



A Technology Planning Kit for Ontario Public Libraries

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for
Southern Ontario Library Service
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May 2001

A Technology Planning Kit for Ontario Public Libraries
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Funded by the people of Ontario through the Ministry of Tourism, Culture and Recreation

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1. INTRODUCTION

Technology in the form of automated processes and machine-readable sources of information has become part of the day-to-day operations of even the smallest Ontario public library. Public expectations of service are growing. As a result, libraries are faced with making decisions about, and formulating strategies for, implementing the many technological applications required for full customer service.

How do administrators make strategic decisions on purchasing, integrating and maintaining expensive hardware and software? How do library staff and boards evaluate the usefulness of technologies in furthering the library's service goals? How are the skills required to select, maintain and use technology effectively brought in to the library?

The preparation of a formal technology plan gives the library the opportunity to relate technological innovation to the library's mission, goals and objectives and provides a context in which to evaluate new technologies and programs. Just as a service plan lays the foundation for setting priorities for the day-to-day operation of the library, a technology plan creates a framework for identifying the hardware, software and skills required to support those priorities.

"The ultimate goal of any plan is to distinguish what needs to be handled from what does not and to identify criteria for the selection.... We must have a 'buying proposition' and know how our selected mix of products will improve our organization's environment. Then we must be able to explain these decisions to our own customers, colleagues, boards and funding bodies. This is a plan."¹ The risk of acquiring technological applications which do not support the library's stated goals is greatly diminished when the library has a technology plan in place.

The Ontario Public Library Guidelines require that a technology plan be in place in each accredited library. (3.5.1 "The library has in place a plan for acquiring, servicing, upgrading and replacing its electronic equipment and software (e.g. local area network, Internet workstations, photocopiers, printers, circulation and catalogue software)"). While there are a number of library technology plans available to use as models, almost all of them are from public libraries in the U.S.A. and do not address the sources of technology funding frequently used in Ontario. A useable model from an Ontario public library has not been found, and it seems that many technologically sophisticated Ontario public libraries do not, in fact, have technology plans in place. Many smaller public libraries do not have staff with the systems expertise required to create such plans without the kind of assistance this kit will provide. In a recent study on Internet services in public libraries, Charles McClure noted that "small libraries may not ... really engage in IT planning, but they are the ones that need it the most."²

The Ontario Library Service offers this Technology Planning Kit to Ontario's public libraries as a template for preparing a plan to guide the library through the selection, acquisition, use and maintenance of technological applications appropriate to the individual library's stated mission, goals and objectives. It should be used as a checklist by library administrative, service and systems staff, or as an outline by outside experts brought in to assist the library, in anticipating technology needs and putting in place the means to implement the solutions.

¹ Umbach, Judith M. (1999). "Planning for technology." *Feliciter*, Vol. 45, No. 6).

² McClure, Charles R. and Bertot, John Carlo (August 20, 2000). *Public library Internet services: impacts on the digital divide*. URL: <http://www.ala.org/oitp/e-ratstage1.pdf>, p.16

2. THE TECHNOLOGY PLANNING PROCESS

STEP 1 – Design the process

Determine which people should be involved in the technology planning process. Building a group vision will focus efforts and support for the plan. Include those who will be using the technology. Suggested participants are the CEO, staff and outside experts, if required.

A project manager can integrate all aspects of the technology project. When planning for installation of new technology, project management should consider the needs of hardware, software and services. For example, vendor requirements could include upgraded electrical connections before a hardware installation or an Internet connection for access to an electronic database are possible.

Familiarize all participants with the library's service priorities. The technology plan is part of the library's strategic plan and must support the larger goals of the library.

STEP 2 - Examine trends, issues and options

Examine public expectations of technology. Do they include workstations for Internet, email, word processing and other business packages? Seek staff input for service delivery needs, required skills and changes to work procedures.

Identify other issues presented in documents such as the Ontario Public Library Strategic Plan, Benton Foundation report, Ken Haycock's annual review on the future of libraries.

STEP 3 - Prepare the technology plan

After identification of strategic issues and expectations, assign tasks related to the plan. Beginning at Section 4, use relevant portions of the kit and its Worksheets to:

- Complete an inventory of current technology applications being used to support library service responses.
- Identify equipment and applications to support future planned services.
- Establish timelines.
- Prepare a draft budget.

Set goals based on service priorities. What services are offered now? Which service goals are most important? Be specific – state the goals in terms of actions, quantities, dates and times. Break large, complex goals down into small steps.

Use technology as a tool to support the service goals. Study the technology implications within the service responses. What do you need to do this year with technology? Where do you want to be in three years?

STEP 4 - Review the technology plan

Did the technology help the library reach its service goals? As part of the annual review of the library's progress in realizing its goals and objectives, evaluate the effectiveness of the technology plan in making possible the achievement of those goals. On a regular basis, gather information on the use of technology services through statistics, progress reports and consultation with staff. Monitor the funding requirements for technology services.

If service responses are adjusted as a result of evaluation, technology plans should be changed accordingly.

3. TRENDS, ISSUES AND OPTIONS

Before you begin the process of creating a technology plan, there are a number of issues to be considered. This section will address the following:

- Information gathering and keeping current
- Approximate cost of hardware and software
- Lease vs buy
- Networks
- Internet access
- Connectivity options – pros and cons
- Hardware standards
- IT support for branch libraries
- Access for all users through adaptive technology
- Security
- Filters
- Physical resources
- Free basic access to electronic services
- Multimedia formats
- Public email
- Strategic alliances with local partners
- Local technology sharing initiatives

3.1 INFORMATION GATHERING

The best way to make an informed choice is to become familiar with the technology products and services that are available for the library. A broad understanding of technology and trends as they relate to library applications will help participants develop a cohesive plan for the library. During the process, gather as much information as possible on library technology products and services and stay current by monitoring information sources. With the rapid changes and growth of technology services, it is important to keep general goals in mind instead of concentrating on details. There are typically a number of solutions available – the correct choice is the one that is the best fit for each library.

Good sources of information include the following sources. Note that these links are current as of the time of publication:

- Reading: There are a number of books on library planning, technology issues and specific applications. The ALA has a good bibliography: (www.ala.org/library/fact21.html)³

For more timely information, there are many print and on-line journals that deal with broad technology services, as well as library-specific issues. Check general interest publications for features on technology.

³ All web addresses were correct at time of printing but may have changed subsequently.

Library:

- Library Journal (www.ljdigital.com)
- Computers in Libraries (www.infotoday.com/cilmag/ciltop.htm)
- Library Hi-Tech (www.mcb.co.uk/lht.htm)
- LITA newsletter (www.lita.org)
- Information Technology and Libraries (<http://bubl.ac.uk/journals/lis/fj/ital/>)
- Biblio Tech Review (www.biblio-tech.com)

Technology:

- Wired (www.wired.com)
 - InfoWorld (www.infoworld.com)
 - Zdnet (www.zdnet.com)
 - Cnet (www.cnet.com)
 - TechWeb (www.techweb.com)
 - The Standard (www.thestandard.com)
- Internet: use any search engine to find topical sites on library automation. Check web feeds for recent articles from online sources
 - Moreover (www.moreover.com)
 - Discussion: talk with colleagues, local experts and vendors. Check listservs (electronic discussion groups). Good sources are SOLS and OLS-N: <http://cgi.sols.org/forms/listserv.html>
lib@olsn.ca
 - Conferences and workshops: attend both library and technology conferences
 - Visits to other libraries: see demonstrations and gauge satisfaction

3.2 INFRASTRUCTURE

The installation or upgrade of the physical resources required for technology services must be planned in advance. Because of the rapid changes in technology, the infrastructure should be flexible enough to adapt to new services.

