Open Source Software & Free Software

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ABSTRACT

This paper presents the necessities and possibilities of Open Source Software (OSS) and Free Software (FS) as viable alternatives to present situation of expensive, rigid and unauthorized software. The motive of this paper is to create awareness among the user about Open Source Software and encourage using them. For those of you, new to the concept, open source software is that which is open to modification by user, as opposed to the closed source, where you get only the executable file and cannot modify it in any way. Open source programs are ongoing projects; unlike the software company coming out with a final product release. In open source community they listen to user requests, comments and reviews. In short, the development process is a group effort of various people of various places rather than a group of a people in a company in some particular place.

Key words
Operating System (OS), GNU/Linux (Linux), Open Source Software (OSS), Free Software (FS)

1. HISTORY

The people behind the initial Open Source Movement were Richard Stallman, Linus Torvalds, and the Open Source Initiative formed by Eric Raymond & Bruce Perens.

1.1 Richard Stallman

Richard Stallman once working in his office at the AI lab at MIT faced a problem with the printer that was given to the MIT by Xerox. The printer frequently jammed. So, he intended to modify the printer driver so that rather than continue to accept print jobs, it would send a message to the connected computer that it had jammed. But, Xerox refused to provide the driver's source code because the person who had created the driver had signed a non-disclosure agreement with the company.

Stallman, who considered software as a source of information to be shared between people, was worried that the measures put up by vendors would make the life of users difficult, by depriving them of the freedom of usage.

So, he started creating an entire free operating system named GNU. Remember that "free" here means "freedom of choice (use, modify and distribute)" to the users, but not "free of cost."

1.2 Linus Trovalds

He was a computer science student at the University of Helsinki when he came across the "Minix" operating system. Minix was open source in that the 12,000 lines of codes were given in a textbook by the creator and author of the book Prof Andy Tenenbaum. Linus intended to improve on Minix, but was refused by the Professor. So, as a hobby Linus decided to create a free OS. Finally, he invented a Kernel (a central part of an operating system) named "Linux", which completed Richard Stallman's GNU. Hence, GNU/Linux was invented which soon became popular as Linux operating system.

1.3 Open Source Initiative (OSI)

The OSI was created in 1998 by Eric Raymond and Brue Perens, since they did not agree to the restrictions imposed by Stallman's ideology of free ("free" as freedom) software. So, the OSI introduced a license named OSL (Open Source License), which was more liberal than the license imposed by Stallman called the GPL (General Public License). Needless to say, the OSL opened new dimensions to Open Source Community as a result of which we can see Linux, which was command line interface originally is now available in GUI (Graphical User Interface).

2. EVOLUTION (Open Source Movement)

Free/open source software (F/OSS) is software for which the human-readable source code is made available to the user of the software, who can then modify the code in order to fit the software to the users needs. The source code is the set of written instructions that define a program in its original form, and when it's made fully accessible programmers can read it, modify it, and redistribute it, thereby improving and adapting the software. In this manner the software evolves at a rate unmatched by traditional proprietary software.

For many years free/open source software has been building momentum. Beginning amidst the technical cultures that produced the Internet and World Wide Web, it is now causing quite a stir in the commercial world as large software corporations are finding themselves competing against commercially available open source software.

What is OSS?

OSS literally means software whose source is open. More broadly we can say OSS should also not restrict the user from freely using it, modifying it and re-distributing it. The most significant differences between OSS and Proprietary Software (PS) is that PS are usually distributed as executable (.exe) files which makes them impossible to learn about its structure and logic, and make corrections or modifications if necessary.

What OSS isn't?

There is a general concept that all OSS is also free of cost, which isn't the case always. There is no restriction on the sale of OSS. People are free to package and sell OSS at a price they consider fit. But given the fact that the OSS is freely available to the next person as well, it is easy to say is will not have high price. If the price is too high then another vendor will enter the market and sell the same product cheaper. Thus it is sure that they will be charged only a fair price.

Why Open Source Software (OSS)?

2.1 Life Span

OSS allows modification by all hence can survive in its current form for a long time. Users need not worry about lack of vendor support or feel compelled to upgrade. Whereas, PS is supported and maintained only by the vendor, so the life of software is linked to that of its vendor only.

