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TRANSFORMING INFORMATION SERVICES: NEW ROLES, NEW STRATEGIES

The information technology services (ITS) department has the potential to increase the efficiency of the whole government. To do this, ITS must be a facilitator and a resource manager.

This report describes today's ITS department at the center of local government—interacting with all departments in a collaborative way. Successful ITS managers understand and work toward the mission and business of government. Their employees are well-trained, flexible, and possess the ability to integrate people and the new technologies. Hiring and staffing decisions for ITS are made with the goals of the municipality in mind; ITS leadership need not be drawn only from the ranks of IT professionals.

The report provides tips for recruiting and retaining in-demand IT professionals. Costs and benefits of outsourcing are discussed. Up-to-date job descriptions, advertisements, staffing diagrams, and appendixes provide practical examples of how to meld expertise in technology with the mission of local government.

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Transforming Information Services: New Roles, New Strategies

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Transforming Information Services: New Roles, New Strategies

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As a department of government, information technology services (ITS) is reaching a critical turning point in its development. Information technology (IT) has tremendous potential to increase efficiency, but many local governments invest large sums of money without realizing the benefits that this technology can bring. In many cases, factors within the organization and the management of technology resources are to blame, not the technology itself.

The missing ingredient is often leadership at the management level. ITS should be able to provide leadership in challenging old assumptions about the capture and distribution of information, testing traditional procedures and practices against current and future needs. ITS must explore and recommend alternative technologies for capturing data at the sources and for dissemination in traditional as well as nontraditional ways.

The ITS manager must be able to answer business questions posed by councils, commissioners, and supervisors: What makes a proposed technology acquisition a good investment? What is the 10-year average annual cost for capital and noncapital expenditures for the change proposed? What specific goals are to be achieved? What is the expected timetable for project completion and benefit gained (return on investment)? What are the associated risks?

Good ITS management will mean that the local government can

- Lower costs for data collection, capture, storage, program development, and processing
- Improve service to citizens and taxpayers
- Produce planning and economic information quickly and accurately
- Create network architectures that link the local government with private business and other organizations
- Provide value-added information to citizens and businesses
- Control budgets and tax growth.

Information technology plays a central role in meeting local government objectives. Information technology provides the platform for efficient and effective service. Well-designed and managed systems help government employees provide information, maintain records, and collect fees. The impact of information technology is evident to citizens and taxpayers who experience firsthand the efficient valuation of property; timely information on real property comparables; accurate tax and utility bills; one-stop locations for paying bills or fees; fast and effective responses to inquiries and requests for service; accurate and timely dispatching of public safety vehicles; and accurate recording of deeds and vital records with easy access later.

Technology can also help local governments cope with the growing shortage of trained and competent professionals because some tasks can be carried out automatically. For example, computer systems in water operations turn pumps off and on; invoice scanners read name, address, and billing information; payment systems transfer funds from a customer's checking account into the utility account; and payroll systems automatically deposit payroll checks into employees' accounts. Information technology is the one resource that may be able to increase productivity and enhance and streamline services while it lowers the cost of each transaction.

But to realize its potential, ITS must move from data processing to information systems and support, and from the role of gatekeeper and monitor to the role of facilitator and resource manager.

FROM DATA PROCESSING TO INFORMATION SYSTEMS AND SUPPORT

The past decade has put the tools of technology into the hands of nontechnical department managers, end users, and customers. These users—in the finance department, the records management offices, the public safety department, the public works department—want the kind of transparency and access to data and reports, and access to the Internet, that they get at home on their personal computers. The solution to customer service in this new environment lies in designing and managing information systems (IS) that reflect current standards for effective computing—including hardware infrastructure, operating systems, and database structures. ITS must shift from a data processing model, in which technicians control all access to centralized systems, to an information systems and support model, in which the end user has access to and control over content entry and reporting.

Strategic information technology objectives: De Pere, Wisconsin

The city's information technology office will refocus its duties on brokering many of the IT resources for the city's various business units and facilitating business-driven demands, rather than being the direct internal provider of IT services. The city's IT office will continue to provide network and communication infrastructure services.

