

Study of Open Source Software and Library Automation

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ABSTRACT

A trend in Open Source Software in librarianship started with the establishment of Open Source Initiative. A series of open source software applications developed in a row. Koha integrated library management system in 1999, Greenstone Digital Library Software and E-prints Digital Library Software in 2000, Dspace Digital Library Software in 2002, Fedora Digital Library Software in 2003, NewGenLib integrated library management software in 2005 and Evergreen integrated library management software in 2006. These softwares helped library professionals a lot in bridging digital divide and automating their libraries in a very cost-effective manner. Open Source software empowered library professionals to compete with the growing technological changes.

1. Introduction

The term "open source" refers to something people can modify and share because its design is publicly accessible.

The term originated in the context of software development to designate a specific approach in creating computer programs. Today, however, "open source" designates a broader set of values—what we call "the open source way." Open source projects, products, or initiatives embrace and celebrate principles of open exchange, collaborative participation, rapid prototyping, transparency, meritocracy, and community-oriented development.

Open source software is software with source code that anyone can inspect, modify and enhance. "Source code" is the part of software that most computer users don't ever see; it's the code computer programmers can manipulate to change how a piece of software—a "program" or "application"—works. Programmers who have access to a computer program's source code can improve that program by adding features to it or fixing parts that don't always work correctly.

Open source software is computer software whose source code is available under a licence (or arrangement such as the public domain) that permits users to study, change, and improve the software, and to redistribute it in modified or unmodified form. It is often developed in a public, collaborative manner. It is the most prominent example of open source development and often compared to user generated content.

2. History of Open Source Software

In 1998, a group of individuals advocated that the term free software be replaced by open source software (OSS) as an expression which is less ambiguous and more comfortable for the corporate world. Software developers may want to publish their software with an open source software license, so that anybody may also develop the same software or understand how it works. Open source software generally allows anybody to make a new version of the software, port it to new operating systems and processor architectures, share it with others or market it. The aim of open source is to let the product be more understandable, modifiable, duplicable, reliable or simply accessible, while it is still marketable.

The Open Source Definition, notably, presents an open-source philosophy, and further defines a boundary on the usage, modification and redistribution of open-source software. Software licences grant rights to users which would otherwise be prohibited by copyright. These include rights on usage, modification and redistribution. Several open-source software licences have qualified within the boundary of the Open Source Definition. The most prominent example is the popular GNU General Public Licence (GPL). While open source presents a way to broadly make the sources of a product publicly accessible, the open-source licences allow the authors to fine tune such access.

The "open source" label came out of a strategy session held in Palo Alto in reaction to Netscape's January 1998 announcement of a source code release for Navigator (as Mozilla). A group of individuals at the session included Todd Anderson, Larry Augustin, John Hall, Sam Ockman, Christine Peterson and Eric S. Raymond. They used the opportunity before the release of Navigator's source code to clarify a potential confusion caused by the ambiguity of the word "free" in English. The 'open source' movement is generally thought to have begun with this strategy session. Many people, nevertheless, claimed that the birth of the Internet, since 1969, started the open source movement, while others do not distinguish between open source and free software movements.

The major changes for libraries came in 1876 when several developments took place together. These developments were the publication of 1st edition of Dewey Decimal Classification, creation of Cutter's Rules for Dictionary Catalogue, and formation of American Library Association; since then a series of developments and new innovations were noticed in the field of library and information science. Williams (2002) notices the introduction of technology to automate library functions entered in the libraries with the use of punch cards for the library circulation and acquisition during 1930s extending to 1960s.

3. Origin of Library Automation

It was World War II that staged the development of libraries throughout the globe. Libraries had huge collection

gaps created by World War II (Rayward, 2002). The libraries, after the World War II, were under huge pressure of acquisition and quick technical processing of it. The existing library technologies were proving inadequate and incapable to bear this pressure. During this time library professionals got attracted towards the new emerging technologies that could boost up the work. But the libraries at that time were not able to manage immediate transition towards implementation of new technologies. Rayward observes the situation as;

When existing library technologies began to break down under economic, social and bibliographical pressures emerging in the late 1950s and early 1960s and library began seeking relief in automation, the introduction of automation involved profound misunderstanding between librarians and early systems developers about the nature of the professional knowledge and tradition of librarianship on one hand and of the capabilities of the new technology and what was required for implementation on the other. (Rayward, 2002, p. 6). However, various projects on Library automation were initiated around the world. According to a survey carried out by Library Automation Research and Consulting (LARC), there were about 2,000 library automation projects in all types of libraries by 1968 and another 20,000 library automation projects were underway in the world by 1973 (Patrinostro, 1974).