2.2 Quality

Everyone can see the OSS so any bugs or shortcomings can be easily identified and resolved. More the people see the code; more is the chance of discovering bugs. In contrast, PS code is usually reviewed by only a small group before releasing. The resulting code is not as bug free as OSS.

Failure Rates as Measured by Fuzz Tests
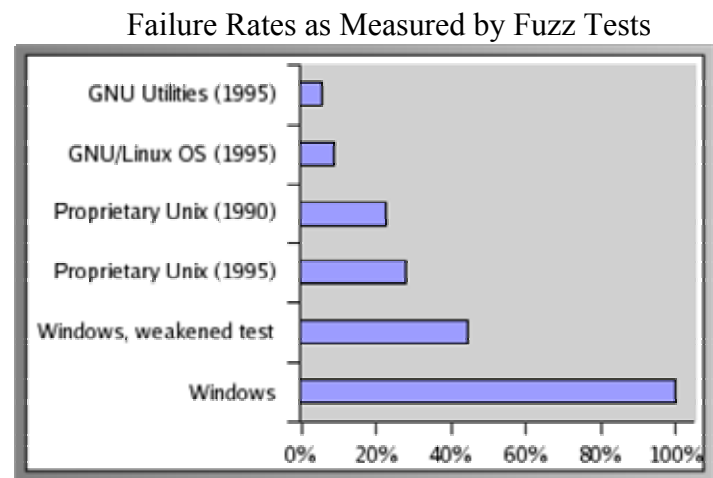
For example, experts have found that Linux has fewer bugs than Windows.

Source:
http://news.com/Security+research+suggests+Linux+has+fewer+flaws/2100-1002_3-5489804.html

2.3 Portability & Compatibility

In case of OSS, different users from different platform contribute and so there is software portable to almost any computing platform. The relevant modifications are made by the users of the respective fields. Whereas a PS vendor's product is limited to the platform. Switching to other platforms may lead to loss. *For example, MS-Office is compatible with Windows only (for MAC it is available but they need to pay royalty for its use) whereas the OpenOffice.org is available for Linux, Windows and MAC also.*

2.4 Response Time

In case of a PS, only the vendor can modify the code of a program hence it takes time to add any feature or remove any bug from it. But, in case of OSS anyone can add to it so as soon as you get a product people start changing it for the better. So, we can get newer versions quicker than compare to the PS.

2.5 Security

Quantitatively measuring security is very difficult. However, here are a number of attempts to do so, and they suggest that OSS/FS is often superior to proprietary systems, at least in some cases. At one time the security of OSS/FS systems was widely debated. Clearly OSS/FS systems are not magically invincible from security flaws. But for most of those who study the question, the issue of whether or not OSS/FS improves or reduces security appears to be an increasingly settled issue.

As of September 17, 2000, here are the total numbers of vulnerabilities for some leading OSes:

| OS	1997	1998	1999	2000
Debian GNU/Linux	2	2	30	20
OpenBSD	1	2	4	7
Red Hat Linux	5	10	41	40
Solaris	24	31	34	9
Windows NT/2000	4	7	99	85

3. MARKET SHARE

Many people think that a product is only a winner if it has significant market share. This is lemming-like, but there's some rationale for this: products with big market shares get applications, trained users, and momentum that reduces future risk. Some writers argue against OSS/FS or GNU/Linux as "not being mainstream", but if their use is widespread then such statements reflect

the past, not the present. There's excellent evidence that OSS/FS has significant market share in numerous markets:

1. The most popular web server has always been OSS/FS since such data have been collected. For example, Apache is the current #1 web server.

