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Local Area Network on a Budget: The Experience of the University of Massachusetts, Boston

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LOCAL AREA NETWORK ON A BUDGET: THE EXPERIENCE OF THE UNIVERSITY OF MASSACHUSETTS, BOSTON

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Abstract: This paper describes Joseph P. Healey Library's LAN developed with existing and new hardware, software and shareware for staff and networking CD-ROMs. This small budget LAN is a model for libraries with limited resources, that must move toward CD-ROM networking, or that plan an enhancement for a library automated system. Some management issues, problems, and implications are discussed.

1. INTRODUCTION

A Local Area Network (LAN) can provide access to microcomputer-based software and hardware to users that otherwise might need to move from workstation to another to use needed applications. CD-ROM use may to be too high to keep them as stand-alone stations. Networking CD stations for sharing popular databases is growing in many libraries nowadays. CD networking is provided by some vendors, or by CD-ROM some applications. However, for any of these purposes a LAN implementation is bound to budgetary constraint. Librarians and administrators might have to look into special funding to satisfy information technology demands from the clients they serve. Many will have to resort to ingenuity to use what they have at hand more efficiently and effectively.

2. BACKGROUND

In the mid-eighties, the Joseph P. Healey Library (HL)[1] implemented Ulysis. It includes four modules -- Cataloging, Circulation, Reserve and Online Public Automated Catalog (OPAC). Ulysis does not have an acquisitions or serials module. HL acquired microcomputer software to automate these two library functions and complement Ulysis.[2]

Later on, HL management realized that most of the library staff had a microcomputer (PC) on their desktop. Library staff used these PCs for word processing, while departments, such as Acquisitions, Reference, Serials, and Bibliographers, were using them to perform specialized functions. Information from each department, though independent, was needed by others for daily operational routines, thus was required to be available for others.[3] A need for inter™departmen-tal electronic communication and sharing functions from all staff's PCs became clear.

Meanwhile, CD-ROMs became so popular that the stand-alone PCs were no longer sufficient. Librarians and management agreed that expanding the number of PCs would not solve the problems. A simple and user-friendly CD-ROM access needs to be developed. In order to accomplish these two goals, LAN was perceived as the most reasonable solution.

3. LAN AUTOMATION PLAN

The development of HL's LAN involved some broad steps:

� An automation needs assessment,

� Hardware and software needs assessment,

� Selection of networking software based on the existing infrastructure,

� Securing funds and management commitment,

� Development and implementation of the staff LAN, and

� Implementation of the CD-ROM network.[4]

On-going steps are: maintenance of the LAN, and continuous assessment of staff and library client's needs for up-grading and future expansion according to HL's automation plan.

Library management wanted a LAN with E-Mail, Ulysis' OPAC and remote OPAC access, inter-connectivity between the stand-alone PC automated modules and software, while developing flexible CD-ROM networking. In addition to this, library staff and library users' computer skills became a major factor in the development of the LAN. The LAN should require no computer skills, or at most, a minimal levels of knowledge of keyboard use and file handling in word-processing and on-line searching software.

HL had a number of IBM PCs and clones but no funds to accomplish the networking task. Once the LAN objectives and goals were set, a proposal was developed and submitted. It was not funded by the external source. While many related factors related to the implementation discussed by Ortiz and Quintana (1992) were relevant to this case, but the decisive factor of HL's success can be attributed to the UMB's administration's interest and commitment to library automation. They perceived this LAN innovation as a necessity, and funded the LAN project with $50,000. This is provided for wiring, new hardware and software. The networking fees for CD-ROMs, word processing, etc. came from the HL's budget. Subsequent and on-going funding comes from the HL's budget and UMB special funds.

4. LAN CONFIGURATION

After the initial assessment and the success in obtaining internal funding, Novell's Netware was selected. It enable multiple PC's (Client) to share information via a File Server (Client/Server Technology). HL staff also determined the type of network required to support existing PC hard-ware.[5] Another reason for selecting Netware was its ability to support multiple types of networks such as ARCNET, ETHERNET or TOKEN-RING.

