Introduction

Scope of the Report

This issue of *Library Technology Reports* provides all the information needed to implement a wireless network in a library. It will explain the basics of the technologies involved as well as the practical issues related to installation. The report also will explore pertinent issues, including computer security, access policies, and appropriate use. The target audience includes library administrators, systems librarians, and other computer-savvy library workers.

For the library administrator, this report aims to provide background information and perspective in order to inform decisions regarding whether or not to implement a wireless network, the relative risks and benefits, the development of policies, and the general terminology and background information necessary to evaluate advice given by technical staff or consultants. For library technical personnel, it provides detailed information for implementing and securing a wireless network in the library setting.

Some sections provide broad definitions of concepts and terminology and others will focus on in-depth technical details.

A Wireless World

Wireless networks are utilized in the home, in small offices, and in business settings. They also can be a component of the networks of large educational, governmental, and commercial organizations.

It's no surprise that wireless networks flourish with today's on-the-go and connected lifestyles. More than ever, people rely on the Internet in their everyday lives, and they seek ways to be online everywhere they go. Because wireless technologies fit in perfectly with today's mobile and technologically linked society, wireless access to the Internet is fast becoming an expectation.

Wireless networks can work especially well for the home and small office. In a home setting, many have more than one computer, and all need access to the Internet and printers so users can share documents, photos, and other resources. Few homes have wired networks. The labor and expense and other complications involved in installing cabling and networking equipment exceeds the threshold of what most homeowners are willing to invest. Those that rent may not be allowed to punch cables through walls and floors. Wireless networks, on the other hand, can be installed in the home with minimal effort and with modest expense.

In regard to wireless service and hardware, most laptop computers sold in the last two years were designed with built-it wireless capabilities. Older laptop and desktop computers can be equipped with wireless cards for less than fifty dollars, and many printers these days come equipped with wireless network facility. A fairly inexpensive wireless broadband router (about a hundred bucks, plus the monthly cable modem or DSL service fee), ties a wireless network together and yields a fully functional home network with Internet access for multiple users.

In today's world, having a computer with Internet access ranks almost as high as having a television for entertainment and information access. Many of our daily chores now take place online routinely—making airline, hotel, and rental car reservations; paying bills; ordering pizza; choosing a movie; doing research for homework assignments; reading articles or books; shopping; chatting with friends via instant messaging (IM); viewing and organizing digital photos; obtaining music;

applying for college; viewing images; reading e-mail; and activity scheduling. A wireless network adds even more convenience.

While on the road, wireless Internet access is fast becoming more of a necessity than a convenience. Business travelers rely on wireless access to conduct business and minimize the inconvenience of being away from family and friends. Wireless Internet access can be found in hotel lobbies, restaurants, coffee shops, convention centers, and other venues that cater to the business traveler. And as most frequent fliers know, airports that offer wireless Internet are especially appreciated.

Though most wireless services offered in business settings require payment, free access is available; an increasing number of businesses have discovered that free wireless Internet access builds customer loyalty and will attract new ones. For those that need to stay connected to their daily jobs and to their offices, the availability of wireless Internet access is often a deciding factor when choosing a hotel or meeting venue.

Misson Possible

Wireless Internet access fits well within the mission of libraries. Almost all libraries provide computer stations with Internet access for their patrons. With information distribution increasingly trending toward electronic access (via the World Wide Web), it's hard to conceive of a library being able to satisfy its users' needs *without* providing Internet access. While the use of print materials and traditional library services continues to grow, access to electronically formatted information through the Internet is increasing at an even faster pace. In the public library arena, vacationers and snowbirds often turn to the local public library to check e-mail and take care of other necessities online.

As sales of mobile computers increase (relative to desktop systems), more individuals will and do carry computers with them outside of their homes. For these individuals, it's far more convenient to take advantage of a library's public wireless hotspot and work on their own machines rather than use library-provided workstations. On their own computers, they are working with familiar tools—their own e-mail systems, for instance—and they can conveniently download information they need.

Most students go to college with laptop computers rather than desktop systems. They are finding it much more convenient to do research in the library on their own computers than on public workstations, which often are so locked down the software is past the point of letting students save information and incorporate it into their papers and bibliographies.

For these and a plethora of other reasons, providing wireless Internet access has grown to be part of a library's essential set of services.

Making Wireless Work in Your Library

This issue of *Library Technology Reports* aims to provide the information libraries need as they consider and deploy wireless networks. It begins with a section on the basics of computer networks. The terminology and concepts of wireless networks are derived from the wired world. The basic principles of operation of wired networks that underlie concerns for security and privacy carry over and are amplified in wireless networks. It's important to note that a solid grounding in basic networking is a prerequisite for understanding wireless technologies.

The report then explores the specifics of wireless technologies. I'll take a look at the theoretical concepts involved, such as transmission techniques and protocols, before turning to the practical chores of designing and implementing a wireless network.

Concerns for security flavor are part of almost all wireless networking discussions. A section of the report reviews the characteristics of wireless networks that cause these concerns, provides perspective of the risks involved, and describes the options for implementing wireless networks while still protecting the security of an organization's other computer systems.

Finally, the report will focus on library-specific application of wireless networks. It will explore the features that libraries typically expect in their wireless network service and the policy decisions that need to be addressed. The report, too, will review the library-specific products and services available in the Open Source and commercial arenas.

By now, wireless networking isn't on the cutting edge. It stands as a commodity technology that can be implemented with inexpensive off-the-shelf components. Libraries interested in implementing wireless networks can be confident the components they purchase will function as advertised and that products manufactured by different companies will work together well.

Since its debut in the late 1990s, wireless networking has been improving steadily, with each product generation offering faster performance, stronger security, and higher reliability. Libraries need not be intimidated by the technology. It's reliable, affordable, and secure.