The IT office will facilitate:

- The reengineering of city business processes so that information technology will become ingrained in the fabric of city business
- City electronic service/information availability at a single point of interaction, 24 hours a day
- The integration of voice, video, and data content into a central organized system
- The use of a single network operating system and suite of applications
- The migration to thin client technology
- The outsourcing of all midrange hardware support and services
- A user training and development environment.

The IT office will focus on the following six objectives over the next 18 months:

- Develop and implement organizational information technology standards for procurement
- Integrate and centralize data from city business units
- Automate billing and payment (transaction) processing
- Enable real-time information lookup for business units
- Enable real-time information lookup for customers/citizens
- Geographic information systems utilization.

Tension is inherent in technology management. Often in local government demands for action are immediate. But these crises stand in contrast to the need for careful planning and thoughtful integration. A local government should develop a strategic plan for the acquisition and management of technology, a plan that increasingly links application systems to meet the strategic needs of the organization without great additional investment in ITS.

A STRATEGIC PLAN FOR ITS

The goal of strategic ITS planning is to provide tools for effective management that are as current after ten years as they are after three. The plan has to work from the top down and from the bottom up simultaneously. The top-down design of local and wide area networks (WANs) effectively connects all buildings and offices, streamlining communication between all units of the government. From the bottom up, standards and protocols allow users in many different functional areas to collect and share data with core applications such as finance, a geographic information system (GIS), or a tax appraisal system.

The local government should strive to build an integrated community of networks. Each office or division maintains its own network or data set but is connected through the communications system with other agencies and offices and even other sites. A good example is the functional integration of a justice system. Warrants are issued, a person is arrested and charged, he or she is arraigned, the court docket is set, district attorneys and public defenders are mobilized, and cases are developed. In an integrated community of networks, people in various offices or units can enter data, view schedules, and access common case information efficiently with little confusion.

The ultimate objective of a strategic plan may be Web-based electronic government, a system that allows anyone in the local government (employee, elected official, or manager) as well as all users of government data (taxpayers, lawyers, realtors, and others) to access public records. The challenge in meeting this objective is the coordination of the incompatible systems that exist in most local governments. The strategic plan must support the development of cross-functional systems.

In most local governments, a strategic plan for ITS will address information technology standards, data access, user training, and ongoing operations and support. As local governments move toward e-government, they will also have to plan for development and maintenance of online applications, revenue generation policies, citizen access, publicity, and evaluation. In fact, planning for IT never stops.

Customer service must be a foremost consideration. The real success of managing information technology is serving the needs of customers with three criteria in mind:

- **Timeliness, accuracy, and usefulness**—ITS and customers must agree on specific, meaningful, and easily measurable benchmarks for determining whether information provided is timely, accurate, and useful
- **Availability**—customers should be able to access information 24 hours a day, 7 days a week
- **Cost-effectiveness**—the cost of technology must be offset by increased value, increased revenues, or decreased costs. The indexes for this measure are time, human resources, and materials.

Customer service in the ITS context refers not only to day-to-day responsiveness but to the close working relationship that must develop if ITS is to help the functional departments of local government use technology to improve productivity and decrease costs. Customer service as a strategic concept demands that ITS staff make the transition from gatekeeping to facilitating and that users become far more technically self-sufficient.

An example of specific objectives contained in one city's strategic information technology plan is provided in the sidebar.

A COMPREHENSIVE MODEL FOR ITS

As local governments adopt more extensive technologies and these technologies continue to converge, the ITS department extends its responsibilities and capacity to include enterprise-wide development, management, operation, security, and maintenance of data centers, WAN, local area networks (LANs), and current and future telecommunication services and support.

ITS Responsibilities

In its new, comprehensive information systems and support role, the ITS department will have the following specific responsibilities:

- Enable and encourage self-sufficiency among users of technology
- Provide a robust network (wide area/metropolitan/campus network) that has enough capacity to link and provide communication for LANs and operational networks for all constituencies to each other and to external networks
- Integrate wireless and wired technologies
- Operate and oversee the government's data centers and enterprise servers
- Establish bilateral service-level agreements with customers and mechanisms to measure performance
- Develop standards for network connectivity, security, and management
- Operate and administer one, and only one, systemwide post office
- Participate on a technology committee and harness the potential that technology-savvy users within the local government staff have to offer
- Evolve and manage the WAN cable plant to ensure future capacity, eliminate duplication of networks, maximize the use of financial and bandwidth resources, and provide for operational redundancy
- Ensure the security of networks and data
- Coordinate and manage technology-related outsourcers
- Oversee and manage the government's data assets
- Plan subnetworks and provide implementation review and assistance
- Define and oversee network segmentation
- Manage the GIS
- Facilitate coordination of local government use of Web technologies
- Provide telephone administration and coordination
- Provide telecommunication services and support
- Develop, maintain, and publish documentation on the information technology infrastructure for its constituents' use.