Market Share for Web Servers Across All Domains, August 1995 - April 2007
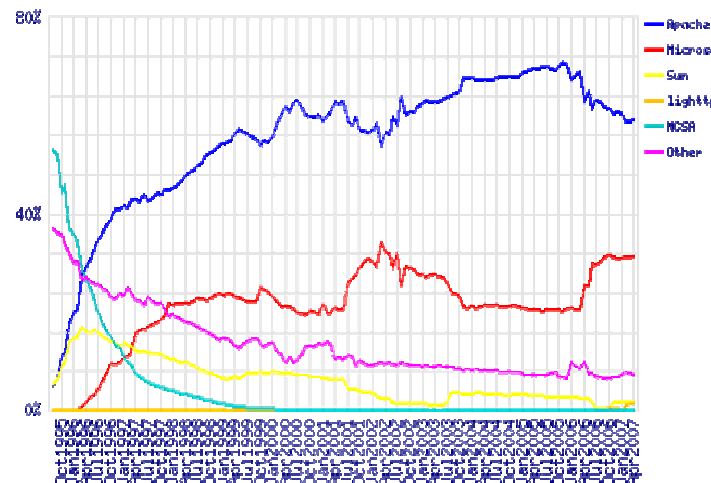
Market Share for Active Web Servers, June 2000 - April 2007
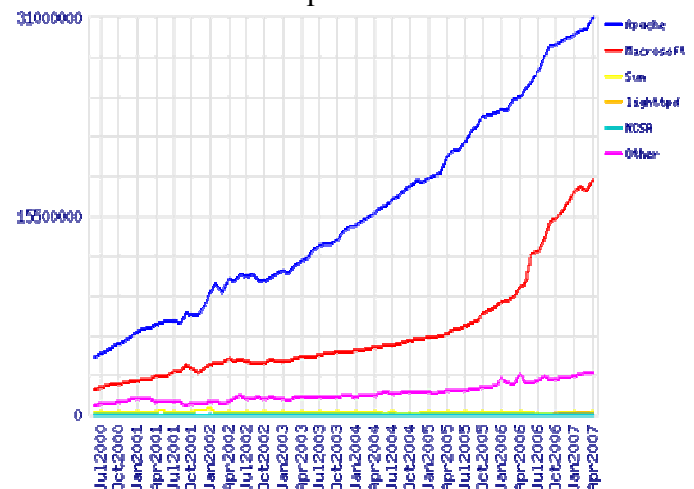
GNU/Linux is the #2 web serving OS on the public Internet (counting by physical machine), according to a study by Netcraft surveying March and June 2001.

OS group	Percentage (March)	Percentage (June)	Composition
Windows	49.2%	49.6%	Windows 2000, NT4, NT3, Windows 95, Windows 98
[GNU/]Linux	28.5%	29.6%	[GNU/]Linux
Solaris	7.6%	7.1%	Solaris 2, Solaris 7, Solaris 8
BSD	6.3%	6.1%	BSDI BSD/OS, FreeBSD, NetBSD, OpenBSD
Other Unix	2.4%	2.2%	AIX, Compaq Tru64, HP-UX, IRIX, SCO Unix, SunOS 4 and others
Other non-Unix	2.5%	2.4%	MacOS, NetWare, proprietary IBM OSes
Unknown	3.6%	3.0%	not identified by Netcraft OS detector

GNU/Linux is the #1 server OS on the public Internet (counting by domain name), according to a 1999 survey of primarily European and educational sites.

Here's how the various OSes fared in the study:

Operating System	Market Share	Composition
GNU/Linux	28.5%	GNU/Linux
Windows	24.4%	All Windows combined (including 95, 98, NT)
Sun	17.7%	Sun Solaris or SunOS
BSD	15.0%	BSD Family (FreeBSD, NetBSD, OpenBSD, BSDI, ...)

IRIX	5.3%	SGI IRIX

GNU/Linux was the #2 server OS sold in 1999, 2000, and 2001.

According to a June 2000 IDC survey of 1999 licenses, 24% of all servers (counting both Internet and intranet servers) installed in 1999 ran GNU/Linux. Windows NT came in first with 36%; all Unixes combined totaled 15%. Again, since some of the Unixes are OSS/FS systems (e.g., FreeBSD, OpenBSD, and NetBSD), the number of OSS/FS systems is actually larger than the GNU/Linux figures. Note that it all depends on what you want to count; 39% of all servers installed from this survey were Unix-like (that's 24%+15%), so "Unix-like" servers were actually #1 in installed market share once you count GNU/Linux and Unix together.

IDC released a similar study on January 17, 2001 titled *"Server Operating Environments: 2000 Year in Review"*. On the server, Windows accounted for 41% of new server OS sales in 2000, growing by 20% - but GNU/Linux accounted for 27% and grew even faster, by 24%. Other major Unixes had 13%.

IDC's 2002 report found that Linux held its own in 2001 at 25%. All of this is especially intriguing since GNU/Linux had 0.5% of the market in 1995. Data such as these have inspired statements such as this one from IT-Director on November 12, 2001:

"Linux on the desktop is still too early to call, but on the server it now looks to be unstoppable."