3.2.1 Telecommunications

How can the best internal and remote connection be provided to technology services? Some options are unavailable in certain regions, so choices could be limited to what is offered locally.

Networks – If there is only one PC, then it is connected to one printer, one Internet line, etc. A LAN (local area network) provides access to common applications for multiple PCs and workstations in the building, such as an ILS (integrated library system), shared printers or Internet connection.

In network design, each component of the network is identified and can be reached on the LAN or through the Internet. In a WAN (wide area network), each site and component has a unique IP (Internet protocol) number for identification so that data traffic can be routed to the correct location. A domain name is created which assigns a unique host name to a system, for example: "www.library.on.ca". A DNS (domain name system) translates each host name to an IP number. In this way, each identified part of the network can be controlled and accessed, whether in a LAN or through the Internet. Network administration

includes configuring each device or resource, creating and maintaining user accounts and controlling access.

Networks allow shared access to a number of services in the system. Hubs or network servers control access to the network and connect multiple PCs in the same building or group of buildings. For example:

- PCs can direct printouts to one common network printer and share one Internet connection
- A network server allows for one-time installation or upgrade of applications. Instead of installing word processing on each individual workstation, a group installation can be delivered via the network server
- Remote stations can be monitored over the network, reducing the time spent troubleshooting individual computers

Internet connection – The goal is to provide the fastest connection for users at the best possible price. If a large number of services are offered, then adequate bandwidth should be planned over a longer timeframe; the demand for greater bandwidth will only increase. One current ILS (integrated library system) vendor standard is 10k times the total number of PCs at a branch.

Many grant opportunities may be available. To improve connectivity, concentrate on those that provide funding to improve bandwidth.

Strategic alliances with local partners should be explored. Technology provides libraries with opportunities for collaboration, as the library becomes one link in the telecommunications infrastructure. Few institutions can afford to build the entire network structure without partners. If available in the area, participation in a WAN will provide access to services for a group of institutions at bulk rates. For example, the library could share access to a high-speed Internet connection with a local municipality or educational institution. The benefit to the library would be the delivery of a virtual library service in the region without building the entire infrastructure by itself.

Connectivity options are limited to what is offered in the local area. A local Internet provider is a good guide to available connectivity services such as regular telephone lines, ISDN, frame relay, DSL, cable, wireless or satellite. The type of connectivity determines the type of hardware to be purchased. For example, a cable connection requires cable routers, cable modems, etc.

The local telephone service provider supplies telecom access. There are different services and speeds available. A minimum recommended dial-up connection using regular digital telephone lines is 56kbps. High-speed dedicated service includes:

- ISDN: leased line (64kbps, 128kbps, 256kbps, etc.)
- T-1: 1.544 Mbps (24 channels times 64k)
- T-3: 43 Mbps (672 channels at 64k)
- Frame relay (56k to T-1)
- Fibre-optic: uses glass fibres to transmit data on a separate fibre cable
- DSL: allows data to be accessed over existing copper telephone lines. Availability of the service is limited by distance to a local switching station.

Cable service offered by television service providers is another high speed choice. However, the coaxial cable line is usually shared with a number of other local customers.

Ensure good security measures since anyone who shares the cable line can access any unprotected components on the network.

Wireless communication can be fixed or mobile. Fixed wireless is a private network or telephone system that uses wireless devices in fixed locations, such as towers or buildings. Although the initial startup cost is high, the advantage is that there is no monthly charge because the bandwidth is private. Remote branches can be part of a wireless network since there is no cable required between locations. Wireless requires line-of-sight; transmitters are mounted on towers and data communication must be free of obstacles such as vehicles, buildings and seasonal foliage. Some transmission is hampered by severe weather conditions. Rather than building the towers independently, investigate wireless services used by local government and seek permission to use existing towers for wireless equipment. Wireless connectivity can solve some of the costs associated with retrofitting since the transmitter is mounted outside the building

Mobile wireless is a bridge to a connected and secure network. Wireless uses radio frequencies to send data between units. Hand-held devices such as mobile telephones, email and fax services are a popular application of mobile wireless networks. Some libraries installed wireless local area networks in larger branches to connect workstations within the building; staff link to the network with handheld devices. Note that the market is still debating over wireless standards and protocols. Until one wireless standard is adopted, wireless service will be limited to the protocol of the selected vendor.

Satellite connections are used in more remote areas. Data is sent to a transmitter and beamed to a satellite. The outgoing data is often sent out through a normal modem connection but is returned at a much faster rate.

3.2.2 Cabling, electricity and lighting

Each piece of networked hardware requires an electrical and network connection, either through cable or wireless.

Cabling – Devices can be connected through twisted pair wire, coaxial cable (used by cable television) or fibre optic cable. A network installation company will provide information on installation costs and cabling standards such as: ANSI/EIA/TIA-568-A Commercial Building Telecommunications Cabling Standard.

Capacity standards vary depending on the application. One common ILS vendor standard is 10Mbps to the desktop.

Some renovation of the building may be necessary to install the network cable. Controlling the amount and proximity of electrical interference to the cabling network can reduce problems and subsequent network support.

Electricity - The electrical wiring must be adequate for the planned technology to include sufficient power outlets and the load on the electrical system. PCs require a “clean” source of power and need protection from static and interruption. A UPS battery backup unit will regulate the flow and provide emergency power.

Lighting – Lighting for computer workstations is different than normal office lighting. A non-glare and diffuse lighting source should be selected for computer monitors

3.2.3 Hardware and software

There are different requirements for hardware and software depending on whether the project is a first-time installation or an upgrade of existing services.

Hardware – It is important to anticipate obsolescence and keep the equipment up-to-date with a policy of regular replacement. Hardware standards should be developed and reviewed annually in the face of rapid changes in technology.

Consider the required number of PCs, servers (application, print and/or network), operating system, printers, modems, hubs, routers, terminals, peripherals such as barcode scanners, speakers, etc.

Equipment standards are a guideline for the amount of equipment required. For example, Wisconsin Public Library Standards (2000) provides one public access workstation per 35 visits per day⁴. Other examples are:

- a minimum of two public workstation per building
- one public workstation for every 5000 residents in the service area
- one per 50 library visitors per day

Standardization of hardware reduces the staff time required to troubleshoot and maintain services for a variety of different equipment. The IT support for remote branches is simplified when all hardware such as PCs, printers, scanners, etc. is uniform.

Software – Is new software, such as an integrated online library system, needed or are improvements, such as Internet access to the library catalogue, patron-placed holds, Z39.50, planned? Like hardware, the amount and variety of new and upgraded software increase rapidly.

Software needs include Internet browser, email, terminal emulator, Internet filter and office software. The software should be properly licensed and compatible with the network and other applications.

Data standards increase the availability of and access to technology resources.

- MARC format is the library standard for bibliographic records. If library data is not in MARC format, the library is limited in the number of applications it can offer to patrons, such as Internet access to the catalogue.
- Z39.50 allows Internet search and retrieval of information from library databases. If the ILS vendor is not Z39.50 compliant, then the online catalogue will not be included in virtual union catalogues such as INFO, which searches live Z39.50 target sites.
- XML is an increasingly popular standard to classify data. It uses standardized metadata tags that enhance Internet retrieval of contents, such as descriptions of the contents of library catalogues.