ITS Budget

Under the comprehensive model, the following costs should be allocated to the ITS budget:

- ITS staff
- Enterprise network servers, equipment, and common software (e.g., Web development, e-mail)
- Network management tools
- Internet and intranet servers
- Database hardware, software, maintenance, and tools
- Data center equipment, staffing, and operations.

The costs of outsourcing particular projects or support services are most appropriately assigned to user departments. See the section on outsourcing (on page 10) for a discussion of outsourcing and budgeting.

ITS Authority

Whether ITS is a separate department or simply one staff person who reports to a member of the management team, it should be empowered to:

- Standardize end-user technology to conform to municipal policies; this includes denying departments the use of software or systems that may interfere with compliant operation (a well-defined strategic plan will not only articulate the decision-

Data processing and information technology services compared

Old Style Data Processing	New Style Information Technology Services
Command-and-control DP management	Collaborative ITS management
System procurement owned by DP	System procurement owned by department
Remained in the back office	Out front in departments
Remote communications (memos)	Communicative help desk
Operationally oriented	Mission oriented
All technical expertise in DP	Technical expertise organization-wide
Application programmers in DP	Business analysts in ITS
System programmers in DP	Toolsmiths in ITS
Home-grown applications	Vendor-provided applications
Internal application maintenance	Vendor-provided application maintenance
Systems analysts in DP	Systems analysts in departments
DP controls access to all data	User is steward of its data
Operator role	System administrator
Mysterious and complicated	Transparent and simple
Closed standards	Open standards
User request reports	User queries and reports
Unmineable data assets	Databases and datamarts
Internal training	External training

making boundaries of each interest group but also provide a forum for dispute resolution)

- Develop policies and procedures that enable end users to request support services
- Define and develop network standards that encompass hardware, software, and protocols
- Define and develop infrastructure standards, including standards for physical connectivity
- Define and develop LAN standards, including network operating systems, security, management tools, and client operating systems
- Set minimum configuration standards for client hardware
- Define and develop data center operating procedures, policies, and standards
- Define database schema, structure, and relationships
- Specify and manage the installation of fiber.

ITS Organization under the Comprehensive Model

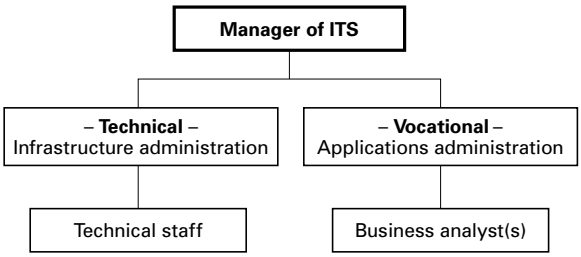
One result of the shift from the data processing model to the information systems and support model is that local government ITS will have to get out of the programming business as soon as possible and practical. For example, for financial applications, ITS will need to plan, purchase, and migrate to a turnkey, comprehensive system that includes such workable and well-supported functions as cost accounting, work order processing, billing and collections, and customer service.

In addition, when necessary, ITS may recommend outsourcing of new small applications and small subsystems in programs such as Microsoft Access or other programs that allow for use of standard query or reporting tools such as Crystal Reports. ITS will need to retrain staff to move away from the centralized data processing model to client server applications, office automation applications, LANs, fourth-generation languages, and interoperable systems and databases. ITS will have to redeploy staff to provide users access to management reports, training, and support; and it will have to manage vendors to take care of integration, updates, and application development.

Organizational models vary with the size of the organization. Large municipalities may find it practical to designate staff as either "technical" or "vocational," as shown in the sample organizational chart in Figure 1.

Figure 1 shows ITS with a bifurcated responsibility. The technical side maintains the infrastructure while the applications function assists departments with their vocational needs. Regardless of the sizes of the user departments, complexity of the system, and size of government, each department will designate one of its

Figure 1: ITS Reorganization



staff to "own" the system and champion it. Large departments with multiple applications may find it valuable to have one or more full-time system analysts dedicated to their application programs.

