Information Technology Management

14

Valerie Bryan
Florida Atlantic University

Practitioner Consultants
Layne Young
Business Relationship Manager
Indianapolis, IN

Donna Goldstein
GIS Coordinator
Palm Beach County School District

> Information Technology is a fundamental force in reshaping organizations by applying investment in computing and communications to promote competitive advantage, customer service, and other strategic benefits. (Charles B. Wang, 1994)

Information technology is a field that changes daily. This chapter provides an overview of how technology impacts park and recreation managers. However, because technology changes so rapidly, park and recreation managers must stay updated on both technological developments and applications to management.

As part of a review for this chapter, the recreation, park, and leisure manager will be exposed to a number of terms crucial for understanding the impact of technology in the managing of information. Select terms have been defined through a vocabulary section in the compendium, while other need-to-know terms have only been highlighted. Several Internet sites have been provided to assist in the paradigm shift for mangers to effectively manage and control information.

Details concerning the technical terms used in this chapter can be found on the not-for-profit Internet site Wikipedia, perhaps the largest on-line encyclopedia on the Internet. The concept of an on-line encyclopedia is a foreshadowing of where technology is taking the leisure service industry. It is important to know these terms (see Compendium 14-1 Significant IT Terms: Scavenger Hunt).

Information technology (IT) is one component of management systems. This chapter is an overview of information technology, with the following sections:

- what is information technology?
- the manager's responsibilities;
- information resources;
- disaster recovery and business continuity;
- IT as a management tool;
- understanding IT infrastructure; and
- IT planning.

> Once a new technology rolls over you, if you're not part of the steamroller, you're part of the road. (Stewart Brand)

What is IT?

A goal of management is to provide the right tools for staff to effortlessly access and store the information required to manage or provide a service. A park and recreation organization may be comprised of many operational and administrative functional areas. Each has an information component. Information technology (IT) is the means by which area personnel perform their information tasks. The information component is composed of six basic tasks or functions (Diebold, 1985). (See Exhibit 14.1 below).

Information technology is an umbrella term that covers a vast array of computer disciplines that permit organizations to manage their information resources. Ultimately, information technology serves as a *fundamental force in reshaping organizations by applying investment in computing and communications to promote competitive advantage, customer service, and other strategic benefits* (Wang, 1994, p. 3).

> The number one benefit of information technology is that it empowers people to do what they want to do. It lets people be creative. It lets people be productive. It lets people learn things they didn't think they could learn before, and so, in a sense, it is all about potential. (Steve Ballmer, Chief Executive Officer of Microsoft, on Woopidoo! Quotations. Retrieved December 31, 2008, from http://www.woopidoo.com)

Exhibit 14.1
Basic Functions of Information Technology

Input	Collecting data using various electronic devices
Communication	Access and movement of data from place to place
Processing	Transferring of data from one form to another
Storage	Retaining data for future reference
Retrieval	Ability to recall data when needed
Output	Ability to transform data into a usable format specified by the user

Diebold, 1985. See the following sites for current application of these IT functions: http://www.littlerock.org/CityDepartments/InformationTechnology/

http://www.cityofsalem.net/Departments/InformationTechnology/Pages/default.aspx

http://www.ci.henderson.nv.us/information_technology/information_security_services.php

http://www.indiana.edu/~r324/tech.pdf

Evolution of IT Management

Computers are not new to park and recreation organization management. To better understand how to manage IT today, it is necessary to look at the three previous eras of IT management: data processing (DP), management information systems (MIS), and information services (IS). These models of IT organization may still be part of existing IT services, because the park and recreation managers were trained and systems designed during the time periods when they emerged.

The Data Processing Era

In the 1960s and 1970s, computer functions were organized into a special division called *data processing*, staffed by personnel skilled in the use of computers. These divisions usually serviced the entire organization—that is, the municipality of which parks and recreation was a part. The traditional data processing model has three main components. (See Compendium 14-2 for Scenario of Data Processing Model):

1. data entry: day-to-day production data entry;
2. operations: day-to-day maintenance, routine report generation, backup, etc.; and
3. applications: software development, maintenance, and support.

The *data processing model* was efficient because:

1. the computers were centralized and operated by technical staff;
2. the applications were designed and tightly programmed to capture the requirements of the business units; and
3. data entry was done by skilled operators.

This model required a pool of technically skilled IT workers. Essentially, for a cost, an automation step was introduced to get more accurate and timely information. A typical data processing task for park and recreation agencies would be recreation activity registration. The process would be as follows:

- blank registrations forms are distributed;
- completed registration forms are received by the recreation business unit;
- forms are batched, by day or center, and taken to data processing;
- forms are entered and an "edit report" is created with each batch;
- the recreation business unit would reconcile the batch with the edit report;
- data processing is advised of any changes to the batch, and if needed another edit report is created and the batch is reconciled again; and
- once the batch is verified, a computer operator enters the data into a finance program and a periodic report is issued to the recreation business unit.

In simple terms, registrations are dropped off at data processing Monday through Thursday, all verification is done by Friday noon, and a weekly report is run Friday and distributed on Monday.

This model is a centralized method of managing IT. All the resources for computing were centralized in one budget. In some governmental units, including universities, this division was part of the finance department. The computers were large mainframes hidden in a restricted area, out of sight. Some business units (usually the finance office) had terminals connected to the mainframe. All letters and memos were done by

typewriter and distributed through inter/intra-office mail and the postal service. The computing resources were focused on processing data.

As IT matured, more business units wanted to be involved. Since the IT budget was not unlimited, projects were prioritized. Business units that did not have the budget for IT projects or were not considered high priority did not get projects done. Executives became very frustrated and created a business need for smaller, cost-effective computers. Computers scaled down to meet the needs of a single department.

Management Information Systems Era

In the 1980s, smaller and less expensive computers helped managers place terminals on their desks to monitor daily business. The shift to managers having direct access to information changed the emphasis of computing. The computer functions were referred to as Management Information Systems (MIS). (See Compendium 14-3 Scenario for an MIS Model.)

There was a major shift from manual record-keeping systems to electronic data entry. Instead of having a data entry division with skilled computer personnel, the park and recreation operation could do its own entry, directly into the mini or mainframe computer; however, MIS specialists were employed, and there may have been an MIS division or unit. The major effect on the workforce was that now managers, supervisors, secretaries, and other staff had to have basic computer skills to do their jobs.

The success of departments getting mini-computers (departmental computers) changed the governments' control of computing from centralized management to decentralized. This meant park and recreation departments began hiring IT professionals to operate the computers and write programs. They reported to someone within park and recreation, usually the finance office. During this time, it was common practice for mayors and city managers to put the responsibility of managing information in the hands of the department directors. A by-product of that decision was that each department began looking for a computer solution that supported their business. The computing department for the city lacked the resources to assist in the acquisition process. The end result was departments having better control of information, but the city as a whole not being able to share electronic information easily.

The 1990s ushered in personal computers (PCs) on a mass scale. Staff enjoyed the freedom of immediate access to computer functions without depending on the MIS division in larger organizations or the MIS expert in smaller ones. Networking desktop units together further increased the value of the PC investment. During the early 1990s, the traditional mainframe operation continued and a new computer unit was developed that supported the PC users at the desktop. This movement to support users at the desktop with simple off-the-shelf computer applications (e-mail, word processing, spreadsheets, and small databases) was referred to as office automation. During this time, three computer environments that coexisted:

- mainframe computing: large general applications (e.g., accounting);
- departmental computing: organization-specific databases (e.g., facility scheduling); and
- personal computing: office automation (e.g., word processing).

The park and recreation executive during this time was not equipped to manage electronic information. There was little or no technology included in leisure service degree programs. There were a number of software vendors that specialized in park and recreation solutions and provided consulting. However, executives became frustrated with the perceived cost of technology and lack of measurable results. Part of the problem was IT professionals who became park and recreation staff ceased or slowed their IT training and learning. As the environment became more complex, the IT staff was less equipped to manage, leading to rising consulting costs.

Information Services Era

Around the year 2000, businesses and government began to view computer functions as one information resource that has many components, each of which uses technological advances. The Y2K scare revealed vulnerabilities in information system management. The world waited in anticipation for computers to crash and send countries into anarchy. As it turned out, it was a non-event, only because companies and government used IS leadership to identify, plan, and implement solutions for all agencies and departments. The principal components (mainframe computer operations, network infrastructure, servers, desktop support, and telecommunications) are now referred to as Information Services (IS). The major shift in government during this time was the emergence of the understanding that information has strategic decision-making value. Many cities began to ask the chief information officer (CIO) to join/advise the cabinet. One of the outcomes was the introduction of standards as a part of managing technology costs, including standards for personal computers, e-mail, word processing and other purchases.

City leaders are now required to take a leadership role in managing information. During this time of change, park and recreation executives responded differently. Some identified IS (the operation of mini-

computers, writing software, etc.) as a non-core service, and responded by soliciting the IS department or contractors for direct support. Other directors elected to stay with a distributed approach, noting that some IS departments may not have proper resources.

Telecommunications became another service inherited by IS managers. Telephony has a similar infrastructure to computer networks, as well as a data component. Office installations usually require a voice connection and a data connection. Under the control of IS, these can be coordinated.

The Internet is now a sophisticated place to do business. City leaders depend on IS to provide protection from unwanted attacks and inappropriate use by staff. This level of complexity has caused leisure service managers to think twice about having full responsibility for the computer function. The term "enterprise" was introduced and refers to all users within government connected to the same network. IS was asked to manage the enterprise and provide and enforce standards for using services.

Information Technology Era

Looking forward to the year 2020, the park and recreation manager is going to have many choices about how to manage information. Managers of today have had technology courses in college and most likely own a home computer. The marketplace is flooded with all sorts of communication, entertainment, and information devices that all have the same core attributes as a basic computer. This is referred to as technology. Hence, this is the *information technology era*. It is a place where there is existing infrastructure to connect various technologies to meet or exceed business needs.
The focus of IT is to assist departments in becoming technology savvy, that is efficient and focused on customer needs. This is done by building on the legacy of each era of IT management:

- data processing—the business process is key, systems must enhance the process;
- MIS—business units are responsible for information, not IT people;
- IS—standards enhance organization, information is strategic; and
- IT—many technologies, using the right technology for the right job.

What is IT? It is the study, design, development, and support of computer-based information systems. With the creation of the Internet, a new basic function has been added to IT, and that is security, protecting information. It is important to understand the various eras of IT management because not all departments have achieved the same technological maturity. This is because there has been significant investment in technology. Until there is a real business need to change IT, park and recreation departments should get the most out of their investment. This means staff members should adapt to the current environment, and plan for the future.

Why IT?

Becoming more productive by using information technology to make management decisions is the ultimate goal of information technology management. Information technology management is a means to make the connection between the park and recreation business and the customers served, whether those customers are in a park, city, university, or a natural preserve. Information technology management has become, and will continue to be, a "value-add" to the organization.

IT Solves Business Problems

If there are no business problems, there is little need for IT. Management today requires the detailed measurement of service delivery and the consequential analysis and review of that service. Information technology will not make better managers. IT will increase the availability of information. It allows the manager to view information in different ways, and assist in the decision-making process. IT does not shut down inefficient recreation centers, managers do. A manager must learn to frame information requests so as to address business problems. (See Assessing Needs section, below.)

IT Increases Personal Productivity

Part of any good agency is the desire to see its employees grow professionally and personally. IT skills are the language of business. Just about every device manufactured today has a keypad, keyboard, or set of buttons as an interface. People who use a number of these devices learn they are similar in operation. Setting a digital watch is much like setting the timer on a VCR. Using a bank machine is much like navigating through an automated voice response telephone system. Using a computer is much the same.

The advent of the Graphical User Interface (GUI) has made the operation of a computer easier to learn. This interface (the look and feel) allows the user to learn intuitively. Instead of reading manuals, the user simply looks at the screen and selects the options that make sense. Software applications are written with help on-screen in the computer program, instead of in large, intimidating manuals. As users need assistance, they simply press the Help button. Part of the realized

efficiency of an organization is the progressive development of information skills.

Culturally, IT makes a large world look small.

> Those who have the skills and knowledge to navigate cyberspace will participate fully in the global village of the future. It is to them that prosperity will belong. (Frank B. Withrow, 1997)

Any information resources are available to the small department as well as the large park districts and even corporations. It is IT that connects a department to its constituents, vendors, and community. The challenge is selecting the technologies that will keep the department focused on its mission, while staying comfortably within the resources allocated.

The Manager and IT

Just as managers are responsible for the physical resources, human resources, and financial resources of an organization, so are they responsible and accountable for the information resources. A manager is not required to know everything about computers and IT. However, the manager must show leadership by acknowledging the strategic importance of IT and subsequently allocating time and money for its proper deployment. The strategic direction of an IT resource is the ultimate responsibility of the organization and its manager. The manager is an integral part of the information culture. The information culture change requires the manager to make all departmental information electronically accessible for efficiency, easy access, review, and decision-making.

There are three basic IT management scenarios for leisure service agencies.

1. IT as a core service—a park district is the best example, because it has ultimate control of the operations, management, and information functions; all of the business units within the district report to the director, the director is accountable to the park board, and IT decisions are part of the business;
2. IT as a required support service—many municipal and county governments require departments to use the sanctioned financial, purchasing, human resource and IT services; there are many variations of this model, and all involve a cost recovery process to support the services; and
3. IT as an elected service—many private recreation businesses, small/rural departments, therapeutic recreation (TR) practices don't need a fully deployed IT resource; they purchase the equipment they need, and seek IT service providers for the rest.

IT management is intertwined in all aspects of business, education, and professional disciplines. "How can customers' needs be met?" The organization's response to this question will dictate the future. Organizations that align their information resources to answer this question will move quickly into the 21st century. Park and recreation organizations are in various stages of IT evolution. Managed change is the key. IT cannot improve service delivery if executives, managers, supervisors, and functional personnel do not embrace it, and change their system of service delivery.

Change can be introduced anywhere in the organization, but to be successful, it must be embraced from the top. IT must work hand-in-hand with implementing the mission of the organization. Job one for management is getting a handle on the business transaction process. This change requires the formulation of clear business requirements, followed by the creation of an information system that enables their fulfillment. The manager must be committed to change, specifically, moving from a manual to an electronic system. If the responsibility for IT is delegated to another level in the organization, and there is no expectation of change, then there will be increased administrative costs due to partially implemented systems and little service enhancement.

Change continues with management. Are the data being reviewed? How timely and accurate is it? Processes must be put in place to continually improve the quality of the data. Once the data are reliable, they are ready to be used for management decisions. Regardless of how successful an organization is in providing services, it must continue to ask, "Should we be providing this activity or program? Should we be maintaining this park at such a high level?" To answer these questions, management must be committed to developing an IT "dashboard," an information system that ties financial information, service performance data, and marketing information together. The advantage to the organization is that departmental information is leveraged for management decision-making.

There will always be some staff who are for and some staff who are against change. The day-to-day service delivery responsibilities fall to the supervisors. These individuals understand the requirements of providing good service and are *very* skeptical about doing something they do not perceive to be beneficial. Time is valuable. The more operational staff are freed from administrative tasks, the more service delivery can be realized. Supervisors provide a wealth of operational knowledge. IT functions should be viewed by management and staff as essential business processes that provide important information for operations, management, and decision-making. This outlook allows

managers to identify systems that are redundant and inefficient and seek incremental change, thus improving the IT operations of an agency.

An organization may need to be reorganized to reflect the IT way of thinking. It is up to the manager to serve as a change agent and to:

- develop the guidelines for making decisions on what and how much to invest in the management information systems for hardware, personnel, system redesign, upgrades, and development of design;
- create a uniform information infrastructure to capitalize on the network of computers, databases, information policies, methods, procedures, and practices;
- allow for more telecommunications;
- define the roles of the information management professional as a conduit between the users, and as an integral player in the business model; and
- define acceptable performance by all the people who feed information into the park and recreation system.

Information Resources

An organization's information resources are characterized by the sources and types of information.

Sources

Every organization is defined by the information resources it is empowered to maintain. Information sources are the documents, files, and databases—both paper and electronic—that an organization creates and maintains in order to manage or provide services. Many resources are mandated in the *governance*: articles of incorporation, charter, or enabling legislation of an organization. Some resources are created as a *best practice of management,* in which information is a professional requirement or expectation. Other information resources are created as a result of the *professional discipline or historical practice.* (To view samples of some of the information resources that commonly originate as documents, files, and databases, see Mandate Resources in Compendium 14-4.)

Administrative and Service Statistics/Information

Organizations should maintain appropriate service statistics in order to plan, interpret, and evaluate park and recreation programs and services. The administrative reporting system should provide management with information on the activities of the organization.

Appropriate records on individual participants and groups should be maintained in a form that lends itself to summarization and provides useful information. Examples include the proportion of constituents receiving services; number of participants registered; number of groups and sessions; attendance; composition characteristics of the participants as well as the constituency, including age, gender, cultural background, marital status, educational level, occupation, length of time in community; and effects of programs on participants when measured, such as level of proficiency, learning of new skills, changes in behavior patterns or new interests expressed, etc.

Information also may be used to predict workloads, determine personnel and other resource needs, and prepare budgets. Examples of data sources are program attendance, equipment and material inventories, work orders, and budget administration records.