3.2.4 Security

The security of data, hardware and networks is of growing concern. With recent publicized attacks, such as viruses and denial of service attacks to disable a network, organizations

⁴ Department of Public Instruction, State of Wisconsin. "Summary of technology related standards", *Wisconsin Public Library Standards (2000)*. URL: <http://www.dpi.state.wi.us/dpi/dltcl/pld/summtech.html>

must be conscious of risk and be prepared to prevent or limit damage. Procedures for preparing and storing regular backup copies of valuable data are part of the duties of a system administrator. Although there is insurance available to protect organizations from loss of data, regular backups are the best defense.

Network security - Networks can be protected with software and hardware such as a firewall, which shields equipment and data from attacks outside the network. For equipment within the network or building, network security can shield valuable data from unauthorized access through authentication and authorization with passwords or encryption. As well, software is available to protect the configuration settings of PCs against vandals. There are a number of effective programs to quickly reset PCs accessible to the public. Anti-virus software must be regularly updated to stop damage from harmful programs delivered via email and the Internet.

Filters - Filtering software may address concerns about acceptable Internet use. This kind of software limits access to specific web sites or pages that contain library-defined words and phrases. Note that the location of public PCs and printers affects the amount of supervision required. Equipment located within staff line-of-sight will reduce vandalism. The installation of privacy screens can decrease the incidence of complaints from patrons offended by displays on public Internet monitors.

Internet control – Internet control software is useful in controlling public access workstations by setting time limits for users and sessions.

3.2.5 Physical resources

There should be sufficient furniture, such as desks or chairs, to accommodate additional equipment. The circulation desk, individual workstations and OPACs can all be assessed for ergonomic requirements.

Consider developing standards for space requirements; for example: 50 sq. feet for each public station, 100 sq. feet for each reference station. Alternative layouts of furnishings and materials can solve some spacing problems. In some cases, renovations will be needed.

3.2.6 Adaptive technology

Access for people with disabilities or special needs is a requirement when preparing the technology plan. Some examples of adaptive technology include:

- Larger monitors or magnification devices
- Voice-activated services, such as screen readers
- Assistive listening devices

3.3 INFORMATION SERVICES

The face of the technology plan is in the technology-based information service it provides to the community. The library is viewed as a gateway to information resources on the Internet and developing these services will enhance the library's role in the community. What technology-based resources are required to achieve strategic goals and improve education or library services?

3.3.1 Integrated online or standalone library system

There are a number of software packages that provide standalone or online access to the library catalogue. These include an ILS (integrated library system) that provides automated circulation, cataloguing and acquisitions. Selecting ILS software that conforms to data standards, such as MARC format and Z39.50, will include the library's catalogue in a local, regional or global catalogue search.

A plan to enhance the existing library automated system should incorporate both short and long-term improvements to library service. Examples are:

- Remote access to the library catalogue via Z39.50
- Patron-placed holds or reserves via the Internet
- Additional workstations
- Increased bandwidth to improve Internet connectivity and speed

Shared or outsourced ILS - One solution for small and larger libraries is to share or outsource the library system.

- Shared system - Once the library database is built, the host server can reside at any location, ideally on a high-speed link to the Internet. A contract can be signed with another library to host data and share its license, server and expertise. Library users and staff will access the library catalogue and integrated library system via the Internet.
- ASP - An ASP (application service provider) allows use of the resource over the Internet in exchange for a monthly or annual fee. The ASP hosts the library data and application and is responsible for all troubleshooting, upgrades, support, repair, etc.

There are some considerations when sharing or outsourcing the ILS:

- The main advantage is cost. Instead of paying for the entire ILS project, the library shares initial capital costs, annual support fees and training with a partner
- Expertise can also be shared, reducing the time spent on implementation and problem solving
- Although the partner library gives up some system control, some staff would welcome the idea of handing over responsibility for network crashes, system failures and bug fixes
- A concern is the degree of impact experienced by users during a system crash. If the entire shared network is down, then a greater number of people are affected by the interruption of service. It should be noted that an independent ILS could crash as well. A larger system usually has greater resources to maintain and support the network, especially during failure.

3.3.2 Electronic information and reference services

The amount of information available electronically is increasing rapidly and so is public demand. The principle of free basic access to electronic services is used to determine which services the library will provide. As more technology-based services are offered, the demand from users will increase, as will a corresponding load on Internet bandwidth.

An important element of success is to publicize the library's electronic services. Regular updates to the library's web page, good signage and documentation will ensure continued use of the library's electronic services.

Electronic databases - The best resources are not always free. Investigate the costs of commercial online and web-delivered databases and search services. COOL (Consortium of Ontario Libraries) is a library initiative to negotiate bulk purchases of electronic databases (www.library.on.ca/cool/index.htm). Excellent sources are available and in most cases, users can access the service remotely with only a valid library card number. The vendor uses patron authentication to access the library's patron database to check for valid accounts.

Digitization - In the digital age, one of the most valuable types of information a library provides is local information. Local collections, such as local history or genealogy databases can be digitized and accessed via the Internet. Unlike most of the holdings in an average library, these collections are not available elsewhere on the Web.

Multimedia formats - Multimedia formats can be integrated into the library catalogue. Standard cataloguing procedures exist for nonbook formats, such as video and sound recordings. Ebook are a new entry. They can either be purchased as separate files loaded on ebook readers or be made available as part of a subscription service on the Internet. As well, the 856 MARC tag for URLs allows a link to the ebook subscription service or Internet resource from within a bibliographic record.

Email and chat - Email remains the most popular use of the Internet, followed closely by chat rooms or web communities. A recent survey from the Burnaby Public Library studied web usage logs during one week and discovered that email accounted for 41% of total use, closely followed by chat rooms.⁵ Many patrons use library workstations to access Internet email accounts and participate in chat rooms or membership-required web communities. Younger users are frequent users of these services. Public use of email or chat could have an impact on library resources, especially if there are a limited number of workstations available. One solution is to reserve some workstations for email and quick searches and others for longer reference sessions. Internet control software is helpful in regulating sessions.

File copying - Some patrons wish to copy files onto disk using library workstations. Giving users the ability to copy or download files onto disk is a service that has value but also has security implications. Frequently, network administrators deny access to floppy disk drives on public workstations. There are solutions that address these security issues, such as network settings, software and disk drive locks.

⁵ Curry, Ann. "What are public library customers viewing on the Internet? An analysis of Burnaby transaction logs" (March 2000) *Burnaby Public Library Internet Use Survey*. URL: www.bpl.burnaby.bc.ca/weblog.htm.

3.3.3 Government services

There is a growing trend to deliver government services via the library. Government forms and services are available over the Internet and users frequently need assistance from trained staff to access the information. Many government publications are in .pdf format and require the installation of Adobe Acrobat Reader on public workstations. GISs (geographic information systems) are used by a number of institutions and individuals. They provide access to maps and geographic data used by government, research institutions and local services, such as police and fire departments.

3.3.4 Access to remote collections

It is important to provide access to other library catalogues through services such as the province's inter-library loan system or via the Internet to Z39.50 compliant catalogues. The province's INFO service provides access to a virtual union catalogue via the Internet. It points to live Z39.50 catalogues and a database of non-Z39.50 catalogues mounted on a server.

3.3.5 Web page

A well-designed web page gives a summary of information about the library, its services and if possible, provides direct access to those resources. For example, the library home page can provide a link to the library catalogue, to licensed commercial databases, offer patron-placed holds, and access to a patron's account. A good design will attract and retain viewers; frequent updates will keep the site current.