American and British libraries began experiments with computers in 1950s and 1960s that quickly spread to other countries of Europe. No innovation or development, according to Rayward (2002), in the field of library profession, after that, was simple or straight forward. Every development had gone through extensive literature studies and efforts of library and technical professionals.

It was the third generation of computer applications which marked a significant invention by Jack Kilby of Texas Instruments in 1958. The invention was integrated circuit. It replaced transistors of second generation and it was able to pack a huge number of transistors into a single chip of silicon. By the end of this generation instead of punched cards, librarians and other technical professionals interacted with third generation computer, through keyboards and monitor and interfaced with operating system (ITL Education Solutions Limited, 2006). The development of computers during 1958 guided Hans Peter Luhn of IBM to generate a computer-based keyword index for the articles appearing in Chemical Abstracts. This keyword index known as Keyword in Context (KWIC) was found very comfortable for the computers as it was inexpensive and presented several access points (Cornog, 1983).

In 1960s another instance of computer uses for cataloguing appeared when Library of Congress used Machine Readable Catalogue (MARC) for the production of standard computerized cataloguing cards. Technologies in this area flourished rapidly to take the developments from MARC to MARC II by the end of 1968. The MARC was designed with the help of 'fields' and 'tags' consisting of three-digit numbers from 001 to 999 for each bibliographic details of the document. Allocating bibliographic details to these tags is called 'tagging', i.e., Title, Author, Publisher, ISBN No. and so on. MARC II became well known among libraries in the US resulting in NISO (National Information Standards Organisation) accepting it as a standard format for bibliographic records in 1973 (Wedgeworth, 1993). 1960s also marked the establishment of Ohio College Library Centre¹ (OCLC) in 1967. With the help of OCLC,

University of Ohio became the first university of the world to do online cataloguing as early in 1971 (OCLC, 2010; Jorden, 2006). Membership of OCLC in its initial years was open for only academic libraries especially college libraries but with an amendment in OCLC Articles of Incorporation on May 17, 1972 non-academic libraries were also permitted to join OCLC (Grosch, 1995). This step of OCLC opened the door to widening the new-born OCLC online system towards cooperative agreements with many regional library networks outside Ohio; by 1975, OCLC had grown up with over 500 participating Now Online Computer Library Center libraries. The number further extended to above 2000 academic, research, public and special libraries by the end of 1970s.

On the other hand, MARC Project boomed up and spread a revolution of computerized library cataloguing in the US followed by the development of national MARC projects by the various national agencies in countries worldwide. UK MARC in the UK and similar projects in several countries mushroomed and by 1986, about 19 countries reported existence of national MARC service and another 25 were in progress (Wedgeworth, 1993).

4. Beginning Of Arpanet, Internet And Online Databases

In 1959 engineers of the US Department of Defense, came together and formed Advanced Research Project Agency (ARPA). The objective of this team was to develop a network that can be used for peer to peer communication in Department of Defence. Department of Defence did not approve the use of this approach, but this research of ARPA provided a strong basis for the Internet. After failing to get its project get approved at Department of Defence, ARPA Connected computers of four Universities of the US, i.e., University of California at Los Angeles, the University of California at Santa Barbara, Stanford Research Institute, and the University of Utah to form ARPANET in 1969. By 1971 the number raised to 13 Nodes with 30 different university sites funded by the ARPA (Cerf, 1993). Within next two years the Global Networks become a reality when University College of London and Royal Radar Establishment, Norway connected to ARPANET.

5. Rising of Digital Divide

Research in automation of library functions was marked mainly in four countries, i.e., United States of America, United Kingdom, Australia and Canada. A few universities and institutions played pioneering role in library automation. In the US it was University of California, Library of Congress, Ohio State University, and Online Computer Library Centre (Tedd, 1994; Rayward, 2002), University of Newcastle and University of Bath in UK (Line, 2006), University of Guelph and University of Waterloo in Canada (Tedd, 1994) and University of Adelaide in Australia (Tedd, 1994). Later similar research extended to few more universities of these countries. The early automation systems include University of California's Melvyl, Geac's ADVANCE, Dynix and BLCMP's BLS, IME's TINlib, Ohio State University's Library Computer System.

