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A comparative analysis of "Open source" and "Closed source" web technologies

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Abstract
This paper defines the concept of 'open source' and 'closed source' web technologies. This paper gives a detailed explanation of 'open source' web technologies while comparing it with its counterpart 'closed source' technologies. Various misconceptions about 'open source' web technologies are clarified. Lastly, advantages and disadvantages of 'open source' web technologies are highlighted.
The paper concludes that, the rate of adoption of open source web technologies - is *growing and accelerating rapidly*. 'Open source' software's (for example, Google technologies; free mobile applications) are looking more and more compelling day by day. Companies, Governments and general public are adopting them rapidly across the world.

Keywords: open source, closed source, rapid adoption

Introduction
'Open source web technologies' are software that can be freely distributed with source code included. These are easily available, such as by free download from the Internet. The source code should be in the same form that a programmer would actually use to maintain it - not, for instance, a generated, confused or intermediate code form. The free license of this software does not restrict others from distributing the code or modifications and derived works under the same terms. Open source applications provide source code that can be freely modified by software developers desiring to customize applications to meet the needs of their organizations.
The opposite of open source is called proprietary software, commercial software or, alternatively, non-open, non-free, 'closed source' software. The typical "closed" commercial software like Microsoft products makes software code unavailable to users and charges hefty license fee from every user. In "closed source" software, software is given at a high COST to the user. The user CANNOT view the source code of the software and CANNOT make changes to it.
On the contrary, open source software can be downloaded free of charge. In open source software, one has complete access to the source code and may copy and redistribute the software to others. One has complete freedom to modify the source code and redistribute the modified versions of the software. But, it has to be specifically stated that it is a modified version being distributed. In "open source" software, software is given at NO COST to the user. The user has complete freedom to view the source code of the software and make changes to it. Typical examples of open source software are – Google technologies, Mozilla Firefox internet browser, VLC media player, Open Office suite, Linux Operating System, Net Beans … et cetera.
Unlike typical "closed" commercial software models, which make software code unavailable to users, open source applications provide source code that can be freely modified by software developers desiring to customize applications to meet the needs of their organizations.

The open source software (OSS) definition states that the *source code of software is distributed with the complete code, the software is free to use, and anyone is free to modify and redistribute it.* This phenomenon has intrigued academic researchers and companies as it goes against the logic of value in closed-source software production but, has proved to be a successful sustainable development model.

Open source: a definition
Founded in 1998, the open source initiative (OSI) is a non-profit industry-recognized approval authority that acts as a steward for the open source definition (OSD), a set of rules that determine if a software product meets strict guidelines for open source compliance. As listed on the OSI's web site (www.opensource.org/docs/osd), official open source products must meet the following criteria (Source - Open Source Initiative, 2007a and b):

Free distribution
1) **Source code:** The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost preferably, downloading via the internet without charge.
2) **Derived works:** The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.
3) **Integrity of the author's source code:** The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.
4) **No discrimination against persons or groups:** The license must not discriminate against any person or group of persons.

5) **No discrimination against fields of endeavour:** The license must not restrict anyone from making use of the program in a specific field like business, original research etc.
6) **Distribution of license:** The rights attached to the program must apply to all to whom the program is redistributed.
7) **License must not be specific to a product:** If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.
8) **License must not restrict other software:** For example, the license must not insist that all other programs distributed on the same medium must be open-source software.
9) **License must be technology-neutral.**

Removing common misconceptions about open source software -

- Open source software poses no more a security risk than commercial software.
- Active user communities constitute the backbone of open source projects and provide technical support (usually through instant-response public discussion forums and emails) for users and developers. Open source is generally used very easily alongwith commercially licensed closed source software.
- Licenses allow commercial applications to be built using open source technology and sold commercially. Companies such as Red Hat, Novell, IBM, and Oracle have all profited from the use of open source technology in their customer offerings and business operations.
- Sometimes licensing and subscription costs apply for certain open source products; however, these fees are minimal compared to most commercial products.

Where can I obtain open source software?

Sourceforge.net provides the largest repository of open source software development. Internet applications such as Firefox and Thunderbird can be obtained at www.mozilla.org. A comprehensive listing of downloadable open source and free software can be found at www.eoslist.com**.** Google technologies are available in plenty at www.google.com. Free mobile apps are available at 'Google store'.

'Open source' Versus 'Closed source'

To understand best how open source technology is developed, we can compare it to traditional 'closed source' software produced by companies such as Microsoft. 'Open source' software is based around the idea that the user can not only view, but change the source code of an application. Closed source software is hidden to prevent the user from either viewing or changing the code. (Source - http://www.extropia.com/aboutus/opensourcetech.html)

After initial production, 'open source' software is released to the development community and undergoes a secondary phase of evolution. It is scrutinised by thousands of professional developers across the globe for potential flaws. These suggestions and improvements are fed back to the developer who considers them for inclusion in his/her application. Whereas, 'closed source' software is developed in isolation with a small team of developers. It isn't possible to build a team of hundreds to check the code because the code is deemed proprietary and secret. Bugs and security flaws are often not found until after a product launch when a steady stream of security patches and updates are required.