HL's management realized that it could be impractical to implement a single type of compu-ter network. Automation plans pursue a mix between IBM and Apple platforms interconnected with library resources at HL and in other libraries. In addition to this NOVELL showed an interest to include Apple connections. Today, with just an additional piece of software (Netware for Macintosh), a MAC can be part of the LAN.

Topology

ARCNET was chosen for data exchange between PCs and the Server. ARCNET is a proven technology and supported by multiple vendors, cost effective when compared to ETHERNET or TOKEN-RING, it can communicate over different media type, such as Coax (RG-62) and Twisted Pair (Telephone Cabling), and it supports and enables mix and

match of different topologies. This makes the LAN flexible and expandable with minimal cost.

Wiring

In the early stages of installation, Coaxial cable was selected. This allows computers in a small area to be connected by one long cable segment (Daisy Chained). Up to 8 computers can be connected to an "ARCNET HUB" in a LOOP or RING. Hard to reach PCs were connected through existing telephone wiring with 4 pairs connectors, this left 2 pairs to be used for data com-munications. Twisted Pair cables already laid by UMB's Telecommunications Department were preferred, thus, saving costs of new cables and installation.

Microcomputers and Printers

The LAN connects the earliest HL's IBM PCs and clones, and the newly acquired 386 and 486 PCs. The LAN current configuration includes fiften IBM PCs and others:

� Seven PC ATs are assigned to heavy use locations, the Reference Desk's PC-AT is one such example. On this workstation, the librarian can access remote OPACs and Ulysis simul-taneously using Quarter deck. It can perform most network accessible applications through DESQview multiple-applications software.

� Seven 386 PCs are CD-ROM workstations on the Reference floor. Each can access CD-ROM databases -- such as *ERIC, PsycLit, CINAHL* (all SilverPlatter), *Business Index* (Infotrac), *Newspaper Abstracts* and *Periodical Abstracts* (both from UMI) -- on the network.

� Five 486 PCs, located in HL's Administrative offices, have Microsoft's Windows™. It is expected that these will be able to access via LAN in the future.

Clearly these PC configurations vary. They range from 640-KB RAM, no HD to 4-MB RAM and 80-MB HD. All have Arcnet cards, monochrome and color monitors, parallel ports for printers and serial ports for modems. HL owns several printers shared by all LAN users. These include Panasonic Dot Matrix printers, HP and TI Laser Printer, and a high speed printer.

LAN Server, Back-up and Gateways

The file server is the key component in the entire network and therefore is equipped with extra features which can accommodate the various workstations requesting information. The server is a DELL 486//50 based PC, which has 1 GB of hard disk, 16 MBs of memory and two network interface cards that divide the network into two independent segments, improving response time. Automatic tape back-ups are performed daily.

Two PCs perform as Gateways. The IBM 3270 Gateway allows access to Faxon's Serial Management System over a dedicated telephone line. The Gateway is a node on the LAN that allows five users to print information to three different printers for call labels, etc. Charon TCP/IP Gateway routes E-Mail messages over the Internet, thereby letting the LAN send and receive electronic mail. This software has been developed for organizations that cannot afford expensive E-Mail packages and who need to communicate over the Internet. This gateway works in con-junction with the Pegasus (shareware) menu driven E-mail software. The gateway is an IBM PC AT with 640-KB RAM, 30-MB hard disk, a network interface card, a 3COM Ethernet adapter for Internet communication.

CD-ROM Server

HL preferred CD-NET by Meridian Inc. One of the main reasons is the Meridian™Novell partnership. Meridian now has the software which will attach multiple CD-ROMs directly to the File Server giving users access to information at their workstations, and thus allowing easy future expansions. Currently 28 CD-ROM drives are connected.

Software

The LAN supports a variety of software for several functions in HL. These applications are accessible from any PC

connected to the network. The LAN is menu driven. It uses NetMenu, a low-cost application that requires no skills beyond keyboard operation. DOS commands are accessible, but these are limited to authorized user for data security purposes.