3.3.6 Office software

There is a large variety of software to aid decision-making and streamline manual processes. Software available for administrative tasks includes:

- accounting and payroll
- word processing
- email
- Internet browser
- production of brochures and newsletters, etc.

3.3.7 Policy

The establishment of clear policies on the use of the library's technology resources is a good framework for public service and organizational needs.

Standards - It is helpful to develop standards for the amount of equipment necessary to meet service goals, as well as space requirements and minimum specifications for purchase of new hardware and software. Regularly monitoring sources of technology information on current standards will help to create minimum specifications; these should be updated at least annually.

Usage - There should be clear policies established for, and distributed to, users of technology services. For instance, a form detailing charges for printing from public

workstations could be displayed at circulation desks. Another common policy in libraries is on acceptable use of electronic resources, such as email and the Internet for the public and staff.

Enforcement of the policy could include a signed agreement, scheduled use of workstations by a logbook or Internet control software, as well as regular monitoring by staff. Preventative measures include anti-virus software on all PCs, network security and general security software for public workstations.

Monitoring use of the technology will indicate if policies should be changed. Usage statistics can be integrated with the library's regular collection of data; statistical reports from the library's ILS can be requested to analyze traffic. As well, some internal processing can be adjusted to gather additional data, such as incorporating specific local coding in cataloguing methods.

3.4 LIBRARY PROCESSES

Automation can have a significant impact on a library's organization and internal processes. Technology resources link information in all departments at many levels, instead of the compartmentalization that is common in manual systems. Technology can be used to streamline administrative procedures and deliver library services more effectively.

A study of the movement of material through the system (requests, order, receipt, payment, cataloguing, processing, contact of patron and circulation) will suggest some efficiencies to reduce the amount of time required to deliver the title to a patron. Can internal procedures support prompt delivery of the request? This is a good time to look at each procedure and ask: "why are we doing this?" If there is no good reason, then the step can be eliminated.

For example, a cataloguing entry is immediately displayed in the ILS library catalogue to public service staff and patrons, both inside the library and by remote access. If patrons can access the title in the catalogue during ordering or item processing, then requests will occur that much sooner. Some improvements to library processes include:

- Reducing delivery times of requested material through online ordering, resulting in the elimination of manual on-order files
- Purchasing material processing such as labels, barcodes, etc., so that the item is shelf-ready
- Installing bibliographic record loaders that load standardized cataloguing entries directly into the library database, reducing the time spent cataloguing titles

The movement of material around circulation desks can also be examined.

- Adjusting the checkout process and equipment layout can help workflow
- The purchase of reliable barcode scanners, additional workstations and receipt printers can address ergonomic concerns

Smart cards are one method of automating fee collection. They contain an embedded memory chip to store information on the user, permitted services and fees. A small device called a smart card reader accesses the information on the card and tracks fee-based activities such as fines, photocopier and print charges.

3.5 SYSTEM SUPPORT AND TRAINING

The growing dependence on technology to deliver services increases the demand for reliable, secure systems. Expansion of automated services will result in an increasing reliance on information technology for both staff and patrons. Who will provide support for the library's technology? As technology services grow, support and service become more specialized, requiring different skill sets. Ideally, there is a system/network manager and IT support staff. For smaller libraries, this is often not possible. Usually, the vendor will provide system support as part of the purchase. After the initial phase, support is outsourced or provided in-house. As the amount of technology services increases, so does the need for internal expertise. The library must consider how much expertise to develop in-house and what to invest for training.

3.5.1 Types of support

There are different types of support and skills required to keep the technology services available.

Hardware

- Installation, maintenance and repair of PCs and servers for applications, networks and printing
- Installation and maintenance of peripherals such as scanner, printer, mouse
- System administration: backups, adding and deleting users, printer control
- Operating system (Windows, Unix, NT, Linux)
- Troubleshooting equipment for connectivity

Software

- Installation
- Upgrades and bug fixes
- Backups
- Troubleshooting
- Integrated library system support

Network

- Adding and maintaining users
- Connectivity
- Security: firewalls and virus protection
- Email
- Troubleshooting

Web page

- Development and maintenance of pages, links and email

3.5.2 Support options

There should be clear expectations of support, whether response is supplied immediately, within four hours, or 24 hours. There should also be sufficient notice of interruption of service for scheduled upgrades, and maintenance should be scheduled during off hours. Again, standardizing equipment and compatibility greatly eases the load on support staff and shortens the response time. There is a variety of library-specific software designed to

control public use of workstations, including Internet access, configuration settings and printer control. These programs ease the support work of staff, especially if located at remote branches.

Outsource - Many libraries purchase all or some type of support from a vendor. The agreement with the vendor should include a description of covered services and the term of the contract. Many vendors include training sessions for staff and/or provide help desk service.

Some libraries make service arrangements with the IT department from the municipality or county. This is very practical if the library is part of a wide area network and does not have the resources to maintain network support or firewall services. It is in the library's interest to negotiate service for the opening hours of the library, not just normal business hours, as libraries experience heavy use of technology resources in the afternoon, evening and weekend hours. Non-library IT staff typically underestimate the amount of support required for libraries. Remote branches should expect reliable, timely support for their locations during the times of busy public use.

Small libraries should consider sharing support with other libraries. It is difficult enough for larger libraries to attract full-time support staff as well as to finance ongoing training to keep those skills current. Sharing support and expertise for an ILS or wide area network will benefit both partners.

Internal - Expertise can be developed in-house. Ideally, there will be a systems manager, network specialist and hardware technicians to support the network. Establish a benchmark, such as one FTE for every 50 or 100 terminals. Appropriate training should be provided for support delivered by staff.

As well, it is helpful to have at least one staff member per branch to deal with computer problems. Staff can be trained to troubleshoot and liaise with the IT department.

Identification and solution of simple problems include:

- Rebooting computers
- Installing printer paper
- Checking power source and cable connections

Some libraries outsource their in-house IT expertise to other departments or local businesses, thereby fostering strategic alliances.

3.5.3 Training

Training is a vital part of delivering technology services effectively in the library. There are a number of methods to deliver training programs: the library can hire staff, contract out or develop from within. The content needed for the audience should be planned: are basic skills enough or is a more advanced training program required? Include the purchase of training material, such as videos or new titles to support technology advances.

Staff training – Many U.S. state libraries recommend that three to five per cent of the automation budget be reserved for staff training. The Ontario Public Library Guidelines recommend that one per cent of the total budget for wages and benefits be spent on

training.⁶ What kind of training is necessary? The Oakland Public Library has developed a good source of technology competencies: <http://bookworm.ci.oakland.ca.us/techcomp.htm>

Some training needs include:

- Acquisitions and cataloguing training for technical services staff if using an integrated library system
- Circulation, reference and Internet searching training for public service staff
- On-going technology training to keeps skills current for systems staff
- Training on office software such as word processing, accounting, email, etc., for administrative staff
- Ongoing training required for software upgrades
- Basic troubleshooting skills: fixing and resetting the PCs, printers, troubleshooting on public access workstations

Training can be delivered in house, from outside trainers or consultants, or by self-study. Costs should include course fees, travel and training material.

Public training – Some libraries offer formal training on searching the Internet and electronic resources. Another method is to develop help sheets or a library web page that contains self-guided help information.

Board training – It is advantageous to deliver formal or informal training to the Board to gain support and understanding for technology services in the library.

