

Open Source: an overview

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1 Introduction

Open Source is not just about programming in the same way the Internet is not just about networks. Its core principles are about the freedom to use, distribute and modify the wide range of computer applications needed to provide Internet services, deliver multimedia content, enable office-like productivity and to keep networks secure. But it goes further than that, as it also changes the way in which ICT is implemented, has an alternative support model and gives users and customers more flexibility in the way they want to use their resources. Open Source is also embedded in many of the current technology developments that are looking to exploit the faster and more permanent network connections now available.

This short paper explains what Open Source is and highlights its main benefits and some of its weaknesses. It goes on to discuss its potential in education before concluding by indicating future work that could be done in exploiting Open Source to deliver suitable ICT solutions for the next stage of the National Grid for Learning (NGfL).

2 What is Open Source?

Open Source is a relatively recent term used to describe a long established tradition in computing, where computer programmers have allowed for the free use of their code and for its possible modification. This is really all about free speech, rather than free beer, but for some people, especially those in education the free

beer aspect has made it very attractive. This type of software has been available since the 1950's and 60's, but was never really available for the mass-user market as this has been dominated by the big commercial providers since the early 1980's.

There are now a number of Open Source licenses under which software can be written, ones that can ensure the ongoing availability of the code. The most popular is the Gnu Public License (GPL), which was formulated by Richard Stallman one of the lead figures in the promotion of 'freely available' software.

Open Source software is available for a wide range of application areas, including server (such as web, proxy and email), desktop (office systems, desktop publishing, web browsers and mail clients), security and networking. A typical Open Source development usually originates for a single person who may have a problem to solve, but develops in a larger project that involves a team of programmers. These developers are geographically disparate and primarily use the Internet for communication and the project will have a web site and mailing list, copies of the software for download, documentation and Frequently-Asked Questions (FAQs). The project will also involve the participation of a number of active users, who through the policy of 'release-early, release-often' will be engaged in the development process, locating bugs and suggesting feature enhancements.

This approach to software development is surprisingly successful¹, as are a number of Open Source

¹Eric Raymond's Cathedral and the Bazaar[?] provides further reading on this area

projects. The most notable example is the Linux operating system, which is probably the largest example of Open Source project. Started by Linus Torvalds in 1990 as a means of teaching operating system design, it quickly became popular amongst other computer scientists. As the number of users grew, so did the number of developers, who continue to develop a rich, versatile operating system now highly regarded in all sectors of Information Technology.

2.1 Linux

One of the misconceptions about Open Source is that it is all about Linux. The Linux operating system is a cornerstone of Open Source applications, because it is Open Source itself, however there are an increasing number of applications for Windows and MacOS, as there are also other Open Source operating systems such as FreeBSD.

A typical Linux installation CD from one of the main distributors (such as RedHat, SuSE, Debian or Caldera) is made up of less than 1% of the operating system itself, the rest of the CD (or increasingly CD's) is made up of quality-assured Open Source applications. This allows users to construct server, router, workstation or custom configurations for the purpose required. The highly cohesive, but loosely coupled modular approach makes for an efficient and effective computer system.

3 Benefits

There are a number of key benefits of Open Source software:

- **Application Quality.** Primarily because of the development process, mature Open Source software is of a high quality and is usually the choice of technical staff, especially for Internet services.
- **Interoperability.** In many cases, Open Source software has been designed around recognised standards and protocols, rather than proprietary file types. For example, there are three good mail servers (sendmail, Exim and Postfix), all of

which support common protocols for mail delivery and transport. There are also a good range of mail clients that support POP3, IMAP and other standard delivery mechanisms. Many Open Source applications have been written for the purpose of network integration, usually originated by people who had specific problems to solve. The most notable example is Samba, a server application that supports Microsoft's SMB networking protocol on other operating systems, such as Linux or Solaris. This is one of the reasons why Linux is so useful, as it can support a wide range of networking protocols and filesystem types that make it work in nearly all network environments.

- **Support.** The main support model for Open Source software is informal and does not rely on support contracts with suppliers and call centres. It is much more peer-based, with the use of mailing lists, web sites, FAQs and HOWTOs to provide support from both developers and more experienced users. To use this support model effectively does require some experience, but is highly effective and less frustrating than traditional methods. However, telephone and on-site support are now available for those users who require it, provided by companies such as <http://www.linuxcare.com>.
- **Flexibility**

4 Difficulties

There are also a number of pitfalls for people currently wishing to adopt Open Source solutions.

- **Packaging.** For the uninitiated, installing and configuring Open Source software can be a little on the technical side. Downloading software, then installing on a local system does take some practice, especially for less popular software. This is however changing, and as a measure, Linux installations have been significantly easier to do over the last twelve months, and given that the main distributions come with a

range of Open Source software that may well be the only installation method used by many.

- **Legacy Support**

5 Open Source in Education

Linux and Open Source applications have been widely used in higher education since the early 1990's. An Open Source system makes a good computing platform for programming and research, but it also forms the backbone of Internet Service Provision, running mail, web, security and other network services.

It is in this area of network provision that Open Source applications are beginning to be used in schools and other learning institutions in the UK. Given that over 60% of Internet Web Sites use Apache, an Open Source web server this is not surprising. While