Acquisitions, Serials, and Administrative Packages

BibBase maintains a database of all books ordered and received, storing funds account information of these books, and generating reports when requested. Allows data transfer from BIP+, Ulrich's+, OCLC, can provide electronic ordering and transfers firm order information to OPAC. Bibliographers can access BibBase from their desks for verification purposes.

Faxon's Serials Management is a database for serials check-in, label printing that works as a remote node in the network. Able Book Bindery Software keeps control of binding shipments and receiving, and printing spine and shelf labels. Paradox is used to produce lists and for serials fund accounting management. Quattro is used for general accounting by upper and middle managers. WordPerfect is available to all LAN users for word-processing.

Telecommunications Software

Procomm Plus, an inexpensive but sophisticated telecommunications package, allows scripting of basic dial-up and main-frame commands. These scripted files provide the unskilled user with all the necessary commands to connect to remote OPACs, to the main-frame, and electronic journals indexes.

LAN users can receive their e-mail through Charon. The gateway interacts with Pegasus. This package routes messages to users, allows Internet connections, emulates most main-frame mail commands with menu driven features, requiring little or no skills.

Reference Applications

Software for Reference use includes: ProSearch for on-line retrieval and search accounting, ProCite, Statistical Package for Library Reference, Hyperpad, and Procomm scripted files for key-stroke access to frequently used OPACs and database services. Disk formatting, printer selection, on-line downloading, and other utilities are accessible from menu driven selections on the LAN, requiring little expertise from users.

5. LAN MANAGEMENT ISSUES, PROBLEMS, AND IMPLICATIONS

The development and implementation of the HL's LAN required the use of systems analysis techniques. In addition, it needed a good deal of awareness and understanding of the current information technology, commitment and perseverance, in order to be able to conceptualize this innovation, visualize the end, and grasp the momentum when this change could be implemented.

Managers, librarians, and staff, as well as other administrators in the organization, must be aware of the potential of information technology (IT). These include some understanding of the technology itself, besides understanding all relevant ramifications in a process of this nature. It is also necessary to have commitment strong enough to overcome possible drawbacks and changes that occur in these projects. Political acumen becomes mandatory. Managers must have a good deal of information about the environment in and out of the library. Such information will be extremely valuable to determine the right time to pursue the implementation of a well-thought project, such as HL' LAN. In some instances, external pressure may become the driving force to implement change in the library, even though IT awareness and understanding is a prerequisite to conceptualizing the innovation, to visualize it, and having the commitment to develop and imple-ment it.

Most issues, problems and implications in IT innovation are the same related to managers' responsibilities -- planning, organizing, staffing, controlling, allocating resources, budgeting, etc. Some of the most sensitive issues come from staffing, organizing, budgeting, and clients' demands and expectations.

Library work flow will change with IT, higher levels of use may occur in departments and services, requiring staff

reallocation. Training staff to accommodate to these new pressures and coping with technostress, technophobia, or resistance to change is one of the most enduring and critical tasks.

Training library users becomes more intensive and extended when IT is accessible. Coping with budget allocations and increasing demands from staff and the public becomes a skill that demands accurate knowledge of constituencies including accurate information on the enrollment figures, number of teachers, degrees held, conferred degrees, information seeking patterns, library use patterns, and substantial knowledge about their clout in the organization.

IT implementation generally has special staff needs. Levels of required IT expertise will vary according to the innovation. Managers will have to identify staff members with expertise and allow time for these to pursue further training, or resort to hiring trained people. Even this requires considerable effort in assessing the need and building a need for new hiring to upper management

Clearly, the issues, problems and implications of developing and implementing a LAN, or any innovation are far from simple and straight forward. The ones mentioned in this paper are just a summary of those perceived as critical. Many other issues must be taken in consideration depending on the library, the staff and the environment in each organization. The management must be versed on the necessary techniques to assess the needs and determine the feasibility of any innovation in the workplace and its impact on staff and the users combined with political savvy.

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