Smaller municipalities are likely to eliminate the formal positions of network administrator and applications administrator and assign these tasks to the few specialists they can afford. The strategy in smaller local governments is simple: effectively manage the networks and keep the system running, and effectively manage key applications such as finance and public safety.

To broaden the view of the ITS within the government and collaborate on information technology priorities and directions, it is highly desirable to have an ITS committee and a GIS users group. A large local government may be able to sustain this more comprehensive organizational structure. In the organizational plan shown in Figure 2, ITS is advised by a Web committee and a GIS users group, and each operational subset is represented on an enterprise technology committee. The issue, as always, is a balance between function and budget. A commitment to a comprehensive strategic technology initiative always has costs.

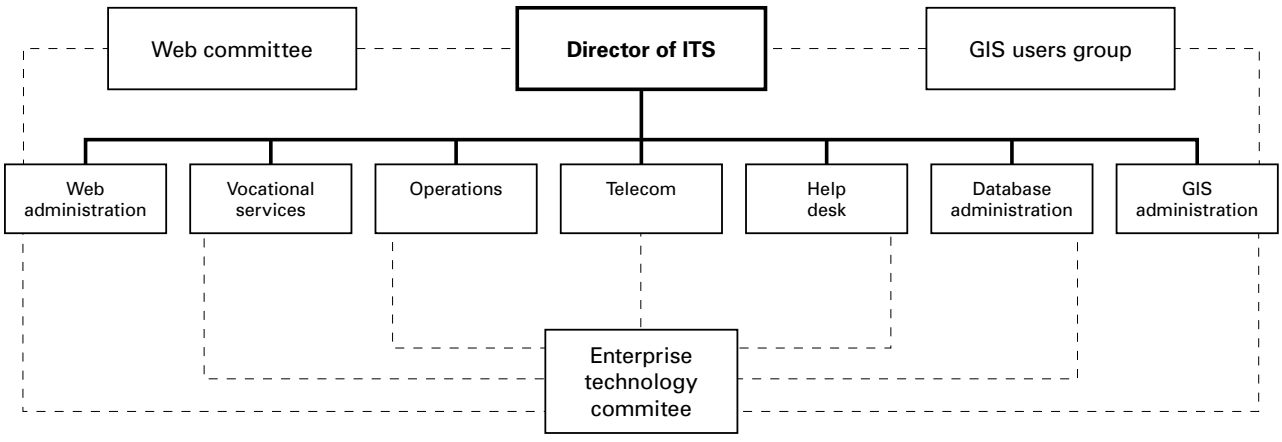
Regardless of the size of the government, ITS should give attention to the following areas:

- Providing ongoing operational support, that is, serving as the primary interface between the various offices to resolve changes to the database and interface with the software vendor
- Maintaining the ITS network in proper working order, to include disk space monitoring, network diagnostics and troubleshooting, network planning, and streamlining system management
- Evaluating new ITS network products and determining their proper use
- Providing hands-on conversion and network integration support and systems training to users of new applications
- Supervising network vendors
- Providing quality control for the design, development, and installation of new database programs
- Providing liaison within each department for computer and communications functions
- Developing an ITS support and management program (see the sidebar on page 6)
- Creating, reviewing, and updating at least annually a comprehensive policies and procedures manual.

STAFFING THE ITS TEAM

Should you have information technology system professionals on your staff? Regardless of size, local governments are free to decide how they wish to provision information technology services. Municipalities with fewer than 100 employees will have a difficult time justifying even a single IT professional. Small municipalities clearly will have fewer user demands, networks to maintain, desktops to manage, and applications to support. A small municipality may

Figure 2: ITS Organization for a Large Local Government



ITS support and management program

Depending on the size and scope of ITS responsibilities, a support and management program should include the following elements:

- Standard guidelines for procurement of hardware and software
- Technical support for end users
- Technical support for government-wide applications such as e-mail
- Criteria for managing disk space, security, and data storage rights
- Training for microcomputer and software application users.