Properly designed administrative reports will reflect comparative data and trends on activities. All records and reports should conform to uniform and current methods of maintaining records and reporting data as may be developed from time to time within the professional field, so that local data may be used for comparative information with other park and recreation organizations.

Monthly reports should provide heads of organizational components with an opportunity to account for the activities in their units during the previous month. Administrative matters may be discussed in the report. Comparative data on activities of the previous month, same month during the previous year, and year-to-date, are valuable sources of management information. The monthly report may also permit the heads of organizational units to identify the objectives of their units for the next month. Then, the annual report may be a summary of the monthly reports. The report should provide comparative data and statistics and account for the activities of the organization.

Information Types

Collected information falls into four general categories, personal information, operational information, administrative information, and departmental information.

Personal Information

Personal information in IT language addresses all items created by the professional for and by the individual. It includes electronic mail (e-mail), voice mail (v-mail), faxing, paging, chatting, browsing (surfing), video conferencing, and telephoning (voice). Personal information can be created by using office automation products (word processing, spreadsheets, business graphics, and other applications). The distinction of personal

information is that it may be stored either locally on a personal computer or in a private area on the network called a home drive. Some of this information is not business-related (pictures of family and friends, a humorous video clip, music files, etc.). When such personal information accumulates it becomes a resource problem for IT backup and storage. This issue has led to strict policies regarding the creation and storage of personal information.

Operational Information

Operational information refers to information reflecting the business function of an organization. Operational information is used for day-to-day business management. Program registration information is important to the business function of a recreation center. Work-order systems are important to park maintenance. The software applications related to these IT functions are referred to as vertical markets, which means that they are specially written for a specific discipline. Sports scheduling software and membership software fall into the vertical market category.

Administrative Information

Administrative information refers to applications that are needed in all sections within an organization. Human resources, payroll, and accounting applications are IT services that are used in all areas of business. Even an organization that does not administer one of these applications may be involved with the workflow through the use of time cards, purchase orders, and check requests. Administrative systems are usually closely watched to make sure the systems are correctly used and to ensure data integrity. Administrative systems contain information that users want on a periodic basis.

Departmental Information

Departmental information is any information (personal, administrative, or operational) that is used for organization business such as marketing and assessment tools for surveys, user statistics, etc., to which everyone needs access.

The distinctions among these information types are important. All users create a certain amount of personal information. This information may not be on the organization network, thus it may not be supported. Departmental information *must* be stored on the organization network, so that it can be supported and accessed by other staff members. Users not attached to the network must identify procedures for supporting departmental information. (See section on disaster recovery, below.)

Many users handle departmental information like personal information. It is stored in an area not routinely supported, and it is not accessible to others. Typically, the standards for creating this information are developed by the user. As such, it is not easily merged, sorted, or integrated with other departmental information. Many staff members perceive their databases to be the official records of the organization; however, they lack accuracy and precision because information was never verified and standards for data entry were lacking.

Each information resource has a cost associated with managing it. As the number of information resources increases, so does the complexity of the organization. The value of information to the organization increases, as more people who need it can access it. One goal for an organization seeking peak efficiency is to design an information system that allows all staff to have access to any information resource necessary to get their jobs done, while protecting information that is confidential or only should be available to certain groups. The costs of such a system increase with the complexity of the organization. Complexity becomes greater if the organization:

- increases staff (staff additions);
- increases the number of organization services offered (new services);
- increases the number of staff locations (new facilities);
- restricts staff access (additional security administration);
- hires computer-illiterate staff (no training expectations); and
- lacks a technology plan and engages in unrestricted buying and implementation.

Information is the result of collection, manipulation, and analysis. Information has a cost, a value, and a shelf life. There is no value to information unless someone needs it. The value of information increases if the user can have access to it in any form desired with an immediate turnaround, *and* if it is current. This can only be accomplished with a good business plan overlaid with a good IT plan. The ultimate goal is to connect all business units together with a common interface and to enforce a management expectation that each unit keeps its information up-to-date. The information must be correct, accessible, and timely (see Exhibit 14.2 and Compendium 14-5).

IT as a Management Tool

"Can you tell me, please, which way I ought to go from here?" asked Alice. "That depends a good deal on where you want to get to," said the cat. (Lewis Carroll)

Exhibit 14.2
Value of Information Factors

Correctness	Accessibility	Timeliness
Precision: What is expected is what is collected.	**Security**: Information available to users who need it.	**Response time:** Information retrieval from request to delivery is reasonable time.
Accuracy: What is collected is what is entered.	**On-line:** Information can be accessed from user's workstation.	**Up-to-date:** Information is current.
Bug-free: What is entered is what is reported.	**Barrier-free:** Information in not requested through another.	**Work flow:** Data entry to information output is efficient.
Utility: What is entered can be used for information.	**Equipment:** Appropriate hardware for information processing for user.	**Reliable:** Information is available when needed.

Every organization has pieces of the information technology puzzle. Some organizations have a simple computer system design, with a few computers connected to servers all within the same building, while others have a complex system of remote locations, multiple lines of business, and a mobile staff. In any case, all systems should provide reliable information to be used in management decision-making. An appropriate information system should encompass personal information, business information, and administrative information.

Universities are a multifaceted network of office complexes, classrooms, computer labs, wireless access, mass storage, and specialty servers. There is always some portion of the network that is being upgraded or a new technology implemented for learning and education. In most colleges, IT resources are specialized to provide quick and knowledgeable solutions to everyday student/faculty needs. A call to the Help desk could be routed to one of the following specialized teams:

- a teaching technologies team that assists faculty with classroom and computer lab systems;
- a security team that manages the login accounts;
- a desktop team that installs and maintains the computer assets;
- a consulting team that provides assistance to faculty/staff regarding basic computer questions; and
- a training team comprised of subject matter experts for instruction regarding the specialty systems (i.e., On-course, Blackboard, and other systems).

Records Management

It is vital for every organization, no matter how large or small, simple or complex, to have a records management system. Records are the lifeblood of an organization. A mark of IT excellence is proper records management.

Usually, there is a record system for each line of business in an organization. Park rangers may use a simple personal database for tracking accident reports. They may use the city's sophisticated Computer Aided Dispatch (CAD) system for deploying personnel and recording criminal activity. They may use the department's finance system for tracking budgets. Using this example, the rangers would be responsible for the data quality and backup of the accident reports, the police department would be responsible for the CAD system, and the department finance office would be responsible for the budget system. City IT would be responsible for connecting users to all the databases and providing a safe place for backup.

The primary function of good record keeping is accountability to the user and organization. Records management is a stewardship process that accounts for the use and status of organization resources and adds integrity to decision making. IT is an important tool for gathering, storing, and recalling information. There must be standards for all record keeping systems, electronic or manual. Consider these items when evaluating a records management system:

- what records must be maintained?
- what is the retention policy for department information?
- who will establish an inventory of records with a filing system for ease of retrieval?

- how are records secured from unauthorized use?
- how are records protected from possible fire/water damage (disaster control)?
- who is authorized to use the records?
- how long should records be retained (retention schedule) consistent with legal requirements?
- who is responsible for managing the records system? and
- how can records be managed more economically or efficiently?

The major parks and recreation business information systems fall into three classifications:

1. transaction processing systems—systems that track the details of transactions with the public; systems include activity registration, facility scheduling and membership systems, to name a few;
2. work management systems—those systems that are used for work orders, work requests, inventories, timekeeping and project management; systems include those that compute mowing schedules, prioritize work requests submitted by center directors, and compute the time it will take for a simple construction project, such as building a shelter or playground; and
3. case management systems—those systems that track information regarding a specific person or case event such as the records associated with therapeutic recreation therapists working with clients or those records associated with a park ranger solving a vandalism case within a park.

Administrative systems are those that provide assistance to the operational divisions and other agency support functions. They should include at least e-mail, financial, personnel and program records, property inventories, legal documents, and accident reports. See Chapters 19 and 20 for details regarding financial records; personnel records are defined in Chapters 16, 17, and 18; and records needed especially for planning are discussed in Chapters 7, 8, and 11. An information/documentation system for risk management is essential (see Chapter 21, Risk Management).

The Internet

The Internet is a place that allows park and recreation departments to reach beyond their walls to conduct business, communicate with people, perform research, and provide information about programs and services. In 1969, the Department of Defense (DOD) initiated an experiment to connect DOD and a number of military research contractors, through a project called ARPANET in 1969. A large number of universities doing military-funded research were initially involved in this experiment to provide a means to reroute information through a system of networks linked in case of an enemy attack (Levine & Baroudi, 1994). The attack never occurred, but the experiment proved to be a success: the Internet was born. A new way to disseminate information across networks using Internet Protocol (IP) was created.

The IP is the technical scheme that enables packets of information to be routed from one host to another as necessary, regardless of the computer creating the original packet of information. The Internet is actually a global collection of networks that pass these packets to each other using this universal language, and other languages that have been created since the original design, such as Transmission Control Protocol/Internet Protocol (TCP/IP). The Internet is the mother of all networks. It is a collection of thousands of sub networks in more than 90 countries around the world. The Internet allows otherwise incompatible computer systems or networks of computers to talk to one another, speak a common language, and to transmit and receive data via dedicated, high-speed telecommunications lines using numerical addresses. This mega-network is also known as the World Wide Web, or Web.

Some features of the Internet have increased Internet use by entities in the public sector, private-for-profit sector, commercial sector, and private, nonprofit sector:

- software applications called *browsers* (such as Microsoft Internet Explorer and Netscape Navigator) allow individuals to view and explore multimedia information on the Web; the Web browsers interpreted the hypertext markup language (HTML) and displayed the documents as Web pages; as of December 2008, Internet Explorer and Firefox were ranked as the number one browsers (see http://www.w3schools.com/browsers/browsers_stats.asp);
- powerful *search engines* make finding information easier; Search tools, such as Archie, Gopher, Veronica, Jughead, and Webcrawler, were replaced with Magellan, Excite, Lycos, and Infoseek; today, users are generally more familiar with Live Search, Google, Yahoo! Search, and Ask.com;
- *Internet Service Providers (ISP)* set up shop to connect people with the Internet; subscribers pay a modest cost to access the Internet; companies and recreation, park and leisure agencies wanted a *presence on the net* because they saw the marketing potential of this medium and joined the move to the Internet;

- *E-travel* revolutionized the hospitality industry to include airline, rental car, hotel, restaurant and entertainment;
- *E-commerce* allowed the secure transfer of money electronically to enable business transactions; a wide variety of commerce is conducted in this way with electronic funds transfer, Internet marketing, electronic data interchange, inventory management systems, and automated data collection systems;
- *wikis* have provided a forum for a group of Internet users to collaborate, create, maintain, and verify the authenticity of information to be shared with the masses; Wikipedia, the free encyclopedia at http://en.wikipedia.org/wiki/Wikipedia, is an example of one of these forums in action; sites such as this can be used to collaboratively define terms, update historical information about parks and monuments, or make summary reports of the state of leisure in the United States and beyond;
- *video or audio streaming* is a technology that compresses and transports the video or audio media file such that there is little distortion, and the quality of the video or audio and high; This delivery method is a great way for getting news and training to a variety of audiences, in-house and beyond;
- the Internet is now the number one carrier of *e-mail;* in many cases, the Internet has also become the access point for phone service and digital voice-mail centers, both in home and in business environments;
- a *webinar* is a technology that allows a number of people to participate in a live training program on the Internet that includes audio and video of a computer workstation from the presenter; it is typically one-way from the speaker to the audience, with limited audience interaction (webcast); a webinar can be collaborative, by allowing for question and answer sessions between the audience and the presenter; with added conference phones, more interaction is feasible for training or better information exchanges;
- Skype.com and ooVoo.com are software technologies that allow users from around the globe to connect using the Internet for *point-to-point video phone calls and PC to phone calls* as well as instant messaging, file transfer, and video conferencing calls to other users of the service and to free-of-charge numbers, while calls to other landlines (conventional telephones) and mobile phones can be made for a fee;
- *podcasting* allows multimedia content to be created in one location (such as a lecture or a workshop) and distributed across the Internet to be played on demand on a computer (PC or mobile) or media player device, such as an MP3 player, an iPod, a Web-enhanced phone, or portable data assistant (PDA);
- sites such as Facebook and MySpace, are free-access *social networking* Web sites that can now be used as workplace networks to share information about leisure programs and services to a global market;
- *video conferencing*, such as GoToMeeting, is a technology that communicates audio and video for a live meeting so that participants can see each other and materials being discussed; in some cases, the conferencing is from one host site to many sites, and in some cases from desktop PCs to desktop PCs; using applications, such as Adobe Presenter, can allow voice-over narration and multimedia content to transform PowerPoint presentations into rich experiences that audiences can view at their convenience;
- *instant messaging (IM)* is a form of real-time communication; the user is enabled to send short text or typed messages across the Internet; many IM services have begun to offer video conferencing features (Voice Over IP or VoIP) and Web conferencing services; Web conferencing services integrate both video conferencing and IM capabilities;
- *electronic auction sites* (Ebay.com, Amazon.com, Goodwill.com, etc.) are used to verify prices for items, locate parts for outdated equipment, and fins specialized supplies or items; in some cases, the sites suggest marketing and revenue-producing strategies for departments to emulate;
- *RSS feeds* are replacing the old listserv as a method of pushing information in the form of an e-mail to electronic mail boxes; instead of receiving an e-mail that is circulated from a listserve, users receive a notice that the information exists; and
- *blog sites* are postings displayed in reverse chronological order using conversational style with text, hypertext, images, and links. Individuals across regions, or even continents, can share views or information for collective exchanges.

The Internet is the most used and versatile of the technologies for all organizations, private and public, business and leisure. It provides service and program functions, external communication, and retrieval of information useful in the administration of the organization. Most sites also have "links," which give

more sources of information. (Note: Web sites and Web addresses—known as uniform resource locators (URLs)—may change!) Many organizations have their own Internet sites, and use them to provide the public with information regarding the organization.

Organizations use the Internet:

- as a global tool for communications (to contact a person in another location);
- as a means to collaborate to solve problems—"nets" or "lists" set up by organizations for members or those interested in a specific topic to obtain information on a given problem situation—for example, the SPRENET list (listserv@listserv.uga.edu), and the list of the National Recreation and Park Association (NRPANET) (http://lists.nrpa.org/mailman/listinfo/nrpanet);
- As a marketing tool for the organization; (not only for advertising a service or product, but also to make reservations, or purchase a product), for example, Wilderness Science & Management at the University of Idaho (http://www.cnr.uidaho.edu/wilderness/);
- as a way to secure the latest information on a topic or a trend, for example, the Web center for social research methods by William M.K. Trochim (http://www.socialresearchmethods.net/) and the Bitterroot Ecosystem Management Research Project (http://www.fs.fed.us/rm/ecopartner/);
- as a source for government documents or official statistics, for example, the Americans with Disabilities Act (http://www.jan.wvu.edu/links/adalinks.htm);
- as a means to purchase/order office supplies, books, or products, such as http://www.officedepot.com/;
- as a communications media with consumers, with public access for registration, reservations, or communication back to the organization, such as http://bloomington.in.gov/documents/viewDocument.php?document_id=2471;
- as a professional organization contact for information, services, and products, for example, the Canadian Association for Leisure Studies, http://www.cals.uwaterloo.ca/;
- as a contact with federal or state organizations, for example, USDA Forest Service: http://www.fs.fed.us;
- as a link to other information, for example, Michigan State University, Dept. of Park, Recreation & Tourism Resources: https://www.carrs.msu.edu/; and
- as a means to train employees at their desks, for example http://www.desktoptraining.co.uk/.

Does this electronic medium offer solutions for the recreation, park and leisure field? Or do the advantages of this medium outweigh the costs and the inherent problems of viruses, unscrupulous vendors, marketing scams, and so on? The questions may be irrelevant, as the use of telecommunications has become more and more accepted as the norm in the workplace and in commerce. See Exhibit 14.3 regarding the growth of e-commerce. According to Forrester Research (http://www.sescommerce.com/ecommerce-growth.asp), U.S. on-line retail spending reached $175 billion in 2007 and is expected to grow to another $335 billion by 2012. (See work by Bertil Lindberg at http://home.earthlink.net/~lindberg_b/GECGrwth.htm for additional information on the growth of e-commerce.)

The number of "Webheads," people who use the Internet, is growing daily. In August 2003, 173,100, 000 Americans were on line, and by June 2008, 220,141,969 Americans were on line (Nielsen/NetRatings, as cited at Internet World Stats). Of the top ten languages spoken worldwide, English speakers are more likely to be users of the Internet. In order of usage, the top ten languages represent 84.9 percent of Internet users and are represented as follows: English (29.4 percent of worldwide users); Chinese (18.0 percent); Spanish (8.5 percent); Japanese (6.4 percent); French (4.7 percent); German (4.2 percent); Arabic (4.1 percent); Portuguese (4.0 percent); Korean (2.4 percent): and Italian (2.4 percent) (See http://www.internetworldstats.com/stats14.htm). Based on data from Internet Systems Consortium, Inc. (http://www.isc.org/), today there are over 72 million active domains or hosts (.com, .net, .org, .info, .biz, .us) on the Internet, a big difference from less than 10 years ago, when the overall number was just over 193,000 (.com, .net, .org). (See Exhibit 14.4).

