THE NEW AUTOMATED LIBRARY SYSTEMS
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Abstrak: Perkembangan sistem-sistem perpustakaan berkomputer di peringkat awal didorong oleh keperluan untuk mencari cara-cara penyelesaian secara berautomasi bagi mengatasi masalah-masalah mendesak yang dihadapi oleh perpustakaan-perpustakaan. Hari ini kita berada di persimpangan jalan dan kita sedang menyaksikan perubahan-perubahan besar dalam sistem-sistem perpustakaan yang terdapat di dalam pasaran. Kebelakangan ini, perkembangan sistem-sistem berkomputer terbuka, berangkaian dan pelayan/pelanggan serta piawaian-piawaian untuk pengurusan maklumat telah banyak mempengaruhi perubahan-perubahan tersebut. Sistem berkomputer pelayan/pelanggan di kalangan perpustakaan adalah berdasarkan piawaian Z39.50. Ia membantu mendapatkan maklumat secara terus dan memudahkan pengaksesan maklumat dalam pelbagai sistem perpustakaan yang berkomputer dan juga dalam pangkalan data jarak jauh. Sistem-sistem perpustakaan yang baru perlu peka kepada cabaran-cabaran yang dikemukakan oleh 'Internet' dan 'World Wide Web'. Pembelian sistem-sistem perpustakaan pada masa hadapan akan terus dipengaruhi oleh permintaan pengguna-pengguna untuk mengakses maklumat yang jauh melebihi apa yang boleh didapati pada OPAC di perpustakaan. Kini pengedar-pengedar komputer perlu memajukan sistem-sistem yang menggabungkan perkembangan-perkembangan baru ini ke dalam pakej standard bagi perpustakaan.

Abstract: The development of the early automated library systems was driven by the need to look for automated solutions to some of the pressing problems faced by libraries. Today, we are at the cross-roads and witnessing great changes to the library systems that are coming into the market-place. Recent developments in open system computing, networking, client/server computing and standards for information management are influencing the changes. Client/server computing in the library environment is based on the implementation of the Z39.50 standards. It helps to achieve transparency and facilitate information access and retrieval between diverse automated library systems and other remote databases. The new library systems also need to address the challenges posed by the Internet and the World Wide Web. Future procurement of library systems will be influenced by users' demands for wider access to information beyond the library OPACs, and thus makes it contingent upon the vendors to develop library systems that integrate all these new developments into the standard library package.

Introduction

Librarians were amongst the early pioneers to explore and exploit the revolutionary processing power of computers. The nature of the work processes in the library environment makes automation a virtual necessity. The early automated library systems addressed rather restricted needs of the libraries. We have come a long way since those early automated library systems. Today, with the great

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KANDUNGAN/CONTENTS

advances made in computer and telecommunication technologies, the application of computers in the library environment has taken on important new roles apart from the original purposes. More and more, the new technologies are changing the profiles of libraries to prepare them for a part in the inevitable global virtual library. Library automation can no longer be viewed in the traditional local context, but has to address both the library automation and other information issues as required by current and future developments.

Phases in the Development of Automated Library Systems

The development of the automated library systems can be said to have gone through three phases:

Phase I   Use of computer technology to automate the library work processes for quick-fix solutions to some of the pressing problems.

Phase II   A phase of consolidation followed by the development of integrated automated library systems.

Phase III Extending the library information resources through the library automated system.

Phase I

In the early 1960s, libraries looked to automation for quick resolutions to pressing problems that were literally getting out of control. The early automated systems developed then were often ad hoc and of a piecemeal nature. Automation of library work processes often progressed independently, with the development of single-task modules to solve circulation, acquisitions or serials control problems. The development of the machine-readable MARC bibliographic records in 1967 had contributed and given greater impetus to the development of the automated library systems, but its development was 'linked closely to developments in library automation in national libraries.'[1] Batch processing and time-sharing of the expensive computer resources were also the prevailing arrangement then.

Phase II

The second phase in the development of automated library systems could be considered a phase of consolidation which built on the developments made in the first phase. The advent of the microcomputer in the early 1980s, and the availability of the minicomputer systems at affordable prices also greatly influenced developments. Large libraries were able to acquire turnkey systems and have their own in-house minicomputer or microcomputer hardware to run their automated library systems. The popularity and suitability of the relational database structure, and also developments in local area networks (LAN), also contributed positively to the development of efficient integrated automated library systems. Besides providing full functionalities for the library work processes, new features were also provided in the library software to incorporate the capability to access on-line information resources outside the library, allow local tape-loading of databases and electronic mailing. Other developments included making the user screens more user-friendly, with the incorporation of WIMP (windows, icons, menu, pointers/pull-down menus) features, self-checkout circulation capability and access to users personal circulation information. Basically, the systems installed were able to provide total solutions to many of the problems that plagued libraries in the past. However, these were mostly proprietary host-based systems, offered through commercial library vendors. Automated library systems were getting too complex to be developed by institutions or libraries on their own as in the past.

Phase III

By the late 1980s, there was much hype in the computer industry on the concept of open system computing. To ensure the point is not lost, computer hardware vendors took pains to promote openness in their systems, promising seamless integration, portability of software, interoperability, etc. among diverse systems. To what extent these have been achieved, is still debatable. However, in the efforts towards achieving openness, there have been some remarkable developments both in hardware and software designs. The development of the client/ server systems could be said to be one of the products of the open system computing concept.