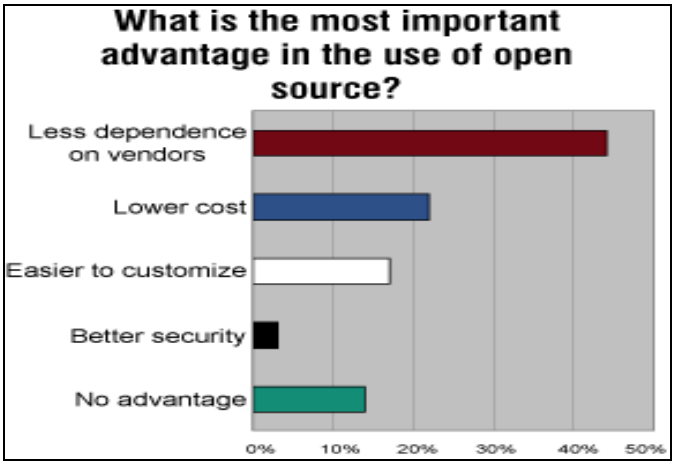
Why is open source code useful?

There are a number of advantages that open source code offers over closed source -

(Source-http://www.oss-watch.ac.uk/resources/whoneedssource.xml)

- **Bug fixing & Security**- as a large number of users can access and change the code, the code can be rapidly corrected of any flaws.
- **Customization -** Closed source applications can only be customized or adapted by the original vendor. Open source applications may be customized by anyone with the requisite skill. Thus, open source software can be readily adapted to meet specific user needs.
- **Translation -** With access to the source code it is easy to translate the language of the software interface. Large closed source commercial software vendors are usually unwilling to translate their products into less widely spoken languages, as the market for them would be too small to guarantee profit.
- **Avoiding lock-** in to proprietary software vendors
- **No fear of product discontinuation -** Open source may be picked up and developed by anyone**.**
- **Cost -** Many open source programs can be obtained at no cost or with a very low cost.

Some of the advantages of open source software are highlighted in the following survey –



(***Source***-http://www.computereconomics.com/article.cfm?id=1043)

Benefits

The benefits of open source are apparent. It enables collaborative development on a global scale, as anyone with the skills can view the code and contribute to it. It serves as an educational tool, as teachers can show students the inner workings of a production-scale product. It is free, and that makes possible usage scenarios not available in fee-based products.

Limitations

(Source-http://news.zdnet.com/2100-9595_22-123310.html)

1) **Lack of motivation for developers -** The problem,

however, is that open source must rely on the willingness of programmers to contribute code without financial compensation.

2) **Money-mindedness** – financial compensation to support their livelihood is a very big motivating factor for programmers to continue on any project.
3) **No one to sue -** Another common objection to 'open source' software is the perception that if the software breaks or is accused of plagiarism, there is no one to sue.
4) **No guarantee of quality or fitness** – of the 'open source' software as, there is no **contractual commitments** on part of the software programmer.
5) **Copy left Licensing -** is possible. This basically means that, companies may be concerned that the use of 'open source software within, their 'closed source' programs may convert their entire code base into a "derivative work" which would need to be made available royalty-free.
6) **There is no guarantee that development in software will happen -** The 'open source' software may die later if there is not enough interest.

Conclusion

It is extremely important to 'see' through the various interpretations of the advantages and disadvantages of open source software. With the plethora of Open Source applications available, one might conclude that we'll never have to buy software. That is quite true, but where we will probably pay for it is in time - time to set it up, time in modification and time in troubleshooting and it's important to bear in mind that the concept of "free" is related to freedom more than to money.

Quoting June 22, 2009 interview to the "The Times of India" newspaper, Jonathan Schwartz, CEO of Sun Microsystems, had summed up the FUTURE of open source web technologies very nicely -

- *"The rate of adoption of open source technologies* - is growing and accelerating rapidly. And with economic pressures mounting, 'open source' software (for example, Google technologies) is looking more and more compelling.
- *The fastest adoptions* – are in places where there's rapid economic expansion, good bandwidth and large student populations. Some of the highest adoptions have occurred in India because of rapid economic expansion and large student populations.
- *Big companies and governments are using it* – 100% of Fortune 500 companies are now using free software. 10 years ago that was barely 10%. We see household names like Google, Yahoo etc. being built entirely on free software.
- *Overall cost advantage* – The initial cost of putting in free software, including service and support fees is just 15-20% of the proprietary closed code software.

Almost 10 years down the road, the predictions are truer than ever with Google technologies and free mobile applications getting rapidly adopted across the world.

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