So does this mean that recreation, park, and leisure agencies should shy away from the use of the Internet? No more than we should avoid using the "friendly Yellow Pages" to do searches, to collaborate with others, to do mass marketing, and so on. It means that we should be informed users who tap the possibilities of the Internet and do not fall prey to some of the pitfalls. The number of sites that have been prepared just to address how to evaluate materials on the Internet serves as a warning of the perils that may exist. See the following as examples:

- http://info.lib.uh.edu/pr/v8/n3/smit8n3.html;
- http://www.vuw.ac.nz/staff/alastair_smith/evaln/evaln.htm;
- http://www.llrx.com/features/webeval.htm; and
- http://www.bcps.org/offices/lis/models/tips/eval.html.

But differences do exist between our friendly Yellow Pages and the Internet, as shown in Exhibit 14.5.

Exhibit 14.3
Worldwide E-commerce Growth

	2000	2001	2002	2003	2004	percent of total sales
Total ($ B)	$657.0	$1,233.6	$2,231.2	$3,979.7	$6,789.8	8.6 percent
North America	$509.3	$908.6	$1,498.2	$2,339.0	$3,456.4	12.8 percent

Source: Forrester Research, 2004

Intranets and Organizational Communication

An intranet is basically a "private Internet." Intranet technology is fundamentally the same as Internet technology, all based around HTML and hypertext transfer protocol (HTTP). "Hypertext" describes the ability to jump around a text document by choosing keywords, or anchors, as they are called in HTML.

The intranet is the method of implementing what was once called the "paperless office." By using intranet technology, coupled with custom programming and interfaces, an entire organization can be run using little to no paper. Besides being environmentally sound, intranet technology makes it easier to manage and handle the vast amount of information necessary to run even the smallest business. On the other end of the spectrum, intranet technology is infinitely scalable all the way to multinational corporations, by using various distributed computing technologies. In Scottsdale, Arizona, an intranet is used to connect the recreation center with the maintenance compound. This has reduced paperwork and increased the quality of communication between the two facilities.

The information on the intranet is *not* for customers to see. It is comprised of administrative information maintained by each section in the organization (each department in the government). The interface to access this information (the browser) is the same interface used for the Internet. With browsers installed on each computer and Web sites developed for each section, an organization can maintain and use information very inexpensively. Intranets operate on the internal network making performance better than the Internet. Intranets are used for, but not limited to, the following:

- document management;
- departmental training;
- policies and procedures;
- corporate directories; and
- sharing of cultural norms and values within the organization.

Typical organizational intranets have job postings, employee handbooks, calendars of events, and other information specific to organization functions.

Exhibit 14.4
Users of the Internet

September, 1996	19.2 M
September, 1997	25.3 M
August, 2003	173.1 M
June, 2008*	220.1 M

*Cited from http://www.internetworldstats.com/stats14.htm

Another component of the organization intranet is the employee area. Many times, organizations will allocate a portion of the intranet for staff to post items for sale, retirement parties, or personal announcements (births, deaths, weddings, etc.). This sort of use adds a human touch to technology.

Electronic Messaging

According to Electronic Messaging Association (Computer Law Association, 1996), the projected growth per year in the use of electronic mail will continue at 19 percent and above just for corporate America. These figures do not include the education, government, and consumer users that make up 80 percent of potential users.

But messaging refers to more than electronic mail. *Electronic messaging* references the collective technologies that enable one person to communicate with another using a number of chosen mediums, such as:

- e-mail;
- faxing;
- paging (alpha, digital, and voice);
- radio (broadband);
- telephone (non-wireless);
- telephone (cellular);
- intercom (public address);
- intercom (telephone);
- push technology;
- list servers;
- automated voice response (AVR);
- fax-back;
- activated kiosks;
- on-line chat mode;

Exhibit 14.5
Comparison of Friendly Yellow Pages and the Internet

STEP	Our Friendly Yellow Pages	The Internet
1	If you are seeking a supplier for a special product, the first search is generally to the Yellow Pages of your friendly telephone book. If you know exactly what you want, you can quickly narrow your search to a few specific topics to retrieve information on a vendor that may supply the product you seek.	There are a million and one products, or in this case, bits and pieces of information, for the customer to search. Using the search engines, it is anticipated that the search can be narrowed and a site can be selected that best represents the information that you are seeking. But, as with our friendly Yellow Pages, items are not always named as we anticipate the items should be named and often are not found in the categories where we hope to find them.
2	Once you have located the product, you must then select a company which you feel can best provide the quality of product you are seeking. You may scan pages to find a name that pleases you or a name that is familiar, or look at the ads and read the fine print, or just pick a name at random because it appeared first or last on the list.	As with our friendly Yellow Pages, once we have arrived at a set of items that appears to be what we want, it is difficult to determine from the layout of the page, or the placement of the page, that the information presented is factual and can be taken at face value.
3	Eventually you will narrow your search to a few agencies that you may wish to call and ask questions to verify they are still in business and are indeed legitimate.	Misinformation, using a variety of multimedia techniques (such as animated images, morphing where images transition from one form to another, or even color and sound), can alter the perception of the viewer. The information placed on the Internet is only as reliable as the people who are placing the information there, much like our friendly Yellow Pages.
4	Finally you will select your vendor and place your order	

- browsing;
- video conferencing;
- Picture-Tel; and
- many more.

But be aware that various features of the e-mail system require the purchase of additional software and hardware. The complexity of the e-mail system will require an expert to install and maintain it. As it becomes more important to day-to-day operations, more resources will be required to support it (assisting users, administration, configuring users, etc). *Spamming,* using electronic message systems to send unsolicited bulk messages, and *flaming*, posting deliberately hostile messages on the Internet or an intranet, can become a problem. Policies regarding the use, abuse, and private nature of e-mail must be established. Security could be a problem. Some businesses view e-mail as an electronic signature or authorization. It is possible to misrepresent an agency by using another's e-mail to order services.

The most widely used piece of technology in the office is the telephone. The communications industry has grown to provide high-speed services for data communication to connect computers. The combination of voice and data functions has led to the development of a worldwide network of communication services. This technology makes it possible for national and international companies to provide services to users without regard to location. Airline reservation systems and automatic teller machines are good examples of the successful use of these technologies.

The discipline of data communications has introduced a new set of technology problems. Reliability in connecting two computers for long periods was difficult to achieve. Business and government installed specialized wiring systems within their buildings to accommodate computer access. Engineers had to move a vast amount of data from point to point without losing any of the pieces. A number of companies emerged during the 1990s to meet the specific needs of high-speed data users. This has led to a global network of high-speed data lines.

Now there are many private and public communication network companies competing for computer users.

With knowledge doubling every 17 months (Catlett, 1995; Bryan, 1998), it has become necessary to devise "just-in-time" solutions for a multitude of recreation and park crises. The proliferation of information has created a data smog, composed of messages by telephone, fax, e-mail, voice mail, and pagers. Communication alone has been sufficient justification for organizations to invest in IT. Park and recreation personnel do not all work the traditional 8 a.m. to 5 p.m. shifts; also, they work in diverse locations. To get important notices, announcements, and other information into the hands of staff, electronic mail has been the tool of choice. Via this tool, staff members have been able to communicate more reliably, in a timely manner, and with less effort than with normal internal routing. But messaging refers to more than electronic mail. *Electronic messaging* is the collective technology that enables one person to communicate with another.

To the user today, the distinction between the voice and data lines is being blurred with new *telephony* technologies. The phone line is now capable of sending messages around the world in whatever medium or technology end users select. People are connected 7 days a week; 24 hours a day, sometimes live (telephone and chatting) and sometimes delayed (e-mail or v-mail). As the messaging component moves to conduits such as cable, the speed of processing the ever-increasing amounts of information increases, as well as the demands for "instant service" or "instant gratification of expectations." The role of management is to sort out what is necessary for business and what staff members, the general public, and customers have come to expect as standard business tools needed for communication, problem solving, and marketing.

As park and recreation organizations evolve technologically, they adopt a number of messaging technologies. Each technology has a purpose, function, and cost (both direct and indirect). The benefits of each vary with the function they serve. The telephone is still the communication tool of choice by businesses around the globe. Since it transmits over the phone lines, as the Internet becomes more popular the demand for more telephone services increases. Both high-speed and voice-grade telephone services have increased dramatically in the last few years to accommodate the services people demand, such as:

- alpha paging systems;
- automated teller machines (ATMs);
- credit card validation;
- fax machines;
- Internet access to ISPs;
- more administrative line costs attributed to IT security systems; and
- utility monitoring systems.

Tracking telephone charges in the past was easy. There was one charge for monthly use, one charge for installation, and detailed charges for long distance. Today, a telephone bill can contain numerous services (call waiting, call forwarding, voice mail, caller ID, etc.). The long distance service may come from several providers on one bill. Many ISP providers require that billing be a part of the phone bill (to decrease mailing costs and guarantee collections). In an organization with numerous phone lines, it is very difficult to manage costs. However, there must be a system to monitor line costs, in order to ensure telephone lines are not going unused or being abused.

It is the trend of many new managers today to have direct and immediate access to people and services. There is a cost for issuing pagers and cell phones to employees to keep them in touch with customers and one another when in field locations, such as for maintenance calls, monitoring a crowd, at an athletic field, or as an emergency communication, etc. Often, complicated policies are developed to prevent abuse; consequently, staff refuses to use pagers because of the hassle factor. There must be clear business reasons for issuing such devices and a reasonable expectation for use. These devices should also be monitored, together with the phone lines.

Voice mail capabilities should be provided to staff members who expect calls from vendors, other departments, or organization staff members. Published phone numbers (white pages) are designated public numbers. These are considered *call points*, meaning the person answering the phone should be prepared to assist the caller or be able to route the call to the proper section within the organization. Voice mail usually should be checked frequently on published numbers.

Some larger organizations use a *call center* approach to handling the public. In a call center, answering the phone is the number one task. Call center workers have computer equipment that allows them to access the information necessary to assist the caller. The public dials one number, and the calls are logged using an automated call distribution (ACD) system. This system is a tool used to guarantee prompt service for callers and time management for call center personnel.

An alternative to the call center is an *automated voice response (AVR) system* to route calls. Typically, a customer calls a central number and gets an automated response, such as the one outlined in Exhibit 14.6. AVR systems are good for screening and routing calls, but may not be viewed as good customer service by people who wish to speak to a live person. AVR systems can be set up to disseminate information. The AVR system can be linked to a fax-back system to allow an organization to fax common forms to the requesting public. The caller follows a set of voice prompts to enter the fax number

Exhibit 14.6
AVR System Responses

Typical AVR System Initial Response to Customer
"Thank you, for calling…"
"Press 1 is you would like to reserve a shelter."
"Press 2 if you would like to register for a class."
"If you know your party's extension, enter it now."
"To talk to the operator, remain on the line."

Typical AVR System Information Dissemination Response
"Press 3 if you wish to hear this week's events."
"Press 4 if you would like the fees and hours for the family center."

Typical AVR System Information Fax-Back Response
"Press 5 for a Program Registration form."
"Press 6 for a map of the area."

to send the document. The document is usually faxed within 10 minutes.

The caller should always have the capability to leave a voice mail message or be transferred to an operator. Being trapped in an AVR system without being able to get to a live person is considered *voice mail jail.* This situation can be very upsetting to callers.

The success of these systems depends on an easy and efficient system design, public education (training), and management commitment to implementing and supporting them. The phone numbers and codes should be distributed with all marketing materials. It may take three to four seasons of operation before the public begins to use them regularly. It is essential that management understands that this type of system involves change, and change takes time.

Centralized faxing is a network product that allows staff to send and receive faxes from their computers. Most fax telephone lines have long distance capability. If the fax machine is unattended, it is one place that a person could use the phone (voice) capability of the fax to make long distance calls. A fax router receives in-bound faxes. The first page is read to determine to whom the fax should be routed. The fax is then routed to a nearby network printer or to a designated computer. Fax services can be extended to anyone attached to the network. One to four phone lines can be allocated to the fax server. Each fax sent is queued in the fax server until a line becomes available. Once the fax is sent, a message to the sender is delivered regarding the successful or unsuccessful transmission of the fax. The cost of such a system is about the same as that of one high-end fax machine.

Decentralized faxing is the proliferation of fax machines and phone lines to support the faxing service in various parts of the organization. This process is unaffected should the network go down. The cost of owning, supplying, and maintaining a high number of machines can be a drain.

E-mail is the most versatile of the messaging technologies. E-mail can be used to send messages inside and outside of the organization (via the Internet). E-mail can be deployed from one of two locations, the Internet (using a browser) or from the desktop using one of many e-mail applications such as Microsoft Outlook or Novell Groupwise. The difference is where the messages are stored. Internet e-mail stores the message on the Internet so it can be accessed from around the world. Desktop e-mail pulls the e-mail down from the Internet and saves it in a network post office or on a PC or laptop. Generally, desktop e-mail has greater storage capacity and more features. Many local governments have both e-mail systems, a desktop client and a Web client. In this scenario e-mail is saved in a network e-mail post office that can be accessed from your office or from the Internet.

E-mail is a versatile technology. It is possible to send e-mail as faxes (by routing an e-mail to a fax machine) or to an alpha pager. E-mail has long been used to send attachments, which are other files (documents, spreadsheets, databases, graphics, etc.). E-mail can be distributed to multiple people simultaneously. Many times, an e-mail conversation is more efficient than talking on the phone. Most messages are short, to the point, and easy to print, whereas there is no documentation for voice conversations. E-mail allows communication to staff with divergent schedules, in remote locations, or away on business. The user can subscribe to special services on the Internet that will

e-mail information to him or her when it becomes available (*list servers*). The user can buy things, pay bills, request services, and communicate with vendors around the world. There are shareware versions and licensed full-featured versions. But most of all, it is the way business does business.

Various features of the e-mail system require additional software and hardware to be purchased. There are both shareware versions and licensed, full-featured versions of e-mail software. The complexity of the e-mail system requires an expert to install and maintain it. As it becomes more important to day-to-day operations, more resources will be required to support it (assisting users, administration, configuring users, etc.). Policies regarding the use, abuse, and private nature of e-mail must be established. Security could be a problem. Some businesses view e-mail as an electronic signature or authorization. It could be possible to misrepresent the organization by using another's e-mail to order services. Further, staff should understand that e-mail is considered a public document, and under the Freedom of Information Act, the media and others may request e-mail memos from public organizations.

Electronic messaging is a powerful tool. It requires thoughtful implementation. Costs must be balanced with service efficiency. Services are varied and complex and as such must be managed appropriately. A messaging audit is a valuable management tool (see Compendium 14.6 for a messaging audit exercise).

Geographic Information Systems

A geographic information system (GIS) captures, stores, analyzes, manages, and presents data that is linked to a specific geographic location. Utilizing the information presented in visual form, managers can make decisions and actually view the relationships that those decisions may have on that geographic location. GIS is a technology that is growing in usage and popularity in the leisure service field.

GIS makes it possible to link, or integrate, information that is difficult to associate through any other means. It is a visualization tool that allows planners, decision makers and service providers to see the impact of changes to the world around them. GIS is important because many services are provided geographically. By using digital maps, satellite data, aerial photos, and other forms of data, an integrated approach can be developed that identifies and possibly solves a problem. A simple multimedia description of GIS can be found on the Internet at www.gis.com.

The typical leisure service agency uses GIS for economic development, park services, recreation services planning, and many other purposes. In relation to economic development, GIS can:

- display capital improvement dollars spent by a neighborhood;
- display property values surrounding park lands; and
- analyze service area population.

In relation to park services, GIS can:

- create wall maps for facilities showing park locations and services;
- calculate mowing acreage of parks;
- inventory locations of park amenities (playground equipment, benches, etc); and
- create detailed "park plans," showing utilities, streets, trails and building locations. (See Chapter 13, Management of Operations.)

In relation to recreation service planning, GIS can:

- calculate "under-served" areas;
- plan public transportation routes to parks and facilities; and
- identify constituents within neighborhoods for target mailing.

In relation to park planning, GIS can:

- identify desirable open space for land acquisition;
- create an impact scenario should services be increased/decreased; and
- create plans for inventorying and managing urban street trees.

Organizations are increasingly required to operate with the speed and efficiency of business while facing ever more complex political and regulatory issues. Organizations must digest an immense amount of information to perform their duties in a fair and sound manner. A GIS has the data management tools to help organizations accomplish this task. GIS technology provides a flexible set of tools to perform diverse functions. More importantly, it makes data sharing among departments easy.

What is GIS?

GIS is the process of creating a digital representation of objects from the real world. In GIS, objects are referred to as features. Typically, features are represented points, lines, and polygons:

- point—for displaying things that have a fixed location and don't take up area, such as a fire hydrant or telephone pole;
- line—describes a linear feature, such as a water line or sewer line; lines can also depict elevation in a series of imaginary lines referred to as contour lines; and

- polygon—a multisided shape identifying area, such as a building footprint or parking lot.

The collection of like features in a GIS is a called a layer. For example, all the polygons representing parkland are referred to as the parks layer. Each layer has a table of data that describes each feature in the layer. This is known as the attribute table. The attribute table for the parks layer may contain the park name, area (in acres), park address, park phone number, and park manager. The essential element that differentiates GIS from other technologies is the information that identifies where each feature is on a map. Each feature is geospatially referenced to a real geographic location.