3.6 COSTS AND FUNDING

3.6.1 Costs

One technology trend is that the hardware is becoming smaller, faster and less expensive. However, the total technology costs will increase as service expands and the network grows more complex. When considering the capital costs as well as the ongoing costs, a library can expect to allocate at least 15 percent of its budget to technology.⁷

One-time capital costs:

- Hardware: purchase, setup and installation
- Software: purchase, setup and installation
- Telecommunications and connectivity setup
- Retrofitting: installation of cable and electrical wiring, asbestos removal, furnishings and building renovation

Annual costs:

- Support: hardware, software and network, maintenance, troubleshooting.
- Connectivity
- Training: initial training and refresher courses
- Replacement: equipment kept up-to-date with a regular schedule of replacement.

⁶ *Ontario Public Library Guidelines: a developmental tool for small, medium and county libraries, second edition* (1999) Ontario Public Library Monitoring and Accreditation Council. p.13

⁷ Boss, Richard W. "Model technology plans for libraries". *Library Technology Reports*, Jan-Feb 1998, vol.34, no.1, p.9

What are the long-term costs of building and maintaining a computer network? The total cost of ownership (TCO) is calculated as:

capital cost + software + connectivity + training + support + replacement + retrofitting = TCO

As a general rule in business, for each dollar of network capital cost, add another dollar annually for tech support and training.⁸ Organizations can reduce expenses by controlling support costs rather than concentrating on minimizing hardware acquisition costs. According to Plante & Moran LLP, studies from research organizations project that over the full life cycle of a computer, the cost of hardware represents about 15 percent of total costs while the costs of support represent between 70 and 85 percent.⁹

Although libraries may not incur the same expense, there are hidden costs in staff time required to support the network. Some libraries rely on the services of volunteers for IT support. However, if the volunteer support ceases, then the library will have to supply technical support at an additional cost.

Staffing requirements – There are no firm standards on the amount of staff support required. Business models suggest one support staff per 150 to 500 workstations. Library guidelines range from one IT staff per 50 to 125 PCs, depending on the design of the network.¹⁰

As a guide for businesses, IBM and MIT developed a formula to calculate the number of staff required to support a network in a business environment.¹¹

Staff members = (no. of workstations/500)
 + (no. of users/1,000)
 + (no. of clusters sharing servers, printers and other peripherals/15)
 + (no. of applications supported/50)
 + (no. of distinct vendor operating systems and applications/1)
 + (no. of software licenses required/25)

For large libraries or consortia, full-time IT staff is the ideal. Staffing positions can include:

- System manager – plans and designs structure of automated systems and networks. Acts as liaison between ILS vendor and library. Maintains scheduled backups and print requests.
- Network specialist – maintains network access for all users, LANs and WAN connections, email access.
- Hardware technician - installs, maintains and troubleshoots hardware, networks and software.

There continues to be a shortage of qualified staff with the required technical skills. This is reflected in the higher salaries being paid to IT staff in comparison with the average wage

⁸ Gartner Group, as quoted in: *TCO models and approaches* (2000) Compaq Computer Corporation. URL: <http://www.compaq.com/tco/models.html>

⁹ Wiescinski, Douglas R. (2000). "Technology support models and contrasting education with commercial enterprises." Plante & Moran LLP, *Michigan Technology Staffing Guidelines, 2000*. URL: <http://techguide.merit.edu/plantemorani.htm>

¹⁰ Mayo, Diane and Nelson, Sandra (1999). *Wired for the future: developing your library technology plan*. American Library Association, p.94

¹¹ Arfman, J. and Roden, P. (1992) "Project Athena: supporting distributed computing at MIT." *IBM System Journal*, v.31, no.3, pp.550-563

offered in libraries. In addition, there are higher costs for IT training and certification from large vendors such as Microsoft.

For smaller libraries, outsourcing training and support services reduces the amount of staffing and training required in-house. It is hard for small libraries to attract IT staff since there is rarely a requirement for full-time IT support. Small libraries often combine IT duties with library work, resulting in a skill set that is in short supply and difficult to keep current. Outsourcing these duties will result in a higher hourly cost, but delegating the skills to professionals with up-to-date skills will ensure reliable system support.

SAMPLE BUDGET

- For library purchasing ILS with OPAC, cataloguing and circulation functions
- One full-time systems manager responsible for ILS support
- Outsourced support for network and hardware
- MARC format conversion project in second year

ITEM	Year 1	Year 2	Year 3	Year 4
Integrated library system (ILS)	\$80,000			
ILS annual software support	\$9,000	\$9,500	\$10,000	\$10,500
ILS hardware	\$20,000			
ILS annual hardware support (outsourced)	\$2,000	\$2,100	\$2,200	\$2,400
PCs, printers, barcode readers	\$30,000			
Replace 1/3 of PCs (beginning Year 4)				\$10,000
Network infrastructure (replace server Year 4)	\$20,000			\$12,000
Network annual support	\$2,000	\$2,000	\$2,000	\$2,000
Telecomm installation	\$5,000			
Telecomm annual fees	\$2,000	\$2,000	\$2,000	\$2,000
Retrofitting	\$15,000			
Staffing: 1 system manager	\$38,000	\$40,000	\$42,000	\$44,000
Training	\$6,000	\$2,000	\$3,000	\$4,000
MARC conversion		\$20,000		
Electronic database	\$800	\$1,000	\$1,000	\$1,100

3.6.2 Financing

How can technology plans be financed?

Grants - Whenever possible, grant funding should be integrated with the technology plan. Grants from sources such as the Bill and Melinda Gates Foundation, CAP, and HRDC should be examined as opportunities to achieve technology goals. These grants can be used to purchase hardware, reduce connectivity costs and participate in provincial networks.

Private - Private funding opportunities from groups such as business and volunteers can be integrated with the technology goals. Potential donors can contribute specific services that are delivered through technology. For example, Friends of the Library groups can organize fundraising for computer equipment, benefiting the library by obtaining hardware and developing community support at the same time. A program of sponsorships, donations and solicitations can fund a number of technology goals.

User fees – Although the revenues are small in comparison with other sources, fees for service can be included, such as Internet use, printouts, training programs or workshops.

Note that fees for service must fall within the provisions of the *Public Libraries Act*, and grants terms of reference.

3.6.3 Budgeting strategies

Purchase - The purchase of computer hardware is a capital cost. To understand the full cost implications, combine the initial purchase with ongoing costs for maintenance, hardware and software support, troubleshooting and upgrades. Include hidden costs, such as staff time for administration and support.

Lease - Considering the high cost of initial purchase of services and support, a good option for small libraries in particular is to lease some parts of the technology service. For instance, hardware can be leased and upgraded on a regular basis, thereby ensuring that equipment is up-to date and current for public service.

The choice to lease hardware changes the budget line to an operating expense. For budgeting purposes, it is easier to build in an annual operating cost instead of justifying a large capital expense. Although the price for leasing is about 30% higher than outright purchase, the real cost of ownership is arguably the same, considering the staff time required for budgeting, troubleshooting and upgrades. Many leasing plans are for a fixed term, such as three years, at which point the hardware can be replaced with newer components. Since the leasing company owns the equipment, it is also responsible for its maintenance and repair. With the rapid change in technology and the growing demands on staff training and time, organizations find leasing an attractive option.

