Free And Open Source Software - Bridging The Digital Divide

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Abstract

Free Software or Gnu Software and Open Source software is the product of the selfless service of millions of programmers all over the world. It is making this world a better place to live in.

1 Free and Open Source Software - Introduction

Free Software written for the Gnu movement in public domain, is the result of the selfless service of thousands of programmers the world over, over the past twenty years. With the growth of the Gnu/Linux Operating system, Gnu/Free software is raging like fire among computer users around the world. Free Software Foundation was founded by Dr. Richard Stallman, after quitting from MIT in 1984 in Boston, USA. Free Software has a unique copyrighting called copyleft, fearing the greedy and immoral from among the proprietary programming community. Any software using free software automatically becomes a free software. It is today one of the biggest philanthropic movements worldwide, working to make the world a better place to live. [1]

Open Source Software guarantees freedom to use, copy and distribute and even modify but the copyright is not transferred to public domain as in Free Software. Ultimately it rests with the group of programmers or the company developing the software. The Open Source Movement was founded in 1988. The difference between free and open source software to the end user is very inconsequential while ensuring that both are available with all the freedoms associated with it and both the source codes are open. With both free and open source software, a student or programmer, can learn from the already optimised and lean codes, develop new applications with it or modify it by adding more features or functionality.

2 Why Free or Open Source Software ?

Free Software (more aptly called freedom software or swatantra software in the Indian context) gives freedom of four levels to the end user. It is called free software as in free lunch and not free beer. The main stress is on the concept of freedom in dealing with the software than on the financial aspects of ownership and possession.

The different freedoms associated with free/open source software are the following,

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†This document is prepared in Latex, the document preparation system *free software* in the Gnu/Linux Operating System.

[1] Refer to http://www.gnu.org for more details.

1. Freedom to Use

   Firstly, free software can be used by anybody irrespective of whether he or she use it at home, commercially or for educational purpose. It does not discriminate a home user and a professional user. All users are equal.

2. Freedom to Copy

   Secondly, free software can be copied to any media without infringing on any copyrights or IPR.

3. Freedom to Distribute

   Thirdly, free software can be distributed to any person or group of persons without any copyright or IPR violation.

4. Freedom to Modify

   Fourthly, since he source code of the free software is also available, an experienced, knowledgeable user is free to modify this source code for enhancing features and functionality. The subsequent distribution of the modified code also requires the source code be made available with the execution code to allow any further modification by any downstream user. Thus Free Software does not die, it lives forever.

Since Free/Open Source Software can be used without any fear of the law enforcing agencies or computer associations, it gives peace of mind to the users. Also it relieves one of the prick of conscience (if any is left) out of using pirated software from proprietary sources. The utility of the software is so great that the user eventually feels a deep sense of gratitude to the Gnu/Open Source Movement and looks for the earliest opportunity to give back to the movement. Giving back includes, helping install the Gnu/Linux OS on friends' PCs, giving occasional talk on specific applications, organising Gnu/Linux User Groups (LUG) in the College or locality, helping clear technical and general Linux related doubts on email mailing lists and many more innovative ways can be thought of.

2.1 Experiences with Free and Open Source Software

The Goa Government has been propagating the use of Free/Open source software in its offices and all educational institutes in the state. The Mechanical Engineering Department of the Govt. College of Engineering, Ponda, Goa has embraced Gnu/Linux in a big way.

The Mechanical Engineering Software Laboratory of the Mechanical Engineering Department of the College of Engineering, Goa was originally the CAD Laboratory running AutoCAD software on the Windows platform. Virus spreading through floppies and from the Internet was a major problem and almost half of the twenty computers in the Lab had some problem or the other, either a hard disk crash or master boot record corruption or software mismatch. The result was that out of twenty computers only ten were functional at any time and the uptime was about 50 % or so.

After the Lab switched over to Gnu/Linux OS, of the RedHat distribution, Open Source, the single purpose Lab immediately got converted into a multi-functional Lab serving several needs at the same time.