There are a few essential layers that enhance the use of GIS. These are known as *special layers*. Special layers include:

- boundary layers—imaginary lines around political and service areas such as country, state, and county, such as zip codes and school districts;
- centerlines—imaginary lines that run down the middle of a street; each feature is a segment and each segment contains information about addressing, for example, in Indianapolis IN; Meridian St intersects with Washington St; going 1 block East on Washington St would take you to 100 E Washington St; going 1 block north on Meridian St would take you to 100 N Meridian St; the attribute table of a centerline contains the street name, speed limit, direction of travel, from address, to address and much more; the centerline is one of the key layers used for finding addresses on a map;
- parcel—a unit of land ownership; every parcel of land on the earth has an owner, and most parcels have a physical address; a parcel layer is used to distinguish private from government land; a GIS is used to approximate what is actually surveyed, so that the boundaries can be reviewed in the office, thus saving a trip to the field;
- base map layers—are typical layers used on most maps; these layers include cities, major streets, parks, lakes, and rivers; if the area of interest is a city, the base map layers might include schools, fire departments, commercial and industrial areas; and
- aerial photography—a collection of many (thousands in some cases) photos, digitally sewn together in a mosaic to portray the land as it is being used.

Aerial photography is one of the most used layers of GIS, because it is visual and people can relate to the images. This layer does not have an attribute table. For practical reasons, aerial photography is done once a year in the spring, when there are no leaves on the trees or snow on the ground. In this way users are able to see building footprints and roads through the trees. There are two types of photos available:

- orthogonal—looking straight down at a subject, which gives the best proportional view of a geographic area and is good for measuring area and computing distance; and
- oblique—looking down the side of a building, which gives the best view of entrances and exits in a building, and is good for measuring height.

There are six purposes for GIS in the leisure service industry.

Research/query. Most people use GIS to explore an area to gain better understanding about the geography. Questions include: How big is it? How far is it from…? Who owns it? Who/where can I get more information? What is close by? Where is it/what is it?

Inventory. A schools layer is an inventory of all the schools within a specified jurisdiction, like state or county; inventories are generally maintained by the department that owns/controls the data, and inventory layers typically have good attribute information;

Analysis can be used to compute the runoff of water from a parking lot, the historical change of a specified location from year to year (using aerial photography), the change of population, race, income, and age of a neighborhood, youth crime in neighborhoods with and without recreation programming and much more; for example, on a population map, various sizes of dots represent cities—the bigger the dot, the higher the population;

Map-making or cartography is the design and production of maps, or visual representations of spatial data, and is often mistaken for GIS; the map is generally the end product in cartography; in GIS, the relationships between the various sources of data, are more significant to the analysis, yet GIS can also generate a map as a product. A good cartographic quality map has the following characteristics:

- a clearly defined map area, with the subject (if any) centered;
- a descriptive title;
- a symbolized map key;
- a North arrow (compass rose);
- a properly cited data source;
- an appropriate scale bar; and
- a creation date with author.

Routing is the process of determining a path from one location to another. MapQuest and other Internet

map services have made this function very popular for getting directions. Routing is based on the centerline layer. Internet based applications update centerline information periodically through the year. In many cases new subdivisions (up to three years old) may not appear. Another form of routing involves building a transportation model to analyze traffic flow. This model can be used to ponder solutions for these problems:

- where would traffic go if we closed the bridge?
- could someone ride a bicycle downtown and take the bus home? and
- identify the best emergency routes to use during a major sporting event.

Public presentations. The visualization component of GIS allows the presenter to quickly display information, so that more time can be spent on decision-making in public meetings; from poster-sized color maps, to aerial photography, to computer generated 3D "fly throughs," all are tools for public presentation that tell a story that would take much longer to communicate by speaking or reading a report.

GIS as an Industry

GIS is a multi-billion-dollar industry employing hundreds of thousands of people worldwide. GIS is taught in schools, colleges, and universities throughout the world. Professionals in every field are increasingly aware of the advantages of thinking and working spatially. The modern era of GIS was fueled by the need for government, military and utility companies to manage assets in a digital mapping system. Simple examples include utility companies working to document the locations of wires, cables, and pipes, and government planners studying the impact of construction in urban areas.

Early GIS systems required massive computer hardware, operated by highly skilled technicians using proprietary software. Data collection was tedious and time consuming. A few commercial GIS vendors appeared in the 1980s, spurring a wider use of the technology. Eventually the cost, power, and access to GIS services became more affordable. Today, many GIS functions can be accessed for no direct cost from the Internet. Most desktop PCs are able to function in a GIS system.

Components of a GIS

A working GIS integrates five key components:

- hardware;
- software;
- data;
- people; and
- methods.

See http://store.esri.com/esri/index.cfm for samples of software in use for GIS. See Exhibit 14.7 for the components of GIS.

A full-blown GIS system with all the components is much too costly for a typical park and recreation department to manage. Typically, GIS services are part of a county or regional government entity that can leverage the cost across several agencies. It is more likely that leisure service agencies participate as users of the GIS and perhaps maintain a layer for parks, wetlands, forests, or other similar layers.

It is not unusual for a department to pay an annual cost for the maintenance and use of GIS services. For departments with modest GIS needs, the Internet offers solutions for creating simple data layers using Google Earth or Microsoft Virtual Earth to accomplish the same tasks using collections. As a participant, park staff may access and use other layers. For example, when a major wildfire occurred at a national seashore, GIS/GPS solutions were used to manage the fire (see Exhibit 14.8).

The Big Picture in Simple Terms:

Given:

- public information should be available and shared with all;
- information is power, and control of information is ultimate power;
- tax increases to support technology advances in government are difficult to justify, but not impossible; and
- it would be difficult to put a price on a technology that could tie the data of multi-government organizations together.
- it would be equally as difficult to put a price on the "lost benefit" of not being able to tie data from multi-government organizations together.

Assumptions:

- money is not a problem;
- political control is not a problem;
- willingness of management is not a problem;
- availability of technology is not a problem; and
- public support is not a problem.

GIS is already a valuable tool working publicly and commercially. Via the Internet, anyone can locate a travel route from their home city to just about any address in the United States (www.mapquest.com). Anyone can purchase devices the size of hand-held calculators that identify hotels, restaurants, and gas stations on every major highway in America. GPS systems (discussed below) installed in cars can give

Exhibit 14.7
GIS Components

Hardware	Hardware can be as simple as a PC accessing GIS from the Internet to as complex as a "full blown" GIS operation with high-powered servers and storage devices. Many GIS shops support large format plotters/printers used for producing maps. Typically, a GIS shop is not part of a leisure service agency; rather the agencies contract for the services as needed.
Software	GIS software provides the functions and tools needed to store, analyze, and display geographic information. Key software components are tools for the input and manipulation of geographic information; a database management system (DBMS) tool that support geographic query, analysis, and visualization; and a graphical user interface (GUI) for easy access to tools. Typically, there are three platforms for GIS software. There is the Web service or Web application, which can be privately or publicly accessed from the Internet. This method would just require a compatible Internet browser to access. The next step for users would be desktop software. There are many vendors that supply simple to very complex off-the-shelf desktop applications. These tools are for those who understand the basics of GIS. Newcomers may find a high learning curve to master the software. Finally, there is server-based software for those organizations that host GIS data and applications.
Data	Data (layers, tables, photography, etc.) is the most important component of a GIS. Some data are static and free to the public, such as country, state and county boundaries. Other data are dynamic, and difficult to obtain and maintain, but very useful if available, such as tree cover, wetland areas, hydrology, crime, and many others. Each layer of GIS data is accompanied by metadata or information about the layer (who created it, when it was created, how it's maintained, etc.). It's good to question the data when looking at a map providing analysis.
People	The people who use GIS fall in three categories: GIS support, data producers, and data consumers. GIS support are those who maintain GIS resources, train others in the technical use, and write custom applications for special use of GIS. Data producers are those who create and maintain specific data layers or cartographic quality maps. It is not unusual for a park and recreation department to maintain a parks layer and create maps for public presentation at board, council, and public meetings. Data consumers are those who query and do research using GIS tools. Many of these tools are intuitive and easy to learn. In any case, people and business needs give GIS data its value.
Methods	A GIS is a major undertaking. It requires data standards, sound planning and agency-wide participation (financing and data). Some things can be done economically; however, due to the complex nature of GIS, other tasks require patience and planning. It is wise to communicate and collaborate with the GIS community to express needs and identify solutions.

drivers pinpoint accuracy in determining their location if they get lost. Public utilities map the routes of utility lines, buried cable, rights-of-way, and easements throughout a geographic area. Public works departments keep track of roads, sewers, and routes for solid waste pickup. Many organizations and departments are motivated to develop a GIS. The "map" portion of GIS is the same for all users. Each interest group maintains its own "layers" of data. There are many layers already developed for public use, such as soil types, floodplains, contours, and others available for use by state and federal organizations.

Guidelines for getting started in GIS include the following.

- Identify the strategic purpose(s) for using GIS, and don't create a GIS shop, unless you have the resources; most regional governmental units have a GIS, and it would be wise to become a partner or customer of one.
- Identify the GIS users within your agency who would maintain the data and mapping functions; organizations should specialize in creating layers of data and not in maintaining the whole GIS system.
- Organizations can maintain their own maps (in the absence of a map provider) if the map is limited to basic features that do not change often.
- Seek guidance from other cities with GIS and/or a GIS provider/consultant.

For a case study using GIS, go to the following Web address to view GIS Web Technology Benefits

Exhibit 14.8
Case Study: Fire Management Interactive Application of GIS at Point Reyes National Seashore

When a major wildfire occurred at Point Reyes National Seashore, California, GIS/GPS were utilized to monitor the daily spread of the fire, measure fire suppression actions, and assess damage to structures and to natural and cultural resources. To see how it worked, go to http://home.nps.gov/gis/applications/documents/pore/gisndx.htm and http://home.nps.gov/gis/applications/documents/pore/fire.htm.

Point Reyes National Seashore is located in Marin County, California, approximately 40 miles northwest of San Francisco. It encompasses 71,046 acres of coastal dunes, coastal prairies, marine terraces, coastal scrub, and forests. This geologically unique peninsula has appropriately been called an "Island in Time." Fall tends to be hot and dry and is the period of highest fire danger when vegetation is desiccated.

How the BAER Team Used GIS/GPS

The wildfire at Point Reyes was the area's most devastating wildfire in 60 years, with more than 12,000 acres of state, federal, and private lands burned. The wildfire was aptly named the Vision Fire after the site of ignition (Mt. Vision); however, the lessons learned from this fire also provided tremendous insights into fire management. The fire began in an illegal campground on State Park lands, and propelled by hot, dry, 50 mph winds, spread rapidly through several decadent vegetation communities from the Bishop pine/Douglas fir along the Inverness Ridge, to sand dunes along the Pacific Ocean. The rate of spread of the fire reached 3,100 acres per hour.

The superintendent of Point Reyes National Seashore called in a team of experts from the Department of Interior, the Burn Area Emergency Rehabilitation (BAER) team. The BAER team was made up of resource specialists with expertise in plants, animals, soils, water resources, cultural resources, structures, and roads and trails from agencies including the U.S. Forest Service, National Park Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, and Bureau of Indian Affairs. A major component of the team was GIS related. The primary task of the BAER team was to produce a report documenting the fire and fire suppression effects on the park and to make recommendations for mitigation and management.

Initially, the most critical information required from the GIS lab was the fire perimeter. Twice each day, a helicopter with a GPS unit on-board flew the fire perimeter, and a map was promptly produced for the firefighters. Another critical data layer was the location and condition of structures destroyed by the fire. California Department of Forestry, Marin County Fire, and National Park Service personnel surveyed homes in the burn area with GPS units (Trimble Navigation, Lt. ProXL, and Basic Plus) and collected data on the condition and location of structures. Within four days of the fire ignition, and while the fire was still burning, the data were converted to a GIS data layer and overlaid with a county parcel map to identify the owners of the structures.

Data were also gathered using GPS on location of hand lines, bulldozer lines, roads, trails, fire suppression effects, noxious weeds, vegetation plots, photo points, and survey points. GIS was then used for mapping, measuring, and monitoring post-fire analysis of burn effects and rehabilitation prescriptions. As users perceived the ability of GIS to measure and calculate information, they requested reports on acreages, linear distances, and so forth.

The fire continued to flare up over the next 10 days, re-threatening homes along the park boundary. Not until 12 days after ignition was the fire declared controlled.

As part of the National Park Service (NPS) fire recovery effort, several studies were initiated to evaluate fire and fire suppression effects on the ecological integrity of communities within and adjacent to the burn area.

for City Government-Case Studies: http://campus.esri.com/campus/library/Bibliography/RecordDetail.cfm?ID=9062&hidpage=1&browseonly=0&CFID=949009&CFTOKEN=28077264.

Global Positioning Systems

A *global positioning system (GPS)* is a constellation of many DOD satellites that orbit the earth approximately every 12 hours. The position and time information transmitted by these satellites is used by a GPS receiver to triangulate a location on the earth.

GPS was developed to provide a continuous, 24-hour, 3-D (position and elevation) coverage anywhere on earth. It provides reliable, repeatable information that is unaffected by rough terrain and bad weather, and is highly resistant to multipath errors and interference.

The satellites broadcast on two carrier frequencies in the L-band of the electromagnetic spectrum ("L1", which is 1575.42MHz, or "L2," which is 1227.6MHz). On these carrier frequencies are broadcast codes, much like radio or television stations broadcast information on their channels (frequencies). The satellites broadcast two codes, a military-only encrypted code (PPS) and a civil-access or standard positioning (SPS) code.

GIS and GPS are part of site-specific management technology. Other aspects include sensors and variable-rate technology (VRT). Sensors give quick, indirect, real-time measurements of soil and plants, which can help in maintenance operations. Sensors can measure soil organic matter content, soil and plant moisture, soil and plant nutrient levels, and pest incidence. VRT was developed to help apply precise amounts of chemicals; a sensor-based VRT ensures that the correct amount of liquid nitrogen is applied to the areas being fertilized—most commonly golf courses. There are sensors on the front of the sprayer that correspond to the nozzle spray width. In the back of the sprayer, are four nozzles that are sized according to different application rates. As the sprayer crosses the field, the sensors optically detect the level of nitrogen in the plants, adding nitrogen at different rates depending upon the plant needs. Researchers are working on VRT technology for other liquid and dry materials.

Disaster Recovery and Business Continuity

Computer crashes are bound to happen. An agency that is dependent on information resources (computers) is more at-risk during a crash. From a high level, the director (or agency head) is ultimately responsible for department information resources, because he is the only person who can set policy, provide budget, and support the enforcement of safe computing standards. IT staff can make recommendations, report abuse, and identify risky circumstances.

IT staff use information and build trust within the agency to encourage people to engage in safe-computing practices. Examples of safe computing practices include:

- log in your computer with a unique name and password;
- change passwords periodically;
- save all business information to a network drive daily, if a network is not available then to back-up media (i.e., tapes, external drives, etc.);
- restrict Internet usage to those sites that are business-oriented and trusted;
- do not open e-mail attachments unless the source is known;
- log off the computer when leaving for lunch or the day; and
- enable screensaver to require password upon reentry.

Disaster Mitigation and Security

A disaster recovery plan begins with mitigation of a disaster. Disaster prevention encompasses three areas:

- computer room security;
- data security; and
- network security.

Computer Room Security

Strict policies to secure your network equipment and servers mitigate the issues of intentional and accidental tampering with equipment. Always consult an IT expert when developing this type of specialized area. A good plan begins by placing the servers and network equipment in a proper room and limiting the number of people who have access. Computer rooms vary greatly in size and complexity. Most architects are familiar with building codes regarding a computer room such as: temperature control, building materials, floor, entry/exit doors, fire suppression, and so on. Some departments will retrofit a closet or storage area to be a computer room.

Data/Application Security

This pertains to the policies and procedures a department has in place for managing data. One policy might be that all business data (documents, spreadsheets, etc) must be saved to the network and not the local drive (C: drive). Another policy might be that all department data on the network are backed up once a night. The back-up media is taken off-site to a secure location.

Many jurisdictions (including state and federal government) have specific rules about backups, specifically, that it is unacceptable to take backup media to a personal residence, where data security could be compromised, lost, or stolen. The policies work to protect the information assets should something happen to the PC or the network. Many techniques (such as setting the default document directory to the network) may be implemented to achieve the desired result and reduce the impact on users. Implementing passwords is another way to mitigate data disasters. Such practices also maintain logs, such that tracking user activity assists in determining the cause of such incidents. Passwords may be implemented at various levels (e.g., at login to a specific workstation, when entering an application, and when entering from a wireless device. It is best to confer with IT experts to determine the best practice for a given agency. In the end, it requires a vigilant IT staff, cooperating com-

puter users and good IT policies. See Compendium 14.7 for a sample policy.

Network Security

This deals with attacks and outages to the infrastructure or something that disables a workstation's ability to get to a server or network printer. Infrastructure includes all the switches, routers ,and hubs (the little black boxes) that connect all the wires and cables together, which form a network. The network also includes all the workstations attached, whether by cable or wireless, laptop or desktop. Part of network security includes how the network connects with the Internet, usually through a firewall. All the e-mail passing to and from the e-mail server is scanned for viruses. File transfers on and off the network may be scanned, screened, or prohibited, depending on the policies of the network environment. Depending on the risk and vulnerability of the network, each device may be connected to an uninterruptible power supply (UPS), a battery backup. Typically, the servers, network equipment, and communication equipment are on power backup. The goal is to prevent an event that disables an agency's ability to conduct business.