The potential of the client/server implementation is not lost to those vendors developing the library systems. Also, rapid developments in telecommunication and computer networking technologies, ensure that the automated library systems of the future should address the need to access information resources outside the confines of a library. There was also a growing awareness of the Internet and its potential for access to other information resources worldwide, and the

development of the World Wide Web (WWW or Web). Together these developments heralded a new era for libraries in general, and for library systems development, in particular. These developments, directly or indirectly, are posing big challenges to libraries and to the library system vendors. The globalisation of information resulting from the easy means of accessing information resources through the new technologies, means that libraries should review their roles and keep up with the inevitable changes. Library users are now able to access a vast amount of information on their own. Their expectations of what the automated library system should be able to do, will change dramatically. Thus, while the first two phases of the development of the automated library systems were very much driven by the need to resolve library issues, this phase is likely to be influenced more by factors regarding users needs. Both the library and system developers need to plan their strategies accordingly to meet this change.

The New Library Systems

In the light of current developments, we are at the cross-roads and witnessing great changes to the automated library systems that are coming into the market-place. In the 1994 annual report of the library system market-place,[2] most of the library system vendors agreed that there are four key trends and issues that influenced the library automation market-place. These were identified as trends in networks, standards, open system and client/server architecture. Coupled with this, are the developments in user interfaces and multimedia applications. All these factors must be addressed either singly or altogether in the design concept of the new automated library systems.

Client/Server Implementation and the Z39.50 Standard

There are many proprietary host-based automated library systems that have been installed over the years. No doubt, these will continue to be used and supported. However, the client/server platform is likely to be the standard implementation for new and future library systems, if they are affordably priced. Under the client/server computing platform, libraries will specifically look to implement the NISO Z39.50 standard to achieve this.[3] This standard formally titled Information Retrieval Service Definition and Protocol Specifications for Library Application, is crucial for defining the mechanisms for automated networking and information access among diverse library systems. It has an equivalent in the ISO

standard called Search and Retrieval, ISO 10162/ 10163 (service and protocol documents respectively) which was formally adopted to international standard status in 1991. Z39.50 is an Applications Layer protocol within the ISO reference model. Its implementation in automated library systems would give full screen transparency, and allows one computer operating in a client mode to perform information retrieval queries against another computer acting as an information server.

Initially, implementing Z39.50 on the library systems involves working with the bibliographic data and expanding the library OPACs to meet the growing need for connectivity and retrieval of information from remote information resources. However, this feature is likely to be extended to all other modules within the integrated library system, as for instance, allowing query to be made to the circulation data of another system or other specialised data like images. Under the client/server implementation, it is also possible to tailor clients to specific applications.[4] This makes it easier for the use of the various modules to be used.

Implementation of the client/server architecture and retrieval through the Z39.50-compliant PC client offers many advantages besides the very attractive graphical user interface (GUI) features. It is possible to access a wide variety of information sources on a single workstation using a single user interface. Its impact extends beyond the integrated library system. It is changing the mode of on-line searching. On-line database vendors are now beginning to make the Z39.50 server interface available for their databases. Thus libraries with Z39.50-compliant OPAC client, are able to search those databases using their own familiar OPAC retrieval interfaces. This applies to CD-ROM databases and other tape-loaded databases available at the remote servers.

Integrating Access to Internet

Modern hardware implementation, telecommunication and computer networking capabilities have brought with them many new products which are accompanied by very attractive graphical user interface. Interest in the Internet has generated new sets of products that are relevant to the library and information fields. These are client/server-based products implemented very much similar to the library's Z39.50 implementation. Access to information resources on a world-wide scale is now made possible and easy through the World Wide Web program, that works through hypertext and hypermedia links to data. The Web has become a

very useful information retrieval interface, because many information resources have incorporated graphics and multimedia in addition to textual resources, allowing Web searches to become more interactive and intuitive.

Library system vendors have not lost sight of the great potential offered by Internet and the Web. Market forces and users demands make it contingent upon the vendors to develop systems that incorporate the means of accessing and querying information servers available throughout the Internet, while at the same time making one's own library's resources available to others. Interfaces to incorporate use of Web browser tools must be integrated into the standard library system. Capabilities to build Web home pages must be provided, with interfaces in the system to create and integrate customised user-friendly screens using the Hypertext Markup Language (HTML) editor.

Conclusion

The library system software that is being developed and coming out in the near future, should not be limited to provide an efficient system to carry out the library's work processes. Users demands and changing mode of access to information, make it contingent upon the library to select a system that will address the changing needs. Gone are the days when automation in the library was a mere backroom activity, where the needs of the librarians were of paramount importance. As the library and the patrons expectations and information resource requirements grow, so too must the automated tools needed to support them.

For most automated library systems, the expansion of the on-line public access catalogue (OPAC) will be the most profound change that has to be addressed in the short term. In an age when users have access to a vast amount of information through sources other than libraries, 'expanding the on-line catalogue is the key to keeping the library as the focal point of information.'[5] However, in the long term, there is a need to look beyond the on-line public access catalogue to the broader role which it can play. Through the OPAC, it must be possible to access different types of records, using a single standard search command. Z39.50 and other standards developed for connectivity to the Internet, and the new hypermedia environment, must be fully integrated into the complete software package, and not as a stand alone offering.

Libraries must begin to revise their wish lists for the purchase or upgrade of an automated library system. Libraries must be empowered to make themselves felt as a potent market force and to effect changes in the development and design of the library software to suit the times. It is evident that library system vendors are ready to respond, as the 1995 report of the library systems market-place in the *Library Journal* noted that new services were developed by evolving vendors, aimed at helping libraries adapt to the new computing environment and that some of the products and services now offered to libraries were not normally seen as aspects of the traditional integrated library system.[6] This is a positive development, and the ability to connect and access remote information resources through the automated library system, will make the concept of the virtual library a fast approaching reality. The automated library system would have undergone a total face-lift from the early systems, and its role would be more broadly defined to address the needs of the Information Age.

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