Outsource – Another option is to outsource some components of the technology services:

- Consultants can study, design or recommend an automation strategy to save the library weeks of upfront work and support
- Outside professionals can provide hardware support and troubleshooting services rather than delivering the services in-house
- Some ILS vendors offer full-service network design and support
- Equipment can be physically located at a hosting company that maintains the hardware and connection
- A hosting service company, such as an Internet provider, can store and maintain library web pages
- Web designers can create a professional, polished library web site

Also of interest to small libraries is an ASP (application service provider) solution. ASPs host Web-based applications, such as word processing or other office software. The ASP can also store the client's application on its server or rent use of its own licenced software and equipment. Clients access the programs and hardware over the Internet and pay on a per-use basis or monthly fee. The ASP is responsible for all the support operations, including hardware maintenance, software upgrades, 24-hour support, etc. The financial resources of the client can instead be directed to improving Internet access. Compare the costs and ease of ASP use with purchasing and installing servers and software and troubleshooting. For example:

- The library uses office software on the ASP server and stores files locally
- The library uses the ASP server to store its own licenced software and data
- The ILS vendor stores the library database on its equipment. The library pays a monthly fee to use the ILS software over the Internet

Partnerships – Libraries can share a server and/or library automation software to reduce costs and share expertise. In this arrangement, there is only one server and the partners share costs for the server, hardware support and software support.

Some libraries negotiate support agreements with municipal or county departments, which often have superior Internet bandwidth, security equipment and staffing resources. Libraries can also split technology costs with other organizations or consortia in the local region, such as schools and colleges, other libraries or library groups. Partners share the costs of hardware support and negotiate the bulk purchase of equipment or materials.

The consortia approach works well for smaller libraries to negotiate various levels of service from a library with an existing technology, such as an ILS. The smaller partner can deal with the larger library to share its automated system and expertise. The larger library will gain by sharing technology costs and increasing buying power. It is advisable to first create a governance agreement, detailing services and fees. Then the partners can develop and maintain shared services such as integrated catalogues, bulk purchase of standard equipment and training.

3.7 TIMELINES

A constant in the technology world is that it is changing rapidly with the appearance of innovative services and the obsolescence of current strategies. Ideally, the library technology plan should cover a three year time period. Realistically, it should be reviewed annually.

Information on the use of technology services should be collected regularly by statistics, progress reports and ongoing consultation with staff. Performance measures can be used to judge user satisfaction with services. If the evaluation leads to a change in service responses, then the technology plan can be adjusted.

The replacement cycle for equipment depends on its environment. In the business world, hardware has a two or three year currency - libraries can extend the useful life of equipment to three or four years. A regular equipment replacement plan can be incorporated in the library's budget. For instance, if the library chooses a three-year replacement cycle for hardware, then after the initial capital cost in year one, another capital expenditure is planned for year four.

4. SETTING TECHNOLOGY PRIORITIES

Every service offered by the library requires a part of the library's infrastructure of buildings, equipment, furniture, materials and staff. Many services will draw on the same parts of that infrastructure. For instance, leisure-reading services require access to a list of the library's holdings; so do information services. The fact that the library's catalogue supports both these services determines how it is arranged. The same holds true for technology infrastructure. The technology selected must support the library's service priorities.

The Technology Planning Kit is organized around the possible service responses identified by the American Library Association in *Planning for Results: A Public Library*

*Transformation Process.*¹² We believe every library will be able to translate this approach to work with its own stated service priorities no matter how it has approached the strategic planning process or in what language it has chosen to express its goals.

4.1 Identifying the technology implications of the service priorities of the library

Listed below in alphabetical order are sample goals and possible technology supports required by each of ALA's service responses. There are a variety of examples presented, suitable for a single library, multi-branch system or consortium.

4.1.1 Basic Literacy

The library addresses the need to read and to perform other essential tasks. The library provides a learning environment, specialized materials and access to trained tutors.

In order to meet this priority, the library could consider:

- Public access multi-media computers for literacy material, printers, assistive hardware
 - Established standards for public workstation space requirements
 - Workstation furniture, including design for disabled access
 - Sufficient cabling and electrical connections
 - Support/service to maintain hardware and software
 - Staff training to provide support and simple troubleshooting
- Literacy training in computer lab with instructional technologies, tutoring software and the hardware to support them
 - Sufficient cabling and electrical connections
 - Support/service to maintain hardware and software
 - Local area network to share access to software, printers, etc.
 - Internet access with sufficient bandwidth
 - Staff training on tutoring software

4.1.2 Business and Career Information

The library addresses the need for information related to business, careers, work, entrepreneurship, personal finances and obtaining employment. The library provides specialized business resources, sources of information on career planning and employment opportunities, and assistance in using these resources.

In order to meet this priority, the library could consider:

- Internet access for all reference desk computers
 - Established standards for workstation space requirements
 - Cabling and electrical
 - PCs and printers
 - Internet access with sufficient bandwidth

¹² Himmel, Ethel and Wilson, William James (1998). *Planning for Results: A Public Library Transformation Process*. Chicago: American Library Association.

- Support/service to maintain hardware
- Staff training
- General purpose printing for all existing public computers with a standard of one network printer for each five PCs
 - Installation of heavy-duty network printer
 - Local area network for network printing
 - Network configuration of PCs and printer
 - Security to prevent unauthorized access to network
 - Staff training to provide simple troubleshooting
- Word processing software on public workstations for resumé preparation
 - Purchase and installation of word processing software
 - Security software to limit vandalism
 - Staff training to provide support
- Reliable photocopier for public use with repair service within 4 hours
 - Purchased or leased photocopier
 - Repair service agreement
 - Staff training for support
- Remote access to electronic business resource database for registered patrons as part of cooperative purchase with local partners
 - Electronic database subscription with licenses for in-house and remote users
 - Internet access with sufficient bandwidth
 - Security, such as firewall for the network or filtering software for public access workstations
 - Staff training to provide support
 - Public training sessions on effective search techniques
- Library web page with access to library resources
 - Committee to develop standards and guidelines
 - Web page to include access to library resources, stored on an owned or leased web server and updated as needed
 - Staff training to update information for library web page
- Smart cards for access and payment of fee-based services, such as printers, photocopiers, fines
 - Exploration of shared services with local partners
 - Turnkey solution to provide smart cards, readers, kiosks, servers, software, network setup and system administration
 - Support/service to maintain hardware

4.1.3 Commons

The library addresses the need of people to meet and interact with others in their community and to participate in public discourse about community issues. The library provides public meeting spaces adaptable to the use of a variety of community groups and may provide video-conferencing facilities.

In order to meet this priority, the library could consider:

- Videoconferencing equipment for public use with online booking of service
 - Wiring to accommodate technology
 - Videoconferencing equipment: video camera, projector, microphone, speakers
 - Sufficient support/service to maintain hardware
 - Internet bandwidth sufficient for videoconferencing
 - Promotion of service on library web page
 - Online booking form that patrons can email to administrative staff

4.1.4 Community Referral

The library addresses the need for information related to services provided by community agencies and organizations. The library provides a database of available services and assistance in using it. The library may provide follow-up on the use of services. The library establishes on-going relationships with community organizations.

In order to meet this priority, the library could consider:

- Web-based community services database in partnership with local organizations
 - Establishment of local technology sharing initiative to share costs of database license, additional hardware and upgrades to bandwidth
 - PC workstations, printers, etc.
 - Sufficient cabling and wiring
 - Sufficient support/service to maintain hardware
 - Purchase of database software or license to create, maintain and access community database
 - Staff training to maintain database and provide assistance to users
 - Links to community information on library web page

4.1.5 Consumer Information

The library addresses the need for information required to make informed consumer decisions and helps residents become more self-sufficient. The library provides specialized resources of consumer related information.