Business Continuity Plan (BCP)

Your agency's BCP should spell out the process of restoring IT services after a disaster to a level where the operations of an agency can acceptably continue. For example, a windstorm may blow down power lines, disabling a recreation center's customer service function. A business continuity objective may be to enable the customer service function in another location. Specifically, voice and data services are redeployed to a new location in such a way that a customer calling would not detect a change in service. This change does not happen efficiently without preparation and planning.

When Disaster Strikes

Given there are information resources, a business operation, and a disaster (of any kind, manmade or natural), what is the expectation of management should the information resource not be available? It depends on the BCP your agency has selected and implemented. The options can be identified in one of seven tiers (as defined by disaster recovery specialists), defined below.

Tier 0: No Off-Site Data—Possibly No Recovery

Businesses with a Tier 0 business continuity solution have no BCP. There is no saved information, no documentation, no backup hardware, and no contingency plan. The time necessary to recover in this instance is unpredictable. In fact, it may not be possible to recover at all.

Tier 1: Data Backup with No Hot Site

Businesses that use Tier 1 continuity solutions back up their data and send these backups to an off-site storage facility. The method of transporting these backups is often referred to as the Pick-up Truck Access Method (PTAM). Depending on how often backups are created and shipped, these organizations must be prepared to accept several days to weeks of data loss, but their backups are secure off-site. However, this tier lacks the systems on which to restore data.

Tier 2: Data Backup with a Hot Site

Businesses using Tier 2 business continuity solutions make regular backups on tape. This is combined with an off-site facility and infrastructure (known as a *hot site*), at which to restore systems from those tapes in the event of a disaster. This solution will still result in the need to recreate several hours or even days worth of data, but the recovery time is more predictable.

Tier 3: Electronic Vaulting

Tier 3 solutions build on the components of Tier 2. Additionally, some mission-critical data are electronically vaulted through Electronic Remote Vaulting (ERV) technologies. The electronically vaulted data is typically more current than that which is shipped via PTAM. As a result, there is less data recreation or loss after a disaster occurs.

ERV requires high-speed communication circuits, some form of channel extension equipment and either physical or virtual tape devices, and an automated tape library at the remote site. IBM's Peer-to-Peer VTS and Sun's VSM Clustering are two examples of this type implementation.

Tier 4: Point-in-Time Copies

Tier 4 solutions are used by businesses that require both greater data currency and faster recovery than users of lower tiers. Rather than relying largely on shipping tape, as is common on the lower tiers, Tier 4 solutions begin to incorporate more disk-based solutions. Several hours of data loss are still possible, but it is easier to make such point-in-time (PiT) copies with greater frequency than tape backups, even when electronically vaulted.

Tier 5: Transaction Integrity

Tier 5 solutions are used by businesses with a requirement for consistency of data between the production and recovery data centers. There is little to no data loss in such solutions; however, the presence of this functionality is entirely dependent on the application in use.

Tier 6: Zero or Near-Zero Data Loss

Tier 6 business continuity solutions maintain the highest levels of data currency. They are used by businesses

with little or no tolerance for data loss and which need to restore data to applications rapidly. These solutions have no dependence on the applications or applications staff to provide data consistency. Tier 6 solutions often require some form of *disk mirroring*. There are various synchronous and asynchronous solutions available from the mainframe storage vendors. Each solution is somewhat different, offering different capabilities and providing different *recovery point* and *recovery time* objectives. Often, some form of automated tape solution is also required. However, this can vary somewhat depending on the amount and type of data residing on tape.

Tier 7: Highly Automated, Business Integrated Solution

Tier 7 solutions include all the major components being used for a Tier 6 solution with the additional integration of automation. This allows a Tier 7 solution to ensure consistency of data above that which is granted by Tier 6 solutions. Additionally, recovery of the applications is automated, allowing for restoration of systems and applications much faster and more reliably than would be possible through manual business continuity procedures.

The BCP (which is a responsibility of the agency director) identifies the level of disaster recovery required. The cost for preparation and implementation can be computed by identifying the components needed to satisfy the tier of recovery selected. This process requires the cooperative work of IT experts, key database managers, and park and recreation management. A director or agency head has the right to know what the disaster recovery plan is for the information resource regardless of who directly manages it (i.e., designated government agency, a contractor ,or in-house.)

Malware: Malicious Software

Malware is the general classification of Internet-based software that affects the performance of workstations and servers. Malware includes viruses, adware, and spyware. Each "illness" requires a specific medical plan.

Threats from Viruses

How can you get a virus? A virus is actually a computer program. The most common way to spread a virus is attaching a file to an e-mail. Just opening a message that contains a virus can activate it. Viruses can be acquired by transferring files from computer to computer, including over the Internet. Computers not properly protected are at higher risk of contracting a virus. Viruses can spread around the world in less than 24 hours. Each virus has a definition that identifies the origin and method of removal. These definitions can be found at any of the popular virus protection Web sites (i.e., Symantec, McAfee, and others).

Take these precautions against viruses:

- do not open messages with attachments unless you know the sender;
- delete them; and
- if you do decide to open attachment, save it first to your hard drive so your antivirus software can act on it.

Virus writers are working around the clock to attack you; the antivirus vendors and Microsoft are working around the clock to help protect you. Some common antivirus companies are listed in Exhibit 14.9.

What is your risk? Viruses can carry a damaging payload, such as a *worm* or *Trojan horse program*. When a virus infects your e-mail or other files, it can:

- make copies of itself, possibly filling up your disk drive;
- send itself to everyone else on your e-mail list;
- reformat your disk drive and/or delete your files and programs; and
- install hidden programs, such as pirated software, that can be distributed and sold using your computer.

Protect yourself against viruses with these steps:

- keep your antivirus software up-to-date;
- routinely examine your computer for the presence of infection;
- get some of the best protection available from antivirus software;
- scan incoming e-mail and attachments; practice good perimeter protection—scan files before you open them;
- sign up for automatic updates with your antivirus vendor; let the program help protect you by automatically updating the virus signature files;
- schedule weekly disk drive scans; schedule your antivirus program to check your system while you sleep; it will have a report waiting for you in the morning.
- make sure it's working; check the antivirus icon on your task bar regularly to make sure your software is active; and
- when you upgrade your computer's operating system or other software programs, get the latest version of your antivirus software, too.

How do you know if your computer has a virus? Watch for the following symptoms. You should contact your IT department if any of these occur on your computer:

- computer slows down—this could indicate unauthorized activity going on in the background; and

Exhibit 14.9
Virus Protection

Software Publisher	Product
Microsoft	Internet Connection Firewall for Windows XP http://www.microsoft.com/windowsxp/using/networking/learnmore/icf.mspx
Symantec	Norton Personal Firewall 2002 (Symantec) http://www.symantec.com/sabu/nis/npf/
McAfee	McAfee.com Personal Firewall (McAfee) http://us.mcafee.com/root/package.asp?pkgid=101&
Zone Labs	ZoneAlarm Pro (Zone Labs) http://www.zonelabs.com/store/content/home.jsp
Sygate	Sygate Personal Firewall PRO (Sygate Technologies) http://www.sygate.com/
Zero-Knowledge Systems	Freedom Personal Firewall (Zero-Knowledge Systems) http://www.freedom.net/products/firewall/index.html?product=firewall
Internet Security Systems	Black Ice Defender (Internet Security Systems) http://www.black-ice-firewall.com/

- unusual behavior of your computer—take notice if applications are not operating correctly or if content in files appears scrambled.

Threats from Adware and Spyware

Much like a virus, marketing companies place programs on your computer with the intention of monitoring where you go on the Internet. Many of these programs are activated when you start your computer and make an effort to contact a server on the Internet. *Adware* programs try to intercept and redirect your Internet use to a specific server or application. *Spyware* programs search your computer for passwords and personal information so that it can be transferred to an Internet server. The intent for some of these programs is to identify your preferences so that ads for products in which you may be interested are displayed prominently (pop-up ads). Other malware programs include keyboard loggers, which detect your keystrokes (when entering a password), so that it can be saved and used later by intruders wishing to gain access to your Internet accounts.

Some of this activity may be innocuous. It truly customizes a Web site making it easier to get the information you need each time you visit. This information is kept in files called *cookies.*

Want a cookie? Cookies are small text files that some Web sites create when you visit, and use to store information on your computer. Some sites use this data to deliver customized content, such as local news or stock quotes.

You can use the Internet Explorer privacy settings to specify how the browser should handle cookies, such as allowing all, preventing all, or prompting you before placing a cookie on your computer (so you can allow or block each time)

Passwords: Access to devices, applications, and accounts. Think of your password as if it were a key to your home and everything you own, including your reputation. What could someone do if they had your passwords?

- access information on your computer, such as your financial records, e-mail messages, stored lists of passwords, and private information;
- open new accounts and buy, buy, buy;
- change your mailing address, and have items they purchase (and bills) sent to them;
- withdraw money from your bank;
- buy or sell stocks;
- apply for loans, including mortgages; and
- pretend to be you in online chats or other online activities, such as auctions;
- change access to devices, applications, and accounts so you can't get it.

If an identity thief changes the mailing address for your accounts, you may not know you have a problem until you get a phone call from a collections agency. Hackers use "dictionary" and other software tools that run rapidly through thousands of likely passwords, looking for easy marks. Help protect your security by using unlikely or strong passwords, managing your

password carefully, and monitoring your accounts. (See Compendium 14-8 for Creating Strong Passwords.)

The challenge, of course, is creating a password that you can remember, but is hard for anyone else to guess. There are many suggestions that will help you to create a "strong" password, which is one that will not easily be guessed by someone else or is not easily identifiable by the software that hackers use to retrieve passwords. The list below contains some of the main suggestions for creating strong passwords. Make sure you create a password that:

- is at least seven characters in length, and the longer the better;
- includes upper and lower case letters, numerals, symbols;
- has at least one symbol character in the second through sixth position;
- has at least four different characters in your password (no repeats);
- looks like a sequence of random letters and numbers;
- does not use any part of your log-in name for your password;
- does not use any actual word or name in any language;
- does not use numbers in place of similar letters;
- does not reuse any portion of your old password;
- does not use consecutive letters or numbers like "abcdefg" or "234567"; and
- does not use adjacent keys on your keyboard, such as "qwerty".

After you have created a strong password:

- keep it to yourself;
- do not write it down;
- do not share it with anyone;
- do not check the "remember my password" feature, without considering the value of the data the password protects;
- create different passwords for information that needs a high level of protection;
- change your password at least every six months; and
- if you had reason to tell someone your password, then create a new one at your earliest opportunity.

Restriction. One of the ways to secure a client/server environment is to "harden" the server *operating system* (OS), then the client OS, to make it even more difficult for an intruder to use a client machine to hack into your network. Harden means to secure, making it harder for anyone to enter it easily. The network administrator would do this using policies, as each OS has different policies, as well as different usages for these policies. It is all dependent on which OS is being used, and what type of security policy the administrator has in place.

When you step away from your computer, be sure to "lock" it. Depending upon the OS you have, there are different ways to lock it. Speak with your network administrator to find out how to do this.

When you buy a new vehicle—whether it's the car of your dreams, a new bike, or a boat—you know you're going to have to maintain it. The oil needs to be changed, the air filter replaced, the tires rotated—all on a regular schedule—so you can trust your vehicle will be available when you need it to get you safely where you want to go. Keeping your computer updated to help protect your privacy is much the same; it involves ongoing maintenance, not a "one shot" fix.

The *management component* assigns specific users' responsibility to every organization database. Some of the responsibilities would be:

- to keep information current and accurate;
- to know how to use the system proficiently;
- to provide training and develop documentation as needed;
- to make sure maintenance contracts with system vendors are budgeted and properly executed and their procedures understood; and
- to put in place a plan for disaster recovery for that system.

These database managers, or super users**,** could be those who know the most about the use of a given system. There are some systems in which there is no database administrator. These systems have questionable accuracy and no provisions for disaster recovery. IT staff may not be able to restore the information because it was never in place to be backed up. This is a management problem that can be corrected by implementing a sound disaster recovery plan.

Information policies need to identify two types of information:

1. *personal information:* documents, spreadsheets, and databases that have no operational bearing on the organization; and
2. *department (organization) information:* Information that has a direct bearing on the management, operation, and administration of organization services.

The policy should state that all organization information *must* be backed up daily. This would include all users on a network and users on stand-alone computers. The policy would require that every organization database have a designated owner who would have custodial responsibilities. The disaster recovery plan

Exhibit 14.10
Survey Results of Senior IT Executives

Survey* by data storage giant EMC 2002, Conducted by RoperASW	14 percent of senior business executives** felt their important data are vulnerable to being lost in the event of a disaster
	52 percent of senior IT executives*** agreed

*274 executives at major U.S. corporations and other large organizations were polled.

**The business leaders polled included senior financial executives, such as chief financial officers and chief executive officers, according to EMC.

***Information technology leaders surveyed included senior IT executives in business units and chief information officers.

would identify each organization database and appropriate owner. This task identifies which staff members are responsible for each piece of information. Backups may be done to a network drive, to a zip drive, to a tape back up, to a DVD-RW, or to remote storage (putting it some where else on the network).

Disaster Recovery

> Our customers tell us that their greatest challenge isn't backing up their information—it's recovering and resuming operations in a timely manner. We don't believe U.S. business leaders are being misled by their IT teams. Instead it is likely a misperception that, if the data are backed up, there is no issue. (David Goulden, as cited in Frauenheim, 2003)

Disaster recovery is a growing field. In a report last year, market research firm IDC said the back-up recovery services market would grow from $3 billion in 2001 to $4.2 billion in 2006, for annual growth of 6.9 percent (see Exhibit 14.10). IDC predicted that the broader business continuity market, which also includes software and hardware such as high-availability computers and storage area networks (SANs), would expand from $29.9 billion in 2001 to $54.9 billion in 2006. That would represent annual growth of 12.9 percent. Estimates suggest that the survival rate for companies without a disaster recovery plan in place is less than 10 percent. According to the Interactive Data Corporation (IDC), about 70 percent of all successful attacks on computer networks were conducted by employees and insiders (see http://iosafe.com/industry-stats).

European business and technology leaders are more aligned on disaster readiness, according to the survey. Two hundred and fifty-four senior business and IT leaders in seven countries were questioned. Forty percent of business executives and 44 percent of IT executives responded that they felt very vulnerable regarding their data.

Companies reported that disaster recovery accounts for 6 percent of their total IT budget in 2001, and 65 percent expected their disaster recovery spending to increase after the 9/11 attacks.

Another management concern is business continuity in the face of a disastrous event. There are many events (i.e., power outage, computer virus attack, vandalism, fire, tornado) that could lead to business interruption. In most cases, IT services are involved. Conducting a disaster recovery audit will help managers identify the risks (financial and delay of service) associated with not being prepared or the inadequacy of existing measures. (See Compendium 14.9 Information Technology Security Plans Exercise). (See Exhibits 14.11 and 14.12).

Exhibit 14.11
Article on the Need for Security

The terrorist attacks of September 11, 2001 resulted in profound changes in U.S. public policy. In public policy analysis language, the attacks represented the ultimate focusing event (See Birkland, 1997 on focusing events); it impelled the President, Congress, and a host of other government officials to craft and enact laws, policies and procedures affecting domestic preparedness, response, and "consequence management" for terror attacks. The federal government also responded to the events of 9/11 by creating the Department of Homeland Security. The President's issuance of new directives, collective federal efforts that developed new preparedness and consequence management programs, and ongoing federally-directed reorganization and redirection of existing disaster-related programs all owe their impetus to the 9/11 terror attacks (Nicholson 2005; Tierney 2005; Bullock, et al., 2005; Kettl 2004). Hurricane Katrina, which struck the U.S. Gulf Coast in late August 2005, triggering the failure of the levy system that protected New Orleans, tested the capacity, adequacy, and limits of disaster policy and management changes made since 9/11.

Source: Sylves, R.T. (n.d.). Disaster policy and management in an era of homeland security.

Understanding IT Infrastructure

> If people built houses the way organizations build strategic information management systems, the first woodpecker that came along would destroy civilization. (Anonymous, cited in Wang, 1994)

Exhibit 14.12
Effects of 9/11 on IT Security

As a result of the 9/11 attacks CEOs of organizations said they would increase spending and make changes:

	Out of 100 CEOs
Boosted cyber security spending by 10 percent	100
Added crises communications	99
Updated emergency response plans	97
More testing of emergency plans each year	90
More testing of emergency plans twice a year	40

Source: Computerworld Security (2004). Survey shows security improvements in private sector. Retrieved on June 8, 2009, from http://www.computerworld.com/printthis/2004/0,4814,90852,00.html

The computers, systems, wiring, little black boxes, and communication services that are used to perform IT functions are referred to as IT infrastructure. IT infrastructure determines an organization's ability to conduct business and provide services in the future.

