing countries definitely stand to gain in many ways from adoption and extensive use of FLOSS. But the report also finds significant obstacles to the extensive use of FLOSS in developing countries.

The report calls on the Finnish government to use, promote and support FLOSS in multiple ways. It suggests to sensitise civil society groups in partner countries about its potential and to encourage locally-trained "grassroot-hackers" to join the worldwide FLOSS-movement.

ELEMENTS for DISCUSSION

MINISTRY FOR FOREIGN AFFAIRS OF FINLAND

Department for Development Policy