In order to meet this priority, the library could consider:

- Skilled staff to provide reference service to access information resources
 - Evaluation of technology skills of staff
 - Regular training sessions for staff to continue to develop knowledge
- At least two computers per branch available for public use of consumer information
 - Purchase of electronic database license
 - Standards for workstation space requirements
 - Sufficient cabling and electrical
 - Sufficient Internet bandwidth
 - Replacement or addition of PC workstations, printers and fax
 - Sufficient support/service to maintain hardware at remote branches
 - Staff training to provide support and simple troubleshooting

- Pointers to consumer information on the library web page
 - Links on library web page
 - Staff training to maintain web page

4.1.6 Cultural Awareness

The library helps satisfy the desire of community residents to gain an understanding of their own cultural heritage and the heritage of others. The library provides in-depth collections of materials and resources in many formats, and programs and displays that reflect cultural heritage. The library provides materials and assistance in languages spoken by community residents.

In order to meet this priority, the library could consider:

- Multimedia public access computers
 - Established standards for public workstation space requirements
 - Workstation furniture, including designs for disabled access
 - Sufficient cabling and electrical connections
 - Support/service to maintain hardware and software
 - Staff training to provide support and simple troubleshooting
- Video projection equipment, microphones, etc., for performances
 - Wiring to accommodate technology
 - Videoconferencing equipment: video camera, projector, microphone, speakers
 - Sufficient support/service to maintain hardware
 - Internet bandwidth sufficient for videoconferencing
- Web page to promote multicultural understanding
 - Input from community groups on appropriate resources
 - Links to library web page
- ESL tutoring sessions in existing computer lab to help non-English or French speaking populations use library resources
 - Grant opportunities for funding
 - ESL software programs for use by tutors
 - Staff training to provide assistance

4.1.7 Current Topics and Titles

The library helps fulfill residents' appetite for information about popular cultural and social trends and their desire for satisfying recreational experiences. The library provides a current collection with sufficient copies to meet high demand in the formats and languages required. The library may offer programs, such as book talks and performances that promote current and forthcoming publications.

In order to meet this priority, the library could consider:

- Computer catalogue of library holdings in all formats with remote access from home or office
 - Cooperative model with other libraries to share purchase and service of integrated library system with standards of MARC format and Z39.50

- Supporting hardware, such as server, PC workstations, printers, etc.
 - Supporting software, such as Internet browser
 - Mount library database server on the Internet
 - Purchase of domain name
 - Network setup of IP addresses and users
 - Reconfiguration of workstations to link to database server
 - Network security such as firewall to protect network from unauthorized access
 - Staff training on use and maintenance of integrated library system
 - Sufficient support/service to maintain network
 - Link to library catalogue on web page
- Timely support of integrated library system
 - Identification of in-house resources for troubleshooting
 - Staff training on simple troubleshooting skills
 - Outsource hardware service and support
- Ebook service to patrons
 - Subscription to ebook service and ebook readers
 - Addition of ebook holdings to library catalogue
- Reader's advisory links on library web page, such as "most requested" section; allow online requests
 - Development of library web page with Internet access to catalogue
 - Creation of "most requested" web page linked to library home page
 - Online request form to be emailed to circulation staff
- Reduced time period between title requests and delivery of item
 - Examination of automated services to reduce steps involved in acquisitions, cataloguing, processing and delivery of titles

4.1.8 Formal Learning Support

The library assists students enrolled in formal educational programs. The library provides informational resources related to course work, assistance in using them and space for study. Specialized assistance with homework and tutoring may be offered.

In order to meet this priority, the library could consider:

- Resources for home schooling needs
 - Designated quiet area for home schooling center
 - Workstations with educational software and access to electronic databases
 - Sufficient Internet bandwidth
 - Internet filters
- Teleconferencing and web-based learning
 - Update of existing computer lab to include teleconferencing equipment, such as projection or large screen monitors, camera, audio
 - Sufficient Internet bandwidth

- Formal training on Web searching for patrons
 - Development of in-house training resources
 - Production of training material, such as handouts, help pages on library web site
 - Advertisement of sessions with brochures, links on library web page
- Up-to-date equipment
 - Inventory of existing hardware
 - Regular monitoring of technology information on current standards for hardware and software
 - Minimum specifications for new equipment to reduce support, updated annually
 - Sufficient support/service to maintain hardware
 - Annual replacement of one third of hardware

4.1.9 General Information

The library helps meet the need for information and answers to questions related to work, school and personal life. The library provides information resources in a wide variety of subject areas, assistance in using them, telephone and off-site reference services.

In order to meet this priority, the library could consider:

- Local area network to link multiple workstations to information resources
 - Participation in regional network to reduce connectivity costs and increase bandwidth
 - Hiring and training of system manager or outsourcing of system administration services from vendor
 - Installation of network server to link computers and printers
- Increase in number of electronic databases available for public use
 - Participation in cooperative electronic database purchasing arrangement, such as COOL
 - Advertisement of resources on library web page to attract use
- 24-hour access to online catalogue
 - Review of technical requirements from integrated library system vendor
 - Installation of library database server located on high speed Internet pipeline
 - Purchase of domain name
 - Network setup of IP addresses and users
 - Reconfiguration of library workstations to link to database server
 - Supporting software such as Internet browser
 - Network security such as firewall to protect network from unauthorized access
 - Sufficient support/service to maintain network
- Monitor trends in technology
 - Access to technology listservs for staff
 - Periodic information exchange sessions

4.1.10 Government Information

The library addresses the need for information about elected officials and government services and programs. The library provides access to government publications and assistance in using them.

In order to meet this priority, the library could consider:

- Web content team to provide government information and GISs (geographic information systems) to users
 - Installation of server to host library web pages
 - Contract with local region to host and maintain server on high speed network
 - Links to region's GIS and government information on library web page
 - Staff training to maintain web page
- Partnerships and other forms of cooperation with local governments, businesses and institutions to provide government information
 - Use of integrated library system to develop and maintain databases for other departments: add licenses; create additional data banks
 - Training of staff to maintain content for web page

4.1.11 Information Literacy

The library addresses the need for skills related to finding, evaluating and using information effectively. The library provides training and instruction in these skills.

In order to meet this priority, the library could consider:

- Staff training on effective searching of the integrated library catalogue, electronic databases and Internet resources
 - Technology assessment and training program for staff
 - Regularly scheduled sessions for technology training
- Public training sessions on effective searching skills, email and Internet use to public
 - Desktop publishing software to produce public guides on search techniques
 - Mobile computer training lab: install cable and wiring in designated training space, purchase mobile furniture so that existing workstations can be relocated to lab space when required
 - Promotion of services on library web page
 - Online booking form that patrons can email to administrative staff
- Up-to-date equipment for public use
 - Inventory of existing hardware
 - Development of standards for equipment to reduce support
 - Leasing plan with vendor
 - Sufficient support/service to maintain hardware
 - Annual replacement of one third of hardware

4.1.12 Lifelong Learning

The library addresses the desire for self-directed personal growth and development. The library provides an extensive collection of circulating materials on a wide range of topics and assistance in using it.

In order to meet this priority, the library could consider:

- Z39.50 compliant library database for Internet access to catalogue
 - Review of technical requirements from ILS vendor
 - Purchase of Z39.50 compliant software from ILS vendor
 - Conversion of library database to MARC format
 - Staff training on MARC cataloguing
 - Installation of library database server on high speed Internet pipeline
 - Purchase of domain name
 - Network setup of IP addresses and users
 - Reconfiguration of library workstations to link to database server
 - Supporting software such as Internet browser
 - Network security such as firewall to protect network from unauthorized access
 - Sufficient support/service to maintain network
 - Link to library catalogue on web page
- Multimedia public access computers
 - Established standards for public workstation space requirements
 - Workstation furniture, including design for disabled access
 - Sufficient cabling and electrical connections
 - Support/service to maintain hardware and software
 - Staff training to provide support and simple troubleshooting
- Public access to interlibrary loan resources
 - Link to interlibrary loan software on library web site
 - Online help screen
- Links to electronic resources for general subject areas
 - Link to Virtual Reference Library <http://vrl.tpl.toronto.on.ca> on library web page

4.1.13 Local History and Genealogy

The library addresses the desire of residents to learn about their personal or community heritage. The library provides a significant collection of materials that chronicle the history of the community and the families in it, assistance in using the collection and interlibrary loan access.