IT is a specialized discipline. It changes so rapidly that it is difficult to stay abreast of the latest advances. Larger organizations are usually supported by a special IT department or contract with an IT company. Although the details and specifications are best left to the specialists, it is important to understand and be able to use IT jargon to specify and plan for IT services. Most park and recreation publications have advertising from IT providers. Smaller organizations may rely on the help of a computer-literate staff person within the organization, or hire a consultant to solve their problems. There are numerous companies that provide IT services, including the local telephone provider. It is imperative that standards be adopted for each component of the infrastructure. Standards can provide a framework to simplify future buying decisions, training, and support. The four components of IT infrastructure are listed in Exhibit 14.13.

Workstations

A workstation could be a computer or a terminal. A personal computer (PC) refers to a standard desktop-size machine that can provide all of the basic computer functions. There are many manufacturers of computers, including Apple, IBM, Dell, Compaq, and others. These manufacturers compete to provide the best solution for an agency's IT needs, while maintaining a modest profit. Each brand of PC has its own distinctive technical features. Currently, the largest percentage of PCs produced for business applications are the Intel-based computers (that is, their hardware is based on computer chips manufactured by Intel Corporation). The Microsoft Corporation provides the majority of OSs found in most PCs as of this printing.

Laptops have become a popular alternative to stationary workstations. A laptop can be configured to work in a docking station, such that it can be connected to a normal-sized monitor, keyboard, and mouse; or it can be taken on the road. Laptops sold today contain a wireless network access card that can be used in hot spots in public areas (i.e., Starbucks, libraries; and WiFi locations) or on the agency's private network.

Exhibit 14.13
The Components of an IT Infrastructure

Component	Description	Typical Managed Objects
Workstations	Device used to access agency information resources	Terminals, desktop PCs, laptop, thin clients, and mobile devices
Data Networks	Communication highways over which data is transmitted and received	LANs (fileserver, wiring, hub, routers, bridges, gateways, workstation, network interface card, WANs, campus network, & peer-to-peer networking)
Enterprise Network	A collection of all networks local and remote in which there is a central coordination of data transmission	Multiple networks, middleware, databases, operating systems
Data Center	Location of mainframe, super computers or global servers	Applications, programs, business objects, Help Desk, processes, workflows

A *thin client device* is now an attractive alternative to a traditional PC or laptop. Essentially, it is a small device that contains a network card, connections for a keyboard and mouse, and enough memory for a user to log in the network. The thin client connects to another part of the network that runs the application and processing. Nothing is stored on the device. It is ideal for the user who runs the same applications every day.

Mobile devices such as Blackberry, Trio, iPods, and other combination cell phone and data devices are now very popular for sending and receiving e-mail, accessing a calendar and the Internet. These devices require a special server to enable these features. Users can maintain contact out of the office with a simple small device.

Ergonomics is the study of a user's working environment. Computer use can cause such maladies as carpal tunnel syndrome, headaches, and back problems. Ergonomic experts look for ways to create safer workstations and reduce the risk of users harming themselves. Some of the work area factors analyzed include lighting, keyboard height, glare, posture, workspace, desk space, work assignments, and time spent on a PC. This research has led to the production of various products, including wrist rests, anti-glare screens, keyboard shelves, and more. Many times, simple purchases can make a big difference in productivity and general health. Unchecked problem workstations may lead to lawsuits or avoidable medical expenses.

> The factory of the future will have only two employees: a man and a dog. The man will be there to feed the dog. The dog will be there to keep the man from touching the computer. (W. G. Bennis, as cited in Boone, 1992)

Some work areas use *terminals* for doing the computing tasks. A terminal is a device that is connected to a mainframe or to another PC. The terminal has limited computer processing capability and is referred to as a dumb terminal. A terminal is low in cost because it contains fewer components than a PC does. If the main computer is down, the terminal is not usable for work. In the past, mainframe computers far exceeded PCs in speed and computing power. However, PCs have become faster, cheaper, and more powerful. Terminals are being replaced with PCs to give the user the power of the mainframe and the flexibility of stand-alone computing.

Networks

A network is a sophisticated collection of computers, wires, and communications equipment. Simple networks, usually ones found on a single floor of an office building, are referred to as local area networks (LANs). Multiple floors, buildings and locations on the same network are referred to as a WAN (wide area network). The basic components of a LAN or WAN are:

1. fileserver (sharing files, printing services or specialty services such as e-mail);
2. wiring (connecting workstations to the network);
3. hub, router, bridge, and gateway (equipment that manages network traffic);
4. workstation (see above section);
5. network operating system (NOS); and
6. data circuits (DSL, T1, broadband/cable).

Fileserver

Servers are specialized computers that "serve up" files and other specialized IT functions. They are composed of large disk storage systems and large amounts of memory, and have rapid processing speeds. Servers are important because they centralize data storage functions, allow only specified users to have access, and provide printing resources as needed.

In larger organizations, a number of servers may be used to provide IT services. Common servers include an *e-mail server* (a distribution center that sends e-mail messages inside and outside the organization), a *fax server* (a device with phone line that sends, receives, and routes faxes to PCs), and an *application server* (dedicated specific database function that provides users with quick access to data). The purpose of specialized servers is to provide the highest possible performance in the most cost-effective configuration. Also, *communication servers* are used to provide network access to users at remote sites and provide network users access to other networks.

Another technique for using servers is *client/server technology*. In this scenario, the PC runs the application software and another program called the *client.* When the application needs data, it is requested through the client. The client and the server are tuned to provide the fastest possible turnaround for information. This technology rivals mainframe power and speed.

Wiring (Topology)

To transmit data on a network, special wiring must be installed. The type of wiring used has an impact on how fast the data will travel on the network. Networks must be planned by IT professionals who specialize in network performance. There are basically four types of wiring standards:

1. coaxial (looks like video cable, not common in new installations);
2. twisted pair (looks like telephone wire, very common and inexpensive);
3. fiber (very fast, can go long distances, expensive to install); and
4. wireless (flexible access, difficult to secure).

Wiring is important because it provides access to the network. All facility construction and remodeling should include wiring for voice (telephone) and data (network access) in every room. This will increase the functionality of buildings, provide enhanced resale and rental value, and prevent unsightly exposed wire installed on a post. Typically, a data jack can be installed in the same location as a voice jack.

Hubs, Routers, Switches, Bridges, and Gateways

A *hub* is a special-purpose black box that reads the information packets on the wire and routes them to their destinations. As workstations send and receive packets, the resulting effect is "traffic" on the wire. This traffic travels at a high speed, but there are times when packets must be held up or re-sent because a device on the network is busy with other traffic. The job of traffic cop falls to the hub.

A *router* sends packets from one network to another, assuming they have the same standard protocols (computer language).

A *switch* is a network device that selects a path or circuit for sending a unit of data to its next destination. A switch is not always required in a network and is generally a simpler and faster mechanism than a router, which requires knowledge about the network and how to determine the route.

A *bridge* is used to route packets from one kind of network to another (among different types of wiring). Essentially, a packet is read on one side of the bridge and converted to the correct protocol on the other side.

A *gateway* is a more sophisticated bridge, needed when the packet requires a specialized conversion (i.e., to access a mainframe). These devices are the workhorses of the network.

Network Interface Cards (NIC)

Circuit cards, known as *network interface cards*, are required for any device that connects to the network. These devices convert PC signals to data packets and put them on the wire. The NIC contains the unique address in which packets are labeled to be sent or received from a specific computer. The NIC routinely broadcasts on the wire, alerting other devices of its presence. Typically, NICs are plugged into servers, workstations, and printers so they can have direct access to the network.

Network Operating System (NOS)

Servers gain their strength from a NOS. This is a complex program that coordinates the movement of data on a network. The NOS controls the flow of information by using a standard protocol for transmitting and receiving packets of data. The NOS also contains administrative features that allow a network administrator to control who can use the network, where users can print, where data can be stored, and a number of other important details. Security is an important function of the NOS.

A *wide area network* (*WAN*) is two networks connected via high-speed data lines instead of just wiring. Many park and recreation organizations have remote facilities. To provide access to organization information resources, it may be necessary to link the administrative network and the remote location. This can be done with a dedicated point-to-point circuit or by using a dial-up line through which the remote facility dials into the administrative network. Not all applications work well over a dial-up connection, because the data transfer speed is not as fast as with a LAN. Applications involving remote communications and WANs must be professionally designed.

A *campus area network (CAN)* is two or more buildings linked together with premise wiring (usually fiber run underground) and administered from a central location. This describes the networking done at most colleges and universities. Each building has a wiring closet with racks of hubs and routers. Wiring from data jacks around the office or classroom is run back to the wiring closet. A building may have a dedicated server.

A local area network (LAN) is a group of computers and associated devices that share a communications line or wireless link and typically share the resources of a single processor or server within a small geographic area and may serve as few as two or three, or thousands, of users. Usually, the server has applications and data storage that are shared in common by multiple computer users.

There are other options for sharing data resources and printing. One option is peer-to-peer networking. This option eliminates the need for a dedicated machine to be a fileserver. Instead, each computer on the wire can share disk space or printers. It is a good option in small offices, where high performance is not required.

Many organizations use the terminal/server form of networking, where the computing power is in the server, mini-computer, or mainframe. This process has been used effectively with text-based applications. Terminals are inexpensive and easy to add within a building.

Networking is a stable technology. Once configured and in place there should be very few operational problems. Depending on the complexity of the network, the organization may assign some of the network administration responsibilities to a staff member on site. This liaison person will add new users and work with IT staff when there is a problem. Although it is possible to purchase and install network technology without professional assistance, it is not recommended.

Enterprise Networks

An enterprise network is a setup that involves there are multiple networks, connected by an array of protocols, from multiple locations around the city or across the nation. Management of such a network is usually done by an IT department or IT vendor. The park and recreation organization becomes part of the enterprise network. The administration of an enterprise network requires that each entity on the enterprise conform to various security and technology standards. Because of the large number of types of workstations and devices available, the network must always be concerned with upgrading aging equipment and changing technology.

The enterprise provides the best opportunity for staff to share information across organization and department lines. Enterprise networks are very mature in connectivity, but are very immature in sharing data. This will change as organization heads discover the benefits of enterprise computing.

Enterprise networks can be used very effectively for campground reservations throughout a state park system or for a recreation event calendar for citizens, encompassing not only the public recreation centers, but also nonprofit organization events.

Data Centers

In large government organizations and businesses, the data center is still a strategic part of IT services delivery. The data center is home to all the mainframe computers. It has a special environment that includes temperature control, a fire suppression system, security control, and a power back-up system. The data center is run by a number of specialized technicians, who maintain and operate the various IT resources. Staff perform such services as daily backup of data, running reports, archiving and restoring data, doing routine maintenance of systems, and so on.

Associated with the data center is the software applications group. This group is composed of programmers who develop, implement, upgrade, and maintain the programs that run on the mainframe. Often the programmers are outside contractors. Costs of data center services are usually charged back to the organization.

Help desk. The manager must see that a *help desk* is established. The help desk is an important function for any IT user community. As users have questions or need assistance with IT services, they call one number for assistance. The help desk is organized as a one-stop problem resolution service. Trained customer service representatives log all calls. Most problems can be resolved right on the phone. The help desk dispatches specialists or technicians if the problem requires an on-site visit. When the problem is resolved, the IT staff member or the help desk will note it in the log. The help desk will follow up with the user a few days later to make sure that all is well. The help desk manager analyzes the call log and makes recommendations to the IT staff about fixing technical problems and to organizations about training problems.

The Information Technology Plan

The development of an IT plan must be facilitated by the manager through a planning process and a planning team. Management must understand the reciprocal impacts of a changing workplace culture and continuing technological advances in IT infrastructure. Assessment of needs, determination of costs, and in-service education programs are essential to a sound and viable IT plan.

The Planning Process

It is probably safe to say that there is no such thing as a five-year (or longer) IT plan for park and recreation organizations. Changes in IT are so revolutionary and rapid that it would be impractical and economically wasteful to spend time on a detailed plan. However, a five-year business plan developed with a land-use plan is a prudent way to do business. By including an IT planner or business partner in the process, organizations can focus on the technology that will be best suited for meeting user needs. As the technology changes from year to year, emphasis will be kept on the business plan, and updating, upgrading, or changing technologies will be an operational decision. There are some planning steps that will increase management's comfort level with technology and work towards eliminating possible disconnects between upper management and IT staff.

An organization may develop an IT strategy that incorporates a complex array of technologies. The desired outcome of this strategy is to make the organization successful in meeting its mission and objectives. Although cost is an issue, the primary focus must be on the delivery of services. IT solutions that do not enhance the end product become overhead costs for the organization.

Effective technology planning can help park and recreation managers make effective purchasing decisions, improve their use of technology, and use resources more efficiently. Technology planning brings clarity and long-term direction for both management practices and staff development. The organization must be committed to both the technology plan and the process. The process in planning for technology is generally

Exhibit 14.14
The Steps in Developing a Technology Plan

Step 1:	Determine programmatic issues and business goals
Step 2:	Develop a preliminary vision for technology use
Step 3:	Conduct an inventory of current technology and available resources
Step 4:	Explore the possibilities of using the technology
Step 5:	Identify technology solutions
Step 6:	Re-examine the preliminary vision: Set technology vision and priorities
Step 7:	Evaluate specific technologies
Step 8:	Develop a technology budget
Step 9:	Determine staff development needs
Step 10:	Develop a technology implementation timeline
Step 11:	Conduct an ongoing evaluation of the technology plan

Source: Revised from National Center on Adult Literacy's Technology Planning for Adult Literacy, 1996.

as significant as the final plan and implementation (see Exhibit 14.14).

To develop a successful IT plan, each park and recreation organization must:

- involve all the relevant stakeholders in creating the plan;
- focus on outcomes in order to define what technologies to use and for which purposes;
- be realistic about costs and effort in supporting and training all the stakeholders;
- address how the delivery of services will change with the new technologies and what affect that will have; and
- address the effect of change in communication between administrators and staff; staff and customers; and administrators, staff, and residents in the global community.

If there is a long time between the creation of specifications and implementation (greater than six months), make the specifications flexible enough to buy the latest technology when purchasing time comes. See Exhibit 14.4 for the success factors identified through research at a technology-based high school, which are applicable to planning and implementation of a technology plan for recreation, park, and leisure service agency (Fugimoto & Morrison, 1997). (See Compendium 14-10 for a sample Information Technology Plan Exercise.)

Paradigm Shifts in Information Technology

There have been a number of changes in the workplace affecting how business is conducted. There are three shifts that are important to understand when planning for IT.

Shift 1: From Personal to Work-Group Computing

Traditionally, as PCs became available, they were given to secretaries, finance staff, and various managers in the organization. As new park and recreation professionals entered the organization, there was greater internal pressure to provide PCs to all supervisors and managers. This was a result of more people purchasing PCs for home, schools teaching better computer skills, and the need for the organization to communicate and be more productive.

For years, staff members enjoyed having their own computers. Organizations provided PCs as tools, just like telephones. Individual productivity increased due, in part, to having a PC readily available. However, organizations as a whole did not always become more productive. A simple exercise, such as creating a status report, became a difficult and tedious process. Managers were trained and proficient in word processing. However, if each manager provided reports in a different format, it was time-consuming to consolidate. (See Compendium 14-11 for a Scenario for Work-Group Reporting.)

If divisions were using the same standard groupware, a report such as this could be a collaborative effort, among all the managers, instead of four individual efforts. In addition, such collaboration would reduce the amount of support staff needed to get the report completed, because information would be shared across divisions.

The shift to work-group computing requires two major changes: First, it requires a change in culture of the workforce, from "my computer" to "our information." For years, divisions and sections of an organization have been delegated the responsibility and authority for producing services and accounting for their cost and quality. The idea of collaborating inter-departmentally was not comfortable, because it meant giving up control or sharing control of a project or service. Managers were concerned with finger-pointing and assigning blame. To overcome that obstacle, departments reorganized, putting all the staff under one manager. For years, departments have been plagued with the issues of centralized versus decentralized management because culture equates control with success.

In today's business environment, success equals satisfied customers. It is too costly to reorganize

information roles every time there is a change in management. Each functional unit must have a defined information resource that is accessible by whatever department, organization, vendor or public entity requires access, to be successful.

Secondly, the shift to work-group computing requires a change in IT infrastructure. When computer equipment was first introduced to park and recreation organizations, only a few staff had access to the technology. Today, many staff members are required to support the information function of the organization. Processes and work flows must be reengineered to create an information resource that is accessible and easy to maintain. Every dollar spent on IT resources must move the organization closer to work-group computing. Exhibit 14.15 illustrates the changes required.

Through the vastly enhanced connectivity capability, businesses have recognized the potential for work-group productivity via this new technology. Instead of having pieces of a project residing in four different areas in four different formats, the project can be managed from one location, with all users having access. All managers can now use a standard set of groupware tools to do the work. Some groupware applications allow users to check out databases, as in a library. In this way, other team members know who has the database, and that exclusive changes are being made. Organizations are also forming high performance business teams, composed of information-oriented staffers who cross division lines to manage department-wide information projects (see Compendium 14-12). In a typical park and recreation organization:

- IT functions are delegated to departments or individuals who have IT skills;
- departments are held accountable for information stewardship;
- individuals within the department perform IT tasks as defined in a job description and acquire training as needed;
- systems are developed based on the strengths and weaknesses of staff members performing the tasks;
- work flows are designed to accommodate the systems in place;
- staff members make presentations to management to acquire new computers and systems, and decisions are based on cost/benefit considerations; and
- face-to-face meetings are held.