At the department level and in concert with the ITS vocational specialists ITS may be engaged in

- Analysis and design of appropriate office applications
- Approval of forms, data extraction, and data importing.

well choose to outsource all ITS tasks to a vendor, who then acts as the information systems department. Even if the municipality chooses to outsource the ITS function, however, someone in the government will need to be the gatekeeper for technology procurement and technical management.

With an increased focus on customer service, ITS departments need staff with people skills as well as technical skills. The ITS manager must be more administrator than technician, a steward of the government's technology assets that may include specialists, consultants, and outsourcers with expertise in communications, networking, telephony, hardware, software, and training.

It is not unusual to find that the existing information services department is unwilling or unable to adopt the new roles described under the comprehensive model of ITS. Many local government managers, frustrated by a tradition-bound ITS department, may want to make a clean start. However, it is often best to reengineer an existing ITS staff than to replace them or look to outsourcing or privatization for solutions. Long-time employees have considerable institutional knowledge about operations, people, and existing technology.

Before resorting to drastic personnel actions, it is prudent to take an objective look at the issues, needs, and possible solutions from the point of view of current staff members. If some staff members are unable to acquire the necessary skill sets quickly enough or resist or refuse necessary changes, they may have to be redeployed or dismissed.

Defining the Skills Needed

ITS professional staff must have an adequate grounding in technology. As management advocates, they ask and answer critical technical questions:

- Can the present system easily and inexpensively meet the demand?
- Is there sufficient backup for the system's protection?
- Are interfaces with other systems required?
- Is source code available to permit making changes in the future?
- Who will maintain the system?
- Are too many desktop computers being installed without planning and coordinating?
- Are printer speeds adequate for anticipated transaction volumes?
- Is future expansion planned for memory, data storage, and peripherals?

Because finding and hiring ITS staff is such a difficult and demanding job, local governments must carefully define the technical skills they need in-house. Consider the following examples:

- A mid-Atlantic county determined that it needed to augment its ITS staff as it updated and increased its computer applications. Although it was purchasing vendor-developed computer applications, it recruited two people with strong programming skills. Neither new employee stayed long because the skills each possessed were not needed in the vendor-supported environment; as programmers, they wanted to program.
- Another mid-Atlantic jurisdiction adopted a different strategy. As part of its technology plan, this city articulated technical standards common in the contemporary technology marketplace. Included were key standards for its LAN architecture, desktop software, technology architecture, and database systems. Their recruitment focused on individuals knowledgeable of these standards. This labor pool was larger and less expensive than the pool of programmers, and the candidates recruited offered a good fit for both employer and employee.

Whatever the current structure—centralized, distributed, or, most likely, a hybrid of the two—ITS staffing and organizational decisions must be made in the context of the objectives of the government and the strategic plan for information technology.

ITS managers must realistically examine what technology services they are willing to offer and what types of service they cannot afford to offer. For example, because many jurisdictions are moving away from creating applications in-house, the need for programmers is diminishing. The services to be offered will determine the profiles of knowledge, skills, and abilities needed on staff.

Perhaps the best applicant at every level is one who understands and values the "business" of government. This is a tall order for ITS organizations. One strategy for finding this kind of person is to decrease the emphasis on technical support and focus instead on providing vocational services.

Vocational specialists provide collaboration between ITS and subsets of users. For example, in the division of public safety, vocational specialists help integrate the information services operations of the sheriff, jail, public defender, district attorney, court administration, and judges. These specialists work on providing ITS tailored to the department's functional needs. They

- Develop service-level agreements with departments that articulate the expectations of all involved
- Maintain an understanding of each department's "business" and how technology can support it
- Coordinate the technical training and scheduling of courses in collaboration with ITS or some other department (such as human resources) that services the enterprise
- Research and identify potential technology opportunities for the departments
- Guide departments through the technology planning and acquisition processes
- Work with departments to develop information technology tactical and project plans
- Assist departments in the acquisition of technology
- Support and maintain existing (but not future) departmental applications
- Serve on the enterprise technology committee.

Depending on the size of government and the range of services provided by ITS, vocational specialists will either reside in ITS, exist as a separate department, or be employed by user departments. Having vocational specialists in the user departments is especially desirable if self-sufficiency is an explicit goal.