An Evans Data survey published in November 2001 found that 48.1% of international developers and 39.6% of North Americans plan to target most of their applications to GNU/Linux. In October 2002, they found that 59% of developers expect to write Linux applications in the next year.

The November 2001 edition of the *Evans Data International Developer Survey Series* reported on in-depth interviews with over 400 developers representing over 70 countries, and found that when asked which OS they plan to target with most of their applications next year, 48.1% of international developers and 39.6% of North Americans stated that they plan to target most of their applications to GNU/Linux. This is surprising since only a year earlier less than a third of the

international development community was writing GNU/Linux applications. The survey also found that 37.8% of the international development community and 33.7% of North American developers have already written applications for GNU/Linux, and that over half of those surveyed have enough confidence in GNU/Linux to use it for mission-critical applications.

A February 2005 survey of developers and database administrators found that 64% use an Open Source database.

Evans Data Corp.'s *"Winter 2005 Database Development Survey"* of developers and database administrators (DBAs), released February 2005, found a strong increase in use of a variety of OSS/FS databases throughout corporate U.S. Evans found 64% (about two-thirds) use Open Source databases (up from 58% the previous year), and over 50% use (or plan to use) XQuery and other open web services standards with their data -- Open Source or proprietary.

Two key factors seem to driving this rise: survey respondents indicated that OSS/FS databases are increasing their performance and scalability to the point where they are acceptable for use in corporate enterprise environments, and many organizations have tight IT and database development budgets. Evans found that MySQL, PostgreSQL, and Firebird were popular OSS/FS databases. Evans found FireBird is the most used database among *all* database programs for 'edge' applications, with Microsoft Access as a close second (at 21%). In addition, MySQL and FireBird are locked in a virtual tie in the OSS/FS database space; each is used by just over half of database developers who use   OSS/FS databases.

GNU/Linux dominates in supercomputing: GNU/Linux is used in 78% of the world's 500 fastest supercomputers use GNU/Linux, most of the world's ten fastest supercomputers... includes the world's most powerful supercomputer (as of March and November 2005).

By March 2005 Forbes noted that 60% of the world's fastest supercomputers use GNU/Linux, using data from Top500 to determine which computers are the world's fastest. Of those   top 500, the best available information shows that 301 run GNU/Linux, 189 on Unix, 2 on FreeBSD (another OSS/FS   Unix variant),

and one on Microsoft's Windows. A few machines' operating systems are unknown, but even so, Forbes says, *"Linux clearly is by far the top choice for high-performance computing."*

4. 10 MYTHS ABOUT OSS

Myth #1. It's all about Linux versus Windows, with Red Hat as yet another challenger to Microsoft.

Myth #2. Open Source Software Isn't Reliable or Supported.

Myth #3. Big companies don't use open source software.

Myth #4. Open Source is hostile to intellectual property.

Myth #5. Open Source is all about licenses.

Myth #6. If I give away my software to the open source community, thousands of developers will suddenly start working for me for nothing.

Myth #7. Open source only matters to programmers, since most users never look under the hood anyway.

Myth #8. There's No Money to be made on Free Software.

Myth #9. The Open Source movement isn't sustainable, since people will stop developing free software once they see others making lots of money from their efforts.

Myth #10. Open Source is playing catch up to Microsoft and the commercial world.

Some Comparable Open Source Software

Proprietary Software	Open Source Software
MS Windows	Linux

MS- Office	OpenOffice.org
MS- Word	Writer
MS- Excel	Calc
MS- PowerPoint	Impress
MS- Access	Base
Windows Media Player	Media Player Classic
Adobe Photoshop	The GIMP
Adobe PageMaker	Scribus
Adobe Illustrator, Corel Draw	Inkscape
Flowcharting Tool --- Visio	Dia
3D Cool	Blender
Macromedia Flash	UIRA
WinZip, WinRar	Zip Genius, 7-Zip
Ahead NERO	Burnatonce, Burrrn
Adobe Acrobat Writer	PDFCreator, DOC2pdf
Adobe Acrobat Reader	Foxit Reader
MS Project	Open Workbench
Fact, Tally	Turbo Cash
MS- IE (Internet Explorer)	Mozilla Firefox, K-Meleon
MSN Messenger, Yahoo Messenger	Miranda Instant Messenger, Gaim
MS- Outlook Express	Mozilla Thunderbird
Typeshala, Touch	Type Faster
Electronics Workbench	Logisim

4.1 Nepalese Perspective

Nepal and other underdeveloped countries have already missed the agriculture and industrial revolutions. Now we cannot offer to left out of the present revolution of Information Technology (IT). The information technology is not just developing new and innovative software and hardware, the main focus should be implementing the current technological advantages efficiently to economize and better manage whole system of country both private and government sectors.

