Running Head: Open Source Solutions for Library Needs

Open Source Solutions for Library Needs

(Version 1.0)

Richard S. Crawford

School of Library and Information Sciences, San Jose State University

Linux Users' Group of Davis (LUGOD)

Open Source Solutions for Library Needs

Introduction: What is Open Source?

Traditionally, a program is defined as a set of instructions which tells a computer what to do. For example, the Windows operating system by Microsoft is a program, or a set of instructions, which tells the user's computer how to send information to the disk drive, how to take information from the user, and how to communicate with pieces of hardware such as the modem or the network card. However, these programs are compiled, which means that they are translated into the binary code which the computer understands. The lines of instructions which are translated into the binary code are called the source code of the program. It might be easy to think of the source code of a program as the recipe for a cake, and the cake itself as the compiled form of the recipe. Once you have the cake, you cannot change it; but if you have the actual recipe, you can change it so that the cake is more to your liking. Similarly, if a user or a programmer has access to the source code behind the program, then the user is able to alter the program, changing the way that it works.

For most proprietary, or closed source, programs (such as Windows, WordPerfect, Oracle, Quicken, etc.), the source code is not available for users or programmers to alter. This means that if a user encounters a bug in the closed source program, they will not be able to fix it themselves, but must rely on the software vendor to fix the error. As many frustrated users know, this can often take a very long time.

Open source software, by contrast, is software for which the source code is freely available. The web server Apache, for example, is a program which runs as many as two-thirds of the web servers on the Internet (Netcraft, 2003). Apache is open source, which means that

anyone can access the source code for Apache and make changes in how the program works. This is exactly how the Apache software has grown and improved over time since its introduction in the late 1990s. Users have downloaded the source code, made modifications, and released those modifications back to the Apache foundation to integrate into new and better releases.

The Linux operating system is another very popular open source program. Invented in 1991 by Linus Torvalds to serve as a replacement for proprietary Unix operating systems, Linux has grown from just a few dozen users in 1991 to millions of users worldwide by 2001 (Diamonds and Torvalds, 2001). There are hundreds of programmers throughout the world who contribute to the development of Linux, but Linus Torvalds, to this day, remains the gatekeeper who oversees all development and approves which changes go into the program and which ones do not.

Other examples of open source software are Mozilla, a web browser derived from Netscape (the web browser which is generally thought to have initiated the World Wide Web revolution and which dominated the browser market prior to Microsoft's introduction of Internet Explorer); Open Office, a powerful replacement for Microsoft's Office suite of applications; and Perl, a very powerful programming language which is so prevalent on the Internet that it has often been referred to as the "Duct tape of the Internet".

The open source movement has its roots in the 1970s, and is continuing to grow in popularity (Raymond, 1999; Williams, 2002). Closed source programs continue to suffer security and performance vulnerabilities and skyrocket in prices. Most open source programs, however, can be downloaded and run for free, although many companies, such as Red Hat and

SuSE, have developed businesses selling pre-packaged versions of open source software. However, even vendor-supplied open source software tends to be significantly less expensive than most proprietary software.

In addition, most open source software can be run on relatively old computers, while most proprietary software programs require much more modern (and much more expensive) hardware to operate effectively. WindowsXP, for example, requires at least a Pentium III computer with several gigabytes (GB) of hard drive space in order to operate without significant performance issues; however, a full-powered Linux installation can run on an old computer with a 486 processor and less than 500 megabytes (MB) of hard drive space with very little impact on performance.

Open Source Solutions in Library Settings

Many have argued that because of the principles of code availability and universal open standards, libraries and library projects are almost ethically required to use and develop open source software. In fact, one of the Keystone Principles of the U.S. Assocation of Research Libraries states, "Libraries will create interoperability in the systems they develop and create open source software for the access, dissemination, and management of information." (Keystone Principles, 2003, section 2.4).

Many libraries, faced with budgetary crunches and the resultant lack of technological resources, have opted for open source solutions to some of their information technology problems. Open source software, as noted above, is frequently very inexpensive, if not free, and can operate perfectly well on older computers -- which libraries often have in abundance.

So, where have open source tools found use within libraries, public or otherwise?

One of the most visible of all open source library solutions is Koha, a broad-featured open source integrated library system (ILS) program (available from http://www.koha.org). Koha was initially developed in 1999 in order to replace a 12-year-old system which was unlikely to meet the challenges of 2000. Katipo Communications, Inc., worked very closely with the Horowhenua Library Trust to develop the system, choosing to work with open source solutions -- specifically, the Linux operating system, the MySQL database program, and the programming language Perl for web integration and network tools -- at all stages of the project. The developers convinced the Library to make the final product open source, so that it would be available to any library that wanted to use it and contribute to it. The Koha development process is guided by a development manager, who oversees all contributions and manages the integration of contributed code into the main code base. Volunteer contributors to the Koha project are based in New Zealand, France, Canada, and the United States.