In order to meet this priority, the library could consider:

- Digitization of local history collection with Internet access to the resource for other agencies and individuals
 - Partnership with local community groups to create web-based list of resources
 - Investigation of grant funding
 - Equipment for digital imaging
 - Sufficient support/service to maintain hardware
 - Staff training on use of digitization equipment

- Links to online local history collections on library web page
- Offer in-house training to the public on local history resources
 - Develop training program for users
 - Regular sessions on searching local history collection
- Microform readers and printers, photocopying facilities
 - Purchased or leased microform readers, printers, photocopier
 - Repair service agreement
 - Staff training for support
- Public access multi-media computers, printers capable of displaying high resolution graphic image
 - Established standards for public workstation space requirements
 - Workstation furniture, including design for disabled access
 - Sufficient cabling and electrical connections
 - Support/service to maintain hardware and software
 - Staff training to provide support and simple troubleshooting
- Public access to interlibrary loan resources
 - Link to interlibrary loan software on library web site

4.2 Technology applications for library administration

The library uses technology to streamline administrative procedures and improve the efficiency of library processes. Backroom functions are supported with automation of document creation and storage, accounting, communication and statistics.

In order to meet this priority, the library could consider:

Office processes - improved efficiency of library office processes with investment in technology

- Word processing: documents, document storage and filing
- Spreadsheets: budgets, forecasting, statistics
- Accounting packages: payroll, statements of income and expenditure
- Email: staff communication
- Internet: information and research
- Web design: library web page
- Internet control software: scheduling and booking of public Internet stations
- Desktop publishing: brochures, newsletters, signage, handouts
- Presentation software: demonstrations, seminars, training
- Scheduling software: booking of meeting rooms, training sessions
- Integrated library system:
 - report on circulation statistics for collection development and staffing of circulation desk
 - report on high demand items to reduce waiting time for reserved items
 - installation of MARC bibliographic record loader to reduce manual cataloguing

Interlibrary Loan - participation in provincial resource sharing system

- PC with Internet browser
- Sufficient Internet bandwidth
- MARC format database
- Submission of tape to SOLS containing library database and holdings
- Standardization of cataloguing procedures to reduce incidence of duplicate titles
- Investigation of Z39.50 requirements to be included as a live Z39.50 target

Public relations - increased presence of library through advertising

- Desktop publishing software to produce brochures
- PC with larger monitor suitable for desktop publishing
- High-quality laser printer

5. WORKSHEETS AND DEFINITION OF TERMS

Worksheets which take the library from priority to technology requirements are included as Appendix A: 1 through 5. Ontario public libraries are free to copy all worksheets for use in planning technological responses to service priorities. Electronic copies of worksheets are available on the OLS web site at www.library.on.ca

APPENDIX A.1: SERVICE PRIORITIES AND THEIR ADMINISTRATION

Priority	A: Current Technological Components	B: Planned Enhancements
Basic Literacy		
Business & Career		
Commons		
Community referral		
Consumer info		
Cultural awareness		
Current topics		
Formal learning		
General info		
Government info		
Information literacy		
Lifelong learning		
Local history		
Administration		

APPENDIX B: DEFINITION OF TERMS

APPLICATION SERVER – A server that provides access to an application, such as an ILS.

ASP – (application service provider) An ASP provides applications, such as software or services via the Internet for a monthly or per-use fee.

BANDWIDTH – Refers to the speed of a communication system. High bandwidth is available with services such as cable, wireless, ISDN, satellite.

BROADBAND – Transmission of data on several channels, resulting in high speed communications.

CLIENT/SERVER ARCHITECTURE – Network architecture in which the client (a PC) requests information or services from a server. For example, users at a PC request a search of a library catalogue that is stored on an application server.

CONNECTIVITY – The method of telecommunication or transfer of data, such as leased lines, wireless, cable.

DNS - (domain name system) The DNS matches the domain name of a system with its numerical IP address.

DOMAIN NAME – A name that identifies an IP address. For instance, www.library.on.ca is a domain name.

FIREWALL - Hardware or software that restricts access to a network to authorized users.

FTP – (file transfer protocol) Standard for electronically transferring files, such as documents, software.

GIS - Geographical information systems are tools used to gather and produce geographic data, such as maps, tables or 3D virtual models

HARDWARE - Any physical piece of computer equipment

HOST NAME – A host is a computer that stores data. The host name is the domain name or IP address of that computer on the network or Internet.

HUB – A hub is a device that provides a common connection point, typically on a LAN.

ILS – (integrated library system) An ILS provides an automated catalogue and includes functions such as cataloguing, circulation, acquisitions, reports.

IP or INTERNET PROVIDER: a company that provides access to the Internet. Users pay a monthly or annual charge to use the company's Internet lines

IP ADDRESS – (or Internet address) An identification number used for any device on a TCP/IP network. If the numbers are used within an isolated network, the numbers can be randomly assigned. If the network is connected to the Internet, a registered IP address is required and a unique number is assigned to each device.

ISDN – (integrated services digital network) A communications standard for sending voice data and video over digital telephone lines.

LAN – (local area network) A computer network contained within a building or group of buildings.

LISTSERV - Electronic discussion groups.

MARC FORMAT - (machine readable cataloguing) A data format for bibliographic records.

METADATA – Data that describes the contents of a database or other data. MARC records and card catalogues are examples of metadata.

NETWORK SERVER – A computer that controls access to the network.

OUTSOURCING – A method to contract out services, such as hardware support.

PATRON AUTHENTICATION – A method of identifying patrons that are authorized to use a service, such as an electronic database.

PRINT SERVER – A server that controls access to a common printer or group of printers.

ROUTER – A device that connects a number of LANs.

SEARCH ENGINE - Software that searches the Web for user-defined information.

SERVER – (application server, network server, print server) A computer that delivers a service such as an application, or shared access to files and printers.

SOFTWARE – A set of computer programs.

TCP/IP – (transmission control protocol/Internet protocol) Communication protocols used by all computers on the Internet.

TERMINAL – A workstation, typically consisting of a screen or keyboard. A dumb terminal has no processing power. A smart terminal has memory and a CPU.

TERMINAL EMULATOR – Communications software that allows a PC to emulate a terminal. Often used to connect terminals to mainframes or application servers such as an ILS.

TERMINAL SERVER – A device that connects a number of terminals to the network

URL – (uniform resource locator) The address of documents and other information on the Web, for example: <http://www.library.on.ca>

WAN – (wide area network) A network that covers a larger geographical area. A WAN usually consists of two or more LANs.

WEB BROWSER – Software that locates and displays Web pages.

WEB FEED: Search engines that check online information sources such as newspapers and journals.

XML – (extensible markup language) XML is a language designed for Web documents. It uses metadata tags to define and locate information on the Web.

Z39.50 – A NISO standard used to search and retrieve information from remote databases. For example, it defines the profile for data such as “author”, “title”, “subject heading” so that an author search can be performed on multiple databases using different ILSs.