The one major advantage of GNU/Linux OS is that it can support wide range of hardware, both old and new. The low cost and scalable sectors imply that with proper implementation more employment and good wages can be provided a very noble situation of country likes Nepal.

Organization like Madan Puraskar Pustakalaya (MPP) and FOSS Nepal has been contributing in the field of OSS and FS.

4.2 Madan Puraskar Pustakalaya released the localized Linux Distribution, NepaLinux 2.0.

NepaLinux 2.0 is continuity to NepaLinux, the localized operating system. The NepaLinux Development Team at Madan Puraskar Pustakalaya aims to make the system as much user-friendly and as less technical as possible with every new release of NepaLinux. In this regard, NepaLinux 2.0 comes up with additional choices to the end-users in the sense that it offers two different localized working Desktop Environments, respectively, GNOME and KDE. The NepaLinux 2.0 package comprises two separate CDs with GNOME Desktop Environment bundled in one of them whereas KDE Desktop Environment in the other. After having looked at the Desktop Environments via the Live CD facility, users may then decide finally which one to install in his/her computer. The introduction of the localized KDE Desktop Environment is one of the chief attractions of NepaLinux 2.0 package.

4.3 Special Features of NepaLinux 2.0

- Linux Kernel 2.6.18

- Localized and updated GNOME Desktop Environment 2.14

- Localized KDE Desktop Environment 3.5.5

- Localized OpenOffice.org 2.2 with upgraded Nepali Spell Checker.

- Localized Seamonkey Suite

- XKB and SCIM input systems

- Better hardware detection and compatibility

- Enhanced and consistent translation

5. Introduction to FOSS Nepal Community
FOSS Nepal Community is established by the team of those enthusiastic people who believe in the usage of Free/Open Source Software. The prime target of FOSS Community Nepal is to promote and diversify the usage of Free/Open Source Software in the country.

To raise awareness among government bodies, private sector, civil society, educational institutions and media for expanding the scope of Information and Communication Technology (ICT) via Free and Open Source Software.

To sensitize government bodies, civil society and media for the implementation of E-Governance by means of FOSS; the optimal solution for E-Gov.

Advocacy for Alternatives in Intellectual Property Rights (IPR) specific to ICT.

To enhance the capacity of IT professionals by promoting inclusion of Free and Open Source Software in educational system and providing platform for IT Professional to make them Globally saleable.

6. Responsibilities and Challenges

OSS/FS society has proved their ability to develop a broad spectrum of free software but there still exists several challenges that make the future of OSS/FS uncertain. OSS/FS is still in growing phase and is growing rapidly, once maturity is reached then OSS/FS have to prove its stability. Meeting those challenges require persistent effort and endurance, determination that may last for year; after all there is freedom at stake.

The freedom is two-edged sword. As with everything else, in OSS/FS also freedom comes with a burden of responsibility. The individuals and organization involved with the movement must be aware that they do not misuse the freedom or harm others both intentionally and unintentionally or attempt to invade private and proprietary information. :

The prominent challenges OSS/FS are facing or may face in future are:

6.1 Secret Hardware

Hardware manufacturers tend to keep hardware specifications secret. This makes writing drivers for GNU/Linux and OSS/FS GUI, more difficult for that hardware.

6.2 Software Patents

Software patents can put algorithms and features off limits to free software for up to twenty years. This is worst threat for OSS/FS. The ways to deal with the patents: either search is invalid or looks for alternatives ways to perform the required functions. If both fail, then OSS/FS is forced to lack the feature.

6.3 Free Documentation

The OSS/FS process large collection of quality software but unfortunately lacks good free manuals. Documentation is essential part of any software package. In absence of good supporting documentation the software may lack the information required for proper utilization. Creation of free manuals is also a part of OSS/FS movement and developers must have awareness and determination to produce and distribute free manuals.

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