In an ideal work-group computing organization:

- the leadership identifies the specific mission of the organization and the subsequent performance levels needed from staff to provide various services;
- business teams are formed (across divisions) that will best accomplish the performance required;
- members of these work groups must acquire a baseline of skills using standard groupware (word processing programs, spreadsheets, e-mail systems, and small databases);
- work flow systems are designed and engineered so that the customer receiving the service benefits from the change;
- all staff members are expected to be contributing members of the work group;

Exhibit 14.15
Summary of Shift from Personal to Work-Group Computing

Organizational hierarchy Personal computing	→	Accountable business teams
Emphasis on the individual	→	Work-group computing Group performance
Designing technology	→	(Re) designing the work systems
Tailorism	→	Work flow reengineering
Technical users	→	Direct support to all users (staff)
Installing technology	→	Leadership for change

- training and support are available to everyone within the group; and
- electronic meetings replace inefficient status meetings.

Groups, not individuals or divisions, are accountable to management for performance. This process will increase intradepartmental cooperation, so that the organization works as a unit instead of as competing divisions. The divisions remain intact and are managed accordingly. The accountants remain together to keep up with policies, procedures, and updates to the accounting systems. The recreation programming units stay together to benefit from leadership and expertise of experienced programmers. Department heads are cognizant of the work groups and provide an environment of encouragement and support. Because of IT, work groups do not have to be in the same location. There are many tools, such as e-mail, teleconferencing, and groupware that allow a team to collaborate while working on a project (see Compendium 14-13).

Shift 2: From System Islands to Integrated Systems

As functions right-size and downsize, staff are lost to other organizations or vendors, become contractors, or leave the field altogether. The existing staff then must continue at the same service levels, using available resources. To accomplish this goal, the division boundaries between administrative units (finance, human resources, purchasing, marketing, etc.) and operational units (recreation services, maintenance, golf, enterprise, etc.), become blurred. Instead of requesting information from other divisions, a staff member needs access to all operational or administrative information (within security limitations). To simplify the process, an organization must develop and implement information standards for document management, database management, and training. Ideal outcomes of this shift include the following:

- management provides infrastructure and systems for staff to do the job;
- staff is properly trained to use systems;
- personal information generated by all users is kept to a minimum; and
- staff and management personnel changes have little affect on organization services.

During the infancy of the office automation craze, there were not sufficient IT tools in place to provide ease of use and access to organization information. Government entities, businesses, and universities are now beginning to change their view of IT. They see their organizations moving from being service producers to being service-contract managers. As this trend continues, there will be less need for the data-entry function (it can be contracted) and more emphasis on the quality of service provided. Organizations will take a closer look at meeting constituent needs and sustaining the financial health of each core activity. (See Compendium 14-14, Scenario for Duplication, and Compendium 14-15, Scenario for Replication.) This type of integration requires research and coordination. It is the business wave of the future, and so the trend must be seriously considered.

Shift 3: From Internal to Extended Enterprise Computing

The third paradigm shift is a little more difficult to understand. It suggests that there are a number of organizations that provide park and recreation services and that everyone can benefit if the customer has direct access to the information about each service (no matter who the provider is). This requires information coordination with boys and girls clubs, YMCAs, school systems, bowling alleys, universities, park and recreation organizations, environmental education groups, hospitals, libraries, sporting goods stores, event-planning consultants, and many, many others. Using traditional management techniques, this type of coordination would be impossible, both technically and politically. IT resources for implementing this type of coordination are now available and affordable. It is up to each organization to determine if it is practical and possible. (See Compendium 14-16 for a scenario for Enhancing the Quality of Basketball.)

Assessing IT Needs

The technology advancements of the 1990s have provided powerful computing machines at the desktop, along with access to mini and mainframe computers around the world. Today there are a wide variety of methods and techniques to manage an agency's information resources. The business world is changing quickly. Technology decisions have an overwhelming effect on agency's resources. This includes the direct costs for planning, developing, implementing, and training, and the indirect cost of change and its impact on the agency. Successful IT leadership involves two guiding principles.

First, organization must be able to identify a clear mission statement that specifies the services it provides and how it provides them, for example:

- produce services in-house or manage services of contractors;
- organize tournaments, manage facilities, or both;
- operate as one organization or autonomous divisions or sections;

- compete, partner, or coexist with other leisure service groups; and
- allow the public to have electronic access to request services.

Each item suggests a different set of requirements for the IT resource. Knowing the business is to know who needs information and when. The organization should be moved from an information-producing to an integrated information resource organization.

IT should be made a part of the business plan. The business need component provides guidelines as to the importance, complexity, and desired outcomes of an information resource required for making the organization successful. By embracing technology, management commits to beginning or continuing the evolutionary process of integrating department information resources. Information production refers to the routine collection of data and the printing of reports (e.g., collecting facility rental data and printing a schedule, collecting attendance figures, and printing a bar chart showing attendance by facility by month). Although some processes may be automated (allowing the end product to be achieved faster or with fewer steps), they may not be integrated or working together to enable change in the way business is done. (See Compendium 14-17, Scenario for Automation, and Compendium 14-18, Scenario for Integration.)

The bottom line is: *make IT part of your business plan—embrace technology*. Move your agency from an information-producing to an integrated information resource organization.

IT planning is a continual cycle of assessing needs. As staff and managers capture important data, someone in the organization must look to the future to see where the business processes is going. The private sector continues to bring new technology to the marketplace. As technology becomes more cost effective (through similar competing products or acquisition through grants, gifts, or other means) transition to new technology becomes an annual management task.

There are many approaches to IT needs assessment. However, it would be a grave mistake to do an IT assessment without reviewing the organization business plan. The business plan sets the priorities, while the needs assessment identifies the projects.

One of the greatest emotional forces for acquiring IT is *PC envy.* In the late 1990s, it was not uncommon for people to have computers at home that were more powerful than the ones at work. As that power gap widened, staff were more vocal about upgrading in the name of productivity. As one staff member got a new computer, people in other areas made plays for better equipment through their supervisors. The end result was that staff may be more productive, but the IT planning process was not served. Computing resources have gotten skewed. Those who were not power users suddenly may have had the best equipment. Another risky decision for a medium to large organization was to replace all the computers at one time without upgrading business practices, planning for global training, or using sound IT principles to guide acquisition practices.

The easiest task in the IT continuum is to buy a computer. There are multiple vendors, great pricing, and standard configurations. The most difficult task is to get staff (training), technology (systems), and the business plan (intended use) moving in the same direction.

Technology changes every 6 months. A computer is obsolete when it is purchased. So by the time an organization specifies a computer, goes through the purchasing process, and has a computer delivered, it may be halfway through the technology cycle. The new machine will have more capability, but that capability may not be realized without strategic training. If you take this scenario and multiply it by X number of computers, there is an increasing lost benefit of buying computers. Each purchase must be planned. The effective disposal of old and unused equipment requires planning, as does the strategic training of staff.

The reverse situation is also true. Organizations are in the information business. As such, the budget must reflect a greater emphasis on IT spending. As Wang (1994) notes:

> By 2020, 80 percent of business profits and market value will come from that part of the enterprise that is built around providing or analyzing information.

It is possible for an organization to be dismantled and replaced (by other service providers) because it cannot respond to the information needs of the public, upper management, governing boards and councils, and the media. How much it costs for a child to play peewee football is now a complicated question. This cost no longer can be reduced to the direct costs associated with the program. It must now include indirect costs from many functional sections within the organization (i.e., maintenance, concessions, staff time, volunteer time, etc.).

If all of the IT systems within an organization are not working together, there is an increasing lost benefit. Information technology systems assure that appropriate management information, such as financial, personnel, and program records are being maintained and allow for a means to audit the systems using the technology. An audit of the manual systems may discover that there are problems with processes, but they were not recognized because there was no way to review the information regularly and efficiently. Converting

a manual process to an automated process introduces organization and clarity. Staff jobs must change to accommodate the automated process. Data must be entered in a systematic way. Information must be generated that can be reviewed for errors, shared with others, and used to support operations.

Planning leads to standards and clarification of the organization mission. It identifies the IT priorities, and balances them with the human and financial resources required to make IT projects successful. Because technology constantly changes, organizations must continually reevaluate their plans and reset their priorities.

A primary function of a recreation organization is to manage program activity offerings. This includes determining client needs, developing programs, marketing program ideas, and tracking user involvement (participation and revenue, scheduling of facilities involved, and many other logistical concerns). A typical automated response would be to acquire a system, load existing program offerings, and provide several ways for users to "sign up" (call in, fax in, walk in, mail in, AVR, voice mail, and others). With all the information in one place, staff could log in, register people, take their money, and provide a confirmation and receipt. There are many benefits that accompany a well-implemented information system.

Today there are more options for offering the program registration function. Traditionally, a recreation program registration database was acquired; users could call in, fax in, walk in, or mail in registration with payment. After implementation, not all departments realized an immediate return on investment (ROI) because of the additional administrative time needed to manage the database. One emerging solution is to allow users to register on line, much like Ticketmaster. This reduces staff time for processing, improves accuracy in customer information and is a convenience for patrons. There are even options to host the service in-house, or allow it to be hosted by a recreation program service provider on the Internet. Software costs, trends in computer use by patrons, banking fees are all considerations when contemplating this strategy.

The IT Business and Planning Team

Teams are increasingly being used to plan IT functions. The success of this approach depends on whether top management supports the use of teams to solve business problems. One aspect of team is the notion of sacrificing personal objectives to achieve team goals. The planning team must have an agenda that improves the agency bottom line or service production. In a park and recreation organization, the manager and chief financial officer (CFO) must be ex-officio members of the team. They provide the reality of the political and financial environment of an organization and they are the biggest stakeholders, since they will assume the biggest risk.

Another member of the team should be an IT person who is familiar with the park and recreation industry. Beyond that, the team should include members of senior management from each of the operational areas, a person versed in project management, a skilled and respected administrative assistant, and field supervisors who understand the basic work-flow processes (see Exhibit 14.16).

Once the team is assembled, specialists and technicians can occasionally be used to bring a new perspective, add expertise, or complete a specific task for the team. The director and CFO are not required to be present at every meeting. The goal is to create a framework for making IT decisions. This team should develop standards and policies for the organization, such as:

- standard hardware configuration (to reduce complexity of maintenance);
- standard software configuration (to reduce complexity of training);
- standard operating system/platform (to reduce complexity of training);
- standard networking system (to increase accessibility of IT resources);
- justification of purchase form (for planned acquisition);
- equipment policy (to reinforce staff on the purpose of computer use);
- access policy (to reinforce security issues);
- disaster recovery plan (to provide specifications for disaster recovery plan); and
- needs assessment (to provide specifications for needs).

They should also:

- review and recommend IT budget;
- recommend an annual work plan (AWP) (IT projects for next fiscal year);
- monitor status of AWP and provide a consolidated report on current IT projects; and
- review the IT processes of other organizations (to stay current).

The planning team is a way to ensure that all areas of an organization have input into the technology plan. This will give the recommendations a higher likelihood of buy-in from staff. Prudent management requires that the IT staff comprehends the leisure service business and the director understands the basics of the IT resource. Since there is a greater emphasis on IT in agencies, directors must learn more about IT in order to make informed decisions.

Exhibit 14.16
Members of the IT Planning Team

Director of park and recreation organization	or (as ex officio members)	chief financial officer
IT person familiar with park and recreation organization		
Members from senior management		
A project manager		
An administrative assistant		
Several field supervisors		
Specialists/technicians as needed		

Costs of a Growing IT Infrastructure

As IT projects are implemented, technology and staff changes cause the project to change. As organizations evolve and become more computer literate, their IT becomes more sophisticated. These incremental upgrades also bring additional costs.

For the *strategic system* to operate at a high level of reliability and to provide information services to customers and staff, it requires:

- funds for needs analysis and design;
- purchase and implementation;
- training (initial and on-going);
- daily operations (staff, supplies, materials, backup, etc.); and
- software and hardware maintenance contracts.

Connectivity, the ability to access information resources within given response times regardless of location, requires:

- hardware upgrades (additional hardware);
- special wiring;
- special capabilities (high speed data links, additional phone lines); and
- additional budget to cover costs.

The *administrative process* must have a certain level of standardization in order to be efficient. This requires:

- standard forms (from data entry to requests for refund);
- system documentation (detailing the system databases); and
- staff knowledge of procedures and training.

Management must include a staff with knowledge of the park and recreation business and information services and be able to:

- negotiate contracts with system vendors or city/organization IT department;
- plan for future system modifications due to changes (organization policy, business developments, customer trends, computer industry advancements, etc.);
- manage users (security access);
- provide special reports and respond to information requests; and
- enforce conformity or notify proper authorities of policy noncompliance.

Professional and Staff Development

All jobs within a park and recreation organization are affected by the management of information. According to Nobel Laureate Herbert Simon, having information stored in one's memory is no longer the definition of the verb *to know* (Simon, 1969). Instead, having access to information and knowing how to use that information has now become the new definition of *to know*. Everything from the way we work or play, to the way we manage the ebb and flow of our daily lives is being changed drastically, and at warp speed, by information technologies. More Americans than ever before of employment age are exposed to and comfortable with a host of technology tools, as noted in the Pew Internet and American Life Project, April 2006 Survey (Horrigan, 2007).

Yet, continuing to train CEOs and their boards in recreation, park, and leisure organizations on the value of information technology remains an ever-present requirement. Even in the business world, the training

Exhibit 14.17
Assets: Information Appliances

Technology	Percent of all Americans who have specific technology
Cell phone	73 percent
Desktop computer	68 percent
Digital camera	55 percent
Video camera	43 percent
Laptop computer	30 percent
iPod or other MP3 player	20 percent
Webcam	13 percent
Blackberry, Palm Pilot, or other personal digital assistant	11 percent

Source: Pew Internet & American Life Project April 2006 Survey. N = 4,001. Margin of error is ±2 percent. See page 2, retrieved from http://wwww.pewinternet.org/pdfs/PIP_ICT_Typology.pdf

of executives continues to represent an impediment to efficient information systems. Ninety-five information managers were surveyed by Computerworld Information Management group of Framingham MA as to "how difficult it would be to persuade top management to approve network computers for some departments?" The responses were as follows:

- not very difficult—19 percent;
- moderately difficult—34 percent; and
- extremely difficult—47 percent.

In many cases; an even greater change is taking place—a culture change from the manager as a non-user of technology who relies on others to assemble information, to the manager becoming a user, collector, and interpreter of the information through graphs and spreadsheets that personally created. Today's manager is an integral part of the information culture, as a player, as a mentor, and even as a cheerleader. The culture change requires the recreation, park and leisure manager to move the management information systems from a paper-pencil process to a technology platform.

Information Skills

Managing information resources will require new and enhanced skills for professionals. Current management techniques (activity-based costing, contract management, brokering services, pay-for-performance, customer service measures, etc.) are designed to capture, analyze, and report information about specific organization functions. For each of the basic information functions, there is a corresponding information skill that staff must have. All park and recreation professionals should be adept at the following basic skills:

Exhibit 14.18
Paradigm Shift Related to Information Control

From		*To*
Manager as a non-user	→	Manager as user
Collecting data	→	Managing information
Secretaries/clerks as typists	→	Communicators & database managers
Computers as typewriters	→	Keys to global information
MIS as section/department	→	MIS as an agency strategy
Computer training as a luxury	→	Computer competence as necessity
Information protecting	→	Information sharing

Source: Adapted from Young, 1994.

Exhibit 14.19
Training Materials Study

Traningmag.com 2003 Industry Report
This year marks only the fourth time in 22 years that the total amount of dollars spent for training by U.S. organizations has dropped, and it is the first time since 1982. Of the $51.3 billion that companies do plan to spend this year, the most noticeable differences are:

Off-the-shelf materials	down 21 percent
Other expenditures	down 31 percent
Seminars/conferences	down 9 percent
Training staff salaries	down 5 percent
Custom materials	up 8 percent

- keyboarding (typing skills);
- basic computer operation (having a comfort level with technology);
- application training (learning to use software, e.g., word processing);
- data management standards (knowing how to name files and where to store them);
- finding information (locating information sources and accessing data); and
- using information (creating reports, making decisions, managing resources, etc.).

In some cases, the use of Intranet-based and Internet-based training offers a means to reduce training costs by:

- eliminating the cost of travel associated with sending employees to training workshops;
- reducing the cost of sending training materials via print or videotapes on a weekly or monthly basis;
- reducing the costs associated with shipping several hundred training videocassettes to employees every week; and
- conducting training at the site where the employee works, (using audio conferencing, PC-based data sharing, telephony, and video and audio conferencing) means the employee does not have to leave work or disrupt his or her schedule.

The training can be made more consistent, standard, and more productive; it can be offered in a less-pressured situation. The savings for the park and recreation organizations can be as much as $1,500 per employee, if the employees are receptive to the medium.