1. It was employing QCad, the free software Computer Aided Drafting system which served the drafting needs of the students as much as AutoCAD. It was a CAD Lab.

2. Having a powerful numerical computation package like Octave or Scilab it more than compensated for its costly proprietary equivalent, Matlab. The Lab served as a computation Lab.

3. Relational Data Base Management Systems is a very important part of any Information Systems practicals. The RDBMS packages of PostgreSQL and MySQL immediately converted the lab to a RDBMS lab overnight, without having to work on the costly proprietary equivalents of Oracle, Ingres, Unify and so on.

4. The free C and C++ compilers of gcc and g++ transformed the Lab to a programming lab too.

5. The networking capabilities of the Gnu/Linux OS transformed the Lab to a networked lab. The resources on each machine were thus shared by all the other machines. Also it offered valuable networking practicals for the students.

6. Round-the-clock Internet access changed the lab as an Internet browsing centre and Information downloading centre of the Mechanical Engineering Dept.

7. The availability of printing, scanning and video projection equipments combined with the LateX Document Preparation System, Gnuplot plotting software and xfig vector graphics software helped transform the Lab to a Project / Document Preparation / Presentation Lab. On-line classes using resources from the Internet gave a definite value addition to the teaching processes in the Department.

8. The availability of plenty of presentation packages in open source, specially the free software MagicPoint, the powerful and lean text based presentation package and Mplayer / WOMP / MoviX , the multi media software for playing DVDs, VCDs, Audio CDs etc.. converted the lab into a MultiMedia Education Centre.

Without any additional budget allocation for the laboratory, by employing free and open source software, the laboratory has been converted to a multi-functional one. The free availability of new applications software, upgrades of existing ones and the total absence of viruses have ensured that the up-time of the Laboratory has risen to a whopping 98 %.

All this would not have been possible if the free software and open source community around the world had been selfish and not put the software developed by them in public domain. The programmers working as a global joint community developing codes for the common good of the people of the world have made this possible. The same effect can also be replicated in many different labs in the world.

3 The Benefits

A striking feature noticed regarding free and open source software users is that the Gnu and open source volunteers are an infectious lot, ALWAYS willing to help others as much as they can and prepared to go any distance to see that the software is fully functional and users are satisfied using free and open source software. The Linux User Groups are totally informal groups which have sprung up in different parts of the world acting as the global interaction forums for these volunteers. They have regular meetings to disseminate information regarding free and open source codes and other technical information.

Engineering Colleges, other professional and academic institutions running right from Under Graduate courses in the Arts, Sciences and Commerce streams to Post Doctoral Programs and different Research Establishments in India can benefit a lot from using free and open source software. Some of the applications have been cited in section 2.1. Schools all over the country will benefit immensely in carrying out the daily activities like word processing, spread sheets, graphing, ordinary computations, writing notes, documentation preparation, surfing the Internet, gathering information and so on. The occasional tinkering required

to make the software more functional, ensures a speedy learning curve in effective system administration.

When computers (hardware and software) get cheap and easily accessible and education becomes cheap and affordable, it helps more people get computer literate and access the resources and facilities available on networks around the world. Computers can be used for the daily chores of a smalltime trader in the village as also for a busy doctor or businessman in the city. This helps bridge the digital divide. One need pay only for the hardware and practically nothing for the software. Only for high security applications, one needs to build security applications on the existing source code. Presently free software is being used in many high security applications in the developed countries of the West and hence security need not be an area of concern for the users.

Internet is the great driving force behind the spread and wide usage of Free and open source software. The Internet has spawned the growth of programming communities around the world who have helped develop some of the finest software in the public domain by constantly interacting with each other through mailing lists and emails. The completed source code and binaries are also put up at these sites for free downloads and testing by the programmers and end users from any part of the world. The beauty of the whole process is that there is complete freedom to use the software and its upgrades and also receive free documentation. The only thing which is morally expected from a user, they are not asking it explicitly from anybody, is to help others also to benefit from using free and open source software as one has benefited from it.