Koha is meant to be used by small and medium-sized libraries and not by major institutions. It lacks some of the major features that large institutions would require. For example, the current version does not support MARC bibliographic formats (though this feature is planned for the next major release), and the database software on which it is built, MySQL (another open source program), is less powerful than other open source alternatives. In addition, Koha does not currently have a module to support serials; this is another feature which Koha developers plan to implement in a future release.

Koha is by no means the only open source ILS solution available; Open Stacks reports that there are at least four such programs in development, with different levels of features and at different stages of development (Anctin, 2003).

Another use of open source in libraries is the use of the Linux operating system in place of Microsoft Windows or proprietary Unix operating systems such as Sun's Solaris or IBM's AIX. Arizona State University, for example, has recently completed a complete transition from Windows-based workstations and servers to Linux-based equivalents (LinuxPR, 2003). This transition, which took fourteen months, resulted in a fifty per cent reduction in cost of ownership, and will allow the library to deliver more customized content and information to their users. (In fairness, it should be pointed out that the cost of ownership is often a small part of the total costs which can be associated with any information technology system; there are training costs, infrastructure changes that might need to be made, and so on. Even so, the total cost of ownership is generally less with Linux systems than for closed source systems).

In 1998, Eric Lease Morgan of North Carolina State University rolled out MyLibrary, an open source web portal which allows students to access a number of library services through a single web-based interface (Morgan, 2003). Although it was originally developed for North Carolina State University in 1998, by 1999 it was being distributed as an open source project and was in use in several dozen different libraries around the world, including at the University of Notre Dame. The wide availability of the software which composed MyLibrary, and the fact that it is open source, allows libraries around the world to implement the program, thus providing valuable access services for their patrons for a very low cost. In addition, libraries that choose to implement the program can customize the software to their own needs, and contribute elements of their own code to improve the software for the global community of users and developers.

Conclusions

For many applications, large libraries and similar institutions may for the time being be

restricted to proprietary, closed source software for many of their information management needs. Small libraries may find that open source ILS programs such as Koha are adequate for their needs. However, Koha needs substantial development to be a viable product for large institutions.

On the other hand, even if large institutions cannot benefit from Koha, there are many other ways in which they can take advantage of open source programs. Switching from closed source operating systems such as Windows to open source operating systems such as Linux or FreeBSD, for example, may offer a substantial cost savings for library institutions; and because open source interfaces to public access can be highly customized to meet individual library needs without the constraints of a vendor's consulting team, many libraries may find that open source solutions are much better suited to their needs than closed source solutions.

Besides cost and flexibility, there are many other compelling reasons for libraries to make the switch from closed source to open source software, including software licensing (most open source programs are subject to much more lenient licenses than closed source programs, and may provide less legal hassles for the library), and open standards, which is an issue that many open source advocates and developers also grapple with. Though it is not within the scope of this paper to discuss these issues in depth, they are issues which must be addressed and come to terms with by anyone who wishes to further explore the ways in which open source solutions may suit library needs.

References

Anctil, E. *Open Stacks: The Open Source Integrated Library System*. Retrieved December 2, 2003, from http://www.anctil.org/users/eric/oss4ils.html.

Chudnov, D. *Open Source Library Systems: Getting Started*. Retrieved November 2, 2003 from oss4lib: Open Source Systems for Libraries: http://www.oss4lib.org/readings/oss4lib-getting-started.php.

Diamond, D. & Torvalds, L. (2001). *Just for Fun: The Story of an Accidental Revolutionary*. New York, NY: HarperCollins Publishers.

Linux PR: ASU West Library Rolls Out Linux. Retrieved December 2, 2003, from http://linuxpr.com/releases/6172.html.

The Keystone Principles. Retrieved November 13, 2003, from http://www.arl.org/training/keystone.html.

Koha - Open Source Library System. Retrieved October 30, 2003, from http://www.koha.org.

Morgan, E. L. *MyLibrary - A Copernican Revolution in Describing Information Resources?* Retrieved November 15, 2003 from American Library Association website: http://www.ala.org/Content/NavigationMenu/LITA/LITA_Events_and_Programs/LITA_National_Forum_2003,_Norfolk,_VA/Programs1/cs1-3morgan.pdf

Netcraft: November 2003 Web Server Survey. Retrieved December 1, 2003, from http://news.netcraft.com/archives/2003/11/03/november_2003_web_server_survey.html

Raymond, E. S. (1999). *The Cathedral & The Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*. Sebastopol, CA: O'Reilly & Associates, Inc.

Williams, S. (2002). *Free as in Freedom: Richard Stallman's Crusade for Free Software.* Sebastopol, CA: O'Reilly & Associates, Inc.