For the most part, today's Generation Y/Millennials—adults born between 1978 and 1990—and the Generation Z—learners born after 1990—are viewed as "digital natives" due to a lifetime of exposure to computers, cell phones, the Internet, podcasts, wikis and blogs, instant messaging (IM), short message service (SMS), video games, and a host of other technologies. These "digital natives" often see the use of technology-based training and distance education courses—with their various multi-media components and multiple techno-tools—as a more enticing and less stressful learning environment due to their prior exposure to the technologies (Sherry & Morse, 1995). Meanwhile, the Silent Generation ("digital aliens" born between 1925–1945), the Baby Boomers ("digital immigrants" born between 1946–1964), and the Generation Xers ("digital adaptives" born between 1965–1979), may see the same course and learning experience with high fear and stress due to the lack of exposure to technology in their developmental years.

> A human being should be able to change a diaper, plan an invasion, butcher a hog, conn a ship, design a building, write a sonnet, balance accounts, build a wall, set a bone, comfort the dying, take orders, give orders, cooperate, act alone, solve equations, analyze a new problem, pitch manure, program a computer, cook a tasty meal, fight efficiently, die gallantly. Specialization is for insects. (Robert Heinlein, as cited in Wang, 1994)

Other training-related savings can be realized in both time and money when policy or legislative updates, facility information, and various announcements are updated each quarter and either placed on a CD-ROM, DVD, or a departmental home page (with or without password protection).

The current multimedia training budgets in corporate America is also expected to go from $10,000 to $6 million with about half of the companies spending at or below $100,000. If the reasons given by corporate America as to why multi-media training is so attractive, then recreation and park agencies may be enticed to join the trend. See Exhibit 14.20.

Scullard and Sugerman (2009) surveyed 5,034 recent training participants to see which training

Exhibit 14.20
Top Reasons Companies Are Using Multi-media Based Training

Question to the reader: Have the reasons altered over time?

Cost effectiveness	40 percent
Just-in time accessibility	26 percent
Efficient/effective	16 percent
Reaches a broad audience	15 percent
Consistency of training	14 percent
Less interruption/interference	13 percent
Less travel	19 percent
Interactive/entertaining	10 percent
Increased retention	9 percent
Condensed program length	8 percent

Source: Computerworld, September 15, 1997.

methods had the greatest impact on their enjoyment and possible transfer of training for employees. Their research revealed the following three training methods: the effective use of small group discussion, role play, and PowerPoint. Research by a host of other authors confirms their findings—when training is enjoyable, the participants are less likely to "zone out" and more likely to apply the learning in their workplace.

The participants in this study said that *discussion groups* were not used in their last training (43 percent of those surveyed responded this way); *role playing* was not used in their last training to make abstract knowledge concrete (23 percent of those responding); role playing was indicated as adding value of at least 25 percent by those surveyed; and the inclusion of *PowerPoint presentations* increased learner enjoyment by 25 percent and made it easier for people to follow along, stay focused, and employ a message or image that related to the topic.

All three of these methods are adaptable to a technology-rich environment, through a host of technology-enhanced learning platforms. Regardless of the training methods used, recreation and park professionals must remain mindful that not all staff members working in leisure-serving agencies are comfortable with the changing technologies. Technophobia is an issue that must be continuously addressed in recreation and park agencies (Index. *Computerworld, v. 3*, 1997, p. 100). For the digital aliens, the technology- based training can be a challenging environment. For many learners of the Silent Generation, technophobia remains a real issue, despite successes with SeniorNet and WebTV (Adler, 2006).

But based on Pew research (Horrigan, 2007b), different ethnic groups are increasing their comfort level with the handheld technologies. Over half of English-speaking Hispanics use their cell phone to send or receive data, and over 84 percent of them have cell phones compared to white Americans (74 percent) and black Americans (71 percent). Is it not feasible to reach either of these racial groups through employment training modules designed for podcasts, V CAST, and text-based tutorials for delivery on phones and other PDA devices?

Generally, individuals with higher educational skills are less apprehensive about entering the technological world. Unfortunately, many employees in the recreation, park, and leisure service agencies in service area positions such as landscaping, maintenance, and related areas, lack both the confidence and the competence to embrace this brave new world. For these individuals, specialized training is needed to not only address the technology skills, but in some cases, to address the literacy needs of the staff members.

Training

Training and re-training staff is an essential component for effective use of IT. Multimedia-based training is considered most effective. Here are some training tips for managers (Tayler, 2009; Maglitta, 1997).

Talk to your IT department.

- IT can determine the most efficient way to deliver the training with existing equipment and software than sending people off to training.
- IT can but make sure that the systems and equipment you currently have can do the job.
- IT can help you to prevent viruses and malware from getting into your network.

Choose the right medium.

- IT can help determine what works most efficiently.
- IT can decide what medium works best to meet the training objectives or how it can most efficiently be modified.
- If training requires use of technology or software only available through vendors, then build training into the purchasing process with vendors serving as tutors or train-the-trainers.
- Vendors may have a more in-depth knowledge of the technology and reduce the time for the manager and staff to implement the technology.

Feel the flexibility.

- Tailor the multimedia to meet the needs of the individual learner.
- Determine if pre-tests or assessments or post-tests or assessments would serve your agency in the future.

Make your multimedia interactive.

- Use authoring tools that attempt to make the multimedia as interactive as possible and encourage "learning by doing."
- Use multimedia that is as realistic and involving as possible—if material is more suited to deliver by paper, then multimedia may not be appropriate.

Grab your audience's attention.

- First, you must determine who the audience is—your staff? the public you serve? administrators that support your organization?
- Be aware that not all viewers of your multimedia have the same level of sophistication in using technology and multimedia—provide varying levels of interaction for the varied levels of your audiences.
- Be aware that the richer the learning experience, the more likely you will engage your viewing audience.

Use carrot and stick approach.

- Let your viewers know what value the multimedia training will be to them.
- Let viewers know what the negatives may be if they do not get the training being provided.

Aim for blended learning.

- Match the medium with the subject.
- Try to have a human tutor to address questions or concerns if the multimedia training is not successful.
- Make sure that the viewers get their questions answered-through a virtual classroom, via frequently asked questions (FAQs), through person-to-person alternative sessions.

Remember people have different learning styles.

- Structure the multimedia to accommodate the various audiences: (http://www.learning-styles-online.com/inventory/questions.asp or http://www.ndt-ed.org/TeachingResources/ClassroomTips/Learning_Styles.htm or http://www.ldpride.net/learningstyles.MI.htm).
- Use classrooms (virtual or otherwise) for coaching, interacting, and as a laboratory for discussing "soft skills."

Manage the learning.

- Train on company time; this offers a better incentive for employees to be selected for training and provides the manager better control over the content of the training and the attendance.
- Use a learning management system to maintain information on how successful the multimedia is.
- Access how the training is being used to meet local needs.

Model, pilot, test.

- Don't neglect pilot testing your multimedia before you implement it on a full scale; refining the system early is less costly than full scale implementation that may not meet your organization's needs.
- Make sure you pilot test with a variety of audiences and feed the information back into the re-design phase of your multimedia training.

The recreation and park managers of the future will be avid users, players, and directors in the ever-changing information technology landscape.

Resources

Adler, R. (2006). *Older Americans, broadband and the future of the net*. Retrieved August 5, 2006, from http://www.seniornet.org/research/SeniorNetNNPaper06-606.pdf

Boone, L. E. (1992). *Quotable business: Over 2,800 funny, irreverent, and insightful quotations about corporate life.* New York: Random House.

Birkland, T. A. (1997). *After disaster: Agenda setting, public Policy, and focusing events*. Washington, DC: Georgetown University Press.

Bosworth, B. (1996, November). *What the surveys tell us about use and information technology in higher education* Paper presented at the Thirteenth International Conference on Technology and Education, Proceedings I. Grand Prairie, TX: ICTE, Inc.

Bryan, V. (1998). Technology & education: Leadership issues. *School Administration: Knowledge, Constructs and Theory.* Dubuque, IA: Kendall/Hunt Publishing Company. URL: http://www.adulteducation.fau.edu/electronic/text/edlead1.htm

Bullock, J. A., et al. (2005). *Introduction to homeland security.* Boston: Elsevier Butterworth-Heinemann.

Catlett, L. (1995). Technology gives us the ability to 'hyper learn'. *Convene, X*, *10*(6).

Computer Law Association. (1996). *The internet and business: A lawyer's guide to the emerging legal issues.* The Computer Law Association.

Computerworld Security (2004). Survey shows security improvements in private sector. Retrieved on June 8, 2009, from http://www.computerworld.com/printthis/2004/0,4814,90852,00.html

Diebold, J. (1985). *Managing information: The challenge and the opportunity.* New York: American Management Association (AMACOM).

Editorial (1997, September 15). The top reasons companies are using multi-media based training. *Computerworld, v.31*, no.37, p. 42.

Environmental Systems Research Institute, Inc. (2008). *What is a GIS?* Retrieved December 21, 2008, from http://www.esri.com/base/gis/abtgis/what_gis.html http://www.esri.com/industries/k-12/education/what_is.html [See also http://www.esri.com/library/brochures/pdfs/gis-sols-for-business.pdf]

Frauenheim, E. (2003). *Survey sees tech divide on data disasters*. Retrieved October 8, 2003 from CNET News.com at http://news.com.com/2100-1009_3-1025121.html?tag=fd_top. Retrieved also March 12, 2009 from http://news.zdnet.com/2100-1009_22-130364.html.

Fugimoto, E. & Morrison, M. S. (1997). A technology high school with business in mind. *T H E Journal*. Retrieved October, 1997, from http://findarticles.com/p/articles/mi_hb5022/is_199710/ai_n18219903/?tag=content;col1.

Greenberger, M. (1971). Computers, communication, and the public interest, Baltimore: Johns Hopkins.

Gross, R. (1977). *The lifelong learner*. New York: Simon and Schuster.

Hill, J. (1996). Considerations in the use of computer technology as an educational tool. *Schole: A Journal of Leisure Studies and Recreation Education, 11*, 133–141

Horrigan, J. B. (2007a). *A typology of information and communication technology users.* Washington, D.C.: Pew Internet & American Life Project. Retrieved May 5, 2008, from http://wwww.pewinternet.org/pdfs/PIP_ICT_Typology.pdf.

Horrigan, J. B. (2007b). Data memo: Mobile access to data and information, March 2008. Washington, DC: Pew Internet & American Life Project. Retrieved May 5, 2008, from http://wwww.pewinternet.org/pdfs/PIP_Mobile.Data.Access.pdf

International City/County Management Association (1998). The use of technology applications in local government. Washington, DC: Author.

International City/County Management Association (1998). Telecommunication strategies for local governments. Washington, DC: Author.

International City/County Management Association (1998). Cable network technology: A primer for local officials. Washington, DC: Author.

International City/County Management Association (1998). Long-range information technology plans: Strategies for the future. Washington, DC: Author.

Internet World Stats: Usage and Population Statistics. (2003, August) Nielsen/NetRatings Internet usage statistics. Retrieved September 12, 2004, from http://www.internetworldstats.com/am/us.htm

Internet World Stats: Usage and Population Statistics. (2008, June.) Nielsen/NetRatings Internet usage statistics. Retrieved December 12, 2008, from http://www.internetworldstats.com/am/us.htm

Kettl, D. F. (2004). *System under stress: Homeland security and American politics.* Washington, DC: CQ Press.

King, J. (1997, May 19). Teaching over the net. Corporate strategies. *Computerworld, 31*, (20), 59.

Levine, J., & Baroudi, C. (1994). *The Internet for dummies (2nd ed.).* Foster City, CA: IDG Books Worldwide.

Maglitta, J. E. (1997). Managing Beyond ROI, *Computerworld Online*, Oct. 27, 1997. Retrieved on June 8, 2009, from http://www2.computerworld.com/home/online9697.nsf/All/971027man_roi1

Mims, Julian L. III. (1996). Records management: A practical guide for cities and counties. Washington, DC: International City/County Management Association.

Morrrison, M. S., & Fujimoto, E. T. (1997). A technology high school with business in mind. *Technological Horizons in Education, 24*, (3), 50–52.

Nicholson, William C. (eds.) (2005). *Homeland security law and policy.* Springfield, IL: Charles C. Thomas.

O'Looney, John. (1997). *Beyond maps: GIS and decision making in local government.* Washington, DC: International City/County Management Association.

Sandlin, Roscoe. (1996). *Manager's guide to purchasing an information system.* Washington, DC: International City/County Management Association.

Scullard, M. and Sugerman, J. (2009). Everything DiSC pulse: The method makes the difference. Retrieved January 12, 2009, from http://www.trainingmag.com/msg/content_display/publications/e3i42c15b7daee64da3a79e00274e4dbc58.

Sherry, L., & Morse, R. (1995). An assessment of training needs in the use of distance education for instruction. *International Journal of Educational Telecommunications, 1*(1), 5–22. Retrieved November 15, 2008, from http://carbon.cudenver.edu/~lsherry/pubs/needs/index.html

Simon, H. (1969). Designing organizations for an information-rich world. Retrieved March 18, 2009, from http://diva.library.cmu.edu/webapp/simon/item.jsp?q=/box00055/fld04178/bdl0002/doc0001/

Sylves, R.T. (n.d.). Disaster policy and management in an era of homeland security. Retrieved June 8, 2009 from http://training.fema.gov/EMIWEB/edu/docs/EMT/Chapterpercent20-percent20Disasterpercent20Policypercent20andpercent20Managementpercent20inpercent20anpercent20Erapercent20ofpercent20HS.doc

Tayler, A. (2009). *Multimedia training: Top 10 tips for managers*. Retrieved March 28, 2009, from http://www.rossiterandco.com/multimedia-training-tips.htm

Tierney, K. J., Lindell, M K., & Perry, R. W. (2001). *Facing the unexpected: Disaster preparedness and response in the United States*. Washington, DC: Joseph Henry.

Wang, C. B. (1994). *Techno Vision: The executive's survival guide to understanding & managing information technology.* New York: McGraw Hill.

Withrow, F. B. (1997, June). Technology in education and the next twenty-five years. *Technological Horizons in Education, 24*(11), 59–61.

Young, A. L. (1994, September). Beating the shell game: Exploring the information maze, your department. Paper presented at the Local Government Information Managers Retreat. Indianapolis, IA.

(2000–2003). Retrieved October 5, 2003 from Search networking.com Web site: http://searchnetworking.techtarget.com/sDefinition

(2001) Worldwide ecommerce growth. Retrieved June 39, 2004 from Global Reach Website: http://glreach.com/eng/ed/art/2004.ecommerce.php3

(2003). Detailed domain counts and internet statistic. Retrieved June 2004 from WhoIs Website: http://www.whois.sc/internet-statistics/

(2003). Microsoft security development center. Retrieved September 17, 2003 from the Microsoft Security Developer Center Web site: http://msdn.microsoft.com/security/

(2003). Retrieved on September 19, 2003 from the White House, Homeland Security Web site at http://www.whitehouse.gov/homeland/21st-technology.html

(2003). *What you should know*. Retrieved on September 17, 2003 from the Microsoft, Security and Privacy Web site: http://www.microsoft.com/security/default.mspx

3 ways to help ensure your system is protected. (2003). Retrieved June 29, 2004, from http://www.microsoft.com/security/guidance/default.mspx.

Authors, Consultants, and Contributors

Dr. Valerie C. Bryan is professor in Educational Leadership in Adult Education at Florida Atlantic University. She has received a variety of awards and other recognitions, including The Outstanding Faculty, 2009; Educational Leadership's Graduate Mentor Award, 2009; and Educational Leadership's Distinguished Teacher of the Year, 2009. She has been President of National Fitness Coalition; President of North Carolina Recreation and Park Society; and State President of Delta Kappa Gamma. She served as a faculty member at University of North Carolina in the Recreation and Park Management Department for 10 years and at the University of West Florida. Valerie is active in the integration of technology in practice and in her research/grant-writing for numerous populations including park and recreation agencies.

Donna Goldstein has been in the computer and GIS industry for over 25 years. As the current GIS Supervisor for Palm Beach County Planning, Zoning, and Building, she is involved in many community projects that involve GIS and other technology applications. As the lead in the GIS countywide community revitalization effort, she coordinated with county departments to create GIS layers, associate necessary data, and perform analysis. The results of the GIS analysis provided criteria to restore 17 blighted communities by improving infrastructure and developing parks. In addition, she installed and configured the GIS system for other departments. She performed a crime analysis comparison depicting one community's crimes before and after the community policing unit was deployed. As a cost saving measure for taxpayers she also secured a contract with PRIDE to develop the county's GIS zoning layer. Her work has been showcased in several publications and on YouTube at http://www.youtube.com/watch?v=_S0DU6ROpB4.

Layne Young is a long-time contributor to the efficient operation of the parks and recreation business and that of the NRPA congresses. He is currently the Business Relationship Manager with the Indianapolis/Marion County Information Services Agency. He works to provide information technology services to parks and recreation, courts, probation, and community corrections. For the past four years, he has been an instructor for Indiana University, Bloomington's School of Health, Physical Education, Recreation teaching a required course on Computers in Parks, Recreation, Sports and Tourism.

Previous Author

Karen Maiorano, software solutions trainer, practitioner for the second edition.

Contributors

For their review and suggestions, appreciation is extended to:

Judy Weiss, special project manager, Community Services Department, Scottsdale AZ
Dr. Daniel Stynes, Michigan State University
Dr. Judy Brookhiser, Murray State University
Dr. Marilyn Jensen, California State University, Long Beach
Dan Sharpless, Indiana University