The continuous developments in library computerisation led the libraries of developed countries far ahead to that of libraries in Asia, Africa, Latin America and many other developing and under developed countries. The term 'Digital Divide' became prominent in 1990s when the differences between the various fields, i.e., education, commerce and

Industry of the countries with IT power and without IT power was clearly visible. The libraries were not exempted from this.

The term digital divide may be "perceived to be the gap between those people who have access to the latest information and communications technologies and those who cannot" (Murelli, 2002). According to Pippa Norris (2001, p. 2) the digital divide is understood to be the difference between "Those who do, and those who do not, use the panoply of digital resources to engage, mobilize, and participate in public life."

The digital divide was observed largely in three aspects; first, availability of technology; second, availability to finance to acquire the technology and third, availability of skills to make use of the technology. After the birth of the Internet, its growth was limited for the first 20 years but as soon as World Wide Web came into existence in 1989 and web browsers were developed, it became a boom and developed rapidly. On the one side where computerization of libraries was started in developed countries, i.e., USA, UK, Australia, Canada, France, Germany, etc. in 1950s and 60s, the other developing and under developed countries could apply these technologies only after 1980s. India reported use of computers in libraries in 1965 in INSDOC, and Bangladesh in 1996. In Africa, Nigerian special libraries initiated the implementation of technologies and played the pioneering role for computerisation of libraries.

6. Evolution Of Open Source Software And Open Access Resources

In 1985 UNESCO developed a software called CDS/ISIS (Computerized Documentation System - Integrated Set for Information Systems) to develop in-house databases of local collection. It was distributed free of cost to the libraries worldwide. Since then libraries in developing and under developed countries started their interest in automating library functions. CDS/ISIS was primarily an information storage and retrieval system used for storing and retrieving bibliographical details of library resources.

In 1985 Richard Stallman established Free Software Foundation (FSF) with an objective to promote universal freedom to create, distribute and modify computer software applications. Additionally, it was established to generate and use funds for GNU project (A project that marked the beginning of free software movement), started by Stallman in 1983. The head office of FSF is in Massachusetts, USA.

In 1998, Eric S. Raymond and Bruce Perens formed Open Source Initiative (OSI) with a hope to remove the ambiguity of the individuals who perceived "free software" as anti-commercial. The aim of OSI was to bring software business into open source in which they could get remarkable success.

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7. Conclusion:

A trend in Open Source Software in librarianship started with the establishment of Open Source Initiative. A series of open source software applications developed in a row. For example, Koha integrated library management system in 1999, Greenstone Digital Library Software and E-prints Digital Library Software in 2000, Dspace Digital Library Software in 2002, Fedora Digital Library Software in 2003, Newgenlib integrated library management software in 2005, and Evergreen integrated library management software in 2006. This software helped library professional a lot in bridging digital divide and automating their libraries in a very cost-effective manner. Open Source software empowered library professionals to compete with the growing technological changes.

As far as open access is concerned, free access to literature was all along there even in ancient times when there were no legal restrictions in having access to literature. But with the invention in printing technologies, price factor started to be involved in accessing knowledge. Slowly and gradually, accessibility to available literature, especially research literature, turned costly to costlier. With the establishment of Educational Research Information Centre (ERIC) in 1966 one may see the development of open access movement though the 10 footmarks of open access were felt so early when a number of inventors did not patent their inventions and kept them under public domain, i.e., open access.

With the growth of the Internet and World Wide Web the distance between the countries across the world became narrower. The concept of resource sharing is realized in true sense. In last few years most of the countries of the world could afford access to computers and other information technology. The cost of the Internet and Computers has reduced to such an extent that any library can easily adopt it with minimum finance. Additionally, increase in ICT education and professional trainings by software vendors have reduced the skills barriers to operate the modern software.

The invention of paper in 105 AD. in China by Cai Lun and printing machine in 15 Century in Europe, were the initial factors that changed the status and fate of the libraries worldwide. Since then libraries have seen the technology growth in all their aspects, i.e., collection, process and services. Collection-wise it has grown over the time from clay tablets, to papyrus rolls, to paper, and now to electronic documents. Even the process of preparation of library records have changed from hand written records using ink pen, to type writers and now to computers. Further, services of a librarian have changed from guardian of documents, to circulator of documents, to information provider and now he is regarded as knowledge manager. The technological changes have been affecting almost every type of library including public, academic and special. A computer with the Internet access has become a very basic necessity of any type of library.

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