If one receives and gives back to the Gnu and open source community in return in the same spirit, the world will be such a beautiful place to live in. Thanks to the vision and wisdom of Richard Stallman (RMS) and his fellow colleagues of the Free Software Foundation and the Open Source Movement from all over the world, we have a very rich and fully functional software system for use by all the people of the world, without fear or favour.

Anybody naturally will have this question, how can one build business models based on software. It is possible to make business models from customisation and service. The knowledge in software should be in public domain for the common good. One can make revenue by helping organisations find better use of the software by customisation and maintaining it for them. Even Dr. Richard Stallman does it even to this day. The developer of free or open source software can sell the software at a cost to public accompanied by the source code. That is a business model. Even if one buys free software this way, since the source code is also supplied, in case the user wants to make additional features and improve the functionality of the software, he can do so himself without fearing any copyright violation or can get others to do for him. In turn if the user is distributing it to others, he has to ensure that the source code too accompanies the execution code to allow the software live for ever.

One should forget the days when a computer professional was considered to a rare commodity and had to be pampered day in and day out. Computers have today become tools for daily use by laymen and gaining expertise in the computer field and applications is so common. The supply of computer professionals in the country presently exceeds the demand in the market, (there is a difference in perception of quality, even though proper training can compensate for this), even though computer professionals service bodies like NASSCOM and computer training firms like Aptech, NIIT and others may differ.

The proprietary Software Companies of the world are holding the people of the world and their governments to ransom by maintaining a high cost of software and its updates, thus blocking the free spread and usage of knowledge for the common good. Nobody has objections if this software were charged nominally, with the source code also distributed along with the execution code.

A famous analogy quoted by many a free software proponent is about the carpenter and the wooden table which he makes. When we purchase a table for a cost, the carpenter not only gives us the right to use the table, he also gives up his right over the wood to make the table and also the right to do what we want with that wood. With the same wood, he cannot stop us from making another beautiful or more useful table. If the same principles were made applicable to the software world, it would definitely have spawned communities of software programmers working on open source software, churning out innovative and more functional software. If Sir Newton and Galileo were not to put their theories and knowledge in public domain and instead patented it charging the people for every usage of those principles, would the world have made such rapid progress as it has in the past couple of centuries ? Nobody would disagree that they have put their untiring efforts and hours of studies to discover those natural truths for the betterment of humanity. Have the present day programmers lost that sense of caring for HUMANITY ?

The only area where proprietary codes score over free and open source codes is in servicing the codes. Most of the non-geek users of free and open source software find the maintenance of software a problem when there is a breakdown. A new breed of computer technicians trained in free and open source software maintenance cab help solve the problem. Educational Institutions and technical institutions may not find maintenance of codes a problem as they would already have developed in-house expertise, but a home user or a small time businessman may find it troublesome and will prefer to be safe with proprietary codes even though it entails extra expenditure.

The decision makers at the government level can plan to start vocational courses on free and open source software maintenance at +2 level and certificate courses in ITIs in the country from the next academic session onwards. The free software and open source community will be helping the government in framing the required syllabus, curriculum and training the teachers. This will give a sure boost to the wide spread usage of free software in the country. Since Gnu/Linux distributions are never resource hungry, even old machines of the PI, PII range can suffice for setting up a decent working lab. Thin clients which work on a central server and distributed clients with no dedicated hard disks is already revolutionising the usage. Such a system is running in the Computer Centre at the College of Engineering, Goa housing 85 machines.

The basis of rich, prosperous Eastern civilisations has been giving and sharing from the societal resources, be it knowledge or material wealth. But the proprietary software / knowledge creation community, spawned from the West is creating an artificial division of the world, dividing the people of the world into the computer/knowledge haves and havenots, widening the digital divide between them.

Free and Open Source software usage is a definite and SURE step forward to help bridge this DIGITAL DIVIDE.