Whether located inside ITS, outside of ITS as a separate entity, or tucked into a user department's organization, vocational specialists, in the role of business analysts, work collaboratively to develop department-specific technology standards, policies, and procedures (while ensuring that department technology adheres to organizational standards, policies, and procedures); arrange for pilot projects within a department; and guide each to develop the technology so that it will be useful across the whole organization. (Appendix C shows an example of how a vocational specialist might be described.)

The ITS Director

Local governments recruiting a new ITS director should consider a pool of talent that includes business or management graduates or graduates from other nontechnical disciplines who, by virtue of their experience and education, have developed an affinity for technology and understand how to apply it.

Within government management ranks (outside ITS), there may be capable, nontechnical managers who understand the business of government and know how to apply technology to achieve operational objectives. MPA graduates bring management, technology, and business concepts that are built-in rather than added on. Specific technical skills and knowledge they lack can be drawn from within the ranks of the technical staff.

Many managers without technical skills hesitate to trust a generalist with ITS oversight responsibilities for fear of alienating the technical staff on which the government depends. These managers' concerns are unfounded, however, because they do not coincide with the most widespread complaints among ITS staff, which are:

- We (the ITS department) do not get the respect from the organization that we deserve
- Customers do not understand us and appreciate what we do
- The technical directions dictated do not allow me to use my expertise and abilities.

These complaints of the ITS staff are basic management issues, not technical issues, and can usually be traced to the leadership and management style of

A vocational emphasis by default

In a Florida county where the ITS department lacked the wherewithal to support technology needs, most departments added staff to support their own technology projects. Each department's focus was on business needs, not on the technology.

This situation has produced some unforeseen advantages. One is that technology has advanced at a far faster pace than it would have under the auspices of ITS. Another is that because the department's focus is on the business rather than the technology, that is also the focus of the hired staff.

The technicians hired look for new technology to solve business problems instead of looking for new jobs to whet a technology appetite. The result is what might be called a vocational, rather than a technical, staff.

The pitfalls of this experience are also evident and instructive. For one, duplicate costs abound. For another, the county finds itself technology rich with few coherent ways to tap the potential of this technology. Third, technology anarchy is rampant: departments own their individual total technology environments and are loath to cede any oversight for the greater good of the county as a whole.

Questions for prospective information technology services director

Imagine asking a prospective information technology services director the following questions.

What is your current director's ability to answer them?

- What are the three things to which you must pay attention in the migration from:
  - Prime hardware to UNIX or NT based hardware?
  - PICK-based application software to more modern software?
- How would you manage such a project? How would you manage the vendor? What are the internal management challenges?
- How would you set up and operate a help desk?
- How would you encourage staff retention?
- What are the advantages and disadvantages of UNIX vs. NT vs. AS400 systems?
- What are your key personnel management principles?
- How might you use existing personnel?
- Are you a hands-on manager? What does this mean?
- When you look into the 10-year crystal ball, what do you see for:
  - Hardware changes?
  - Software changes?
  - Personnel requirements?
- How does a municipality pose different issues for an information systems director who migrates from the private sector?
- Should information systems take charge of telecommunications, copier, and other technology areas?
- How should one proceed with GIS? What steps would you take?
- Are you customer-service driven? What does that mean for the city? How would you know that you have been successful?
- Should a city satisfy most of its support needs by outsourcing or through in-house staff? What are the issues?
- Document scanning—everyone wants it. How would you proceed to acquire and implement it? Who would be first?
- Describe your strategic planning skills. Describe your ability to plan, direct, and organize.
- When it comes to support, how do you handle a difficult user?
- Once the initial project is over, what can we do with the information that is generated?
  - How can we make the information available to the public?
  - Should we charge for it?
  - How do we maintain security?
- How can we use technology to make it easier for "customers" to do business in and with the city?

the ITS director. They diminish when ITS leadership is building relationships and teams rather than a technology monolith.

Candidates from the private sector may have more business acumen and more technical experience across a broader range of technology platforms, but they often find the adjustment to the public sector a challenge because of its different values and modes of service. Anyone being considered for the job of ITS director should be able to answer questions like those in the sidebar on this page. A sample advertisement for an ITS manager is shown in the sidebar on page 9, and an example of a job description can be found in Appendix A.

Large local governments may want to have a separate director to manage vocational or applications responsibilities— departmental hardware and software application acquisition and support that are beyond the duties of ITS and its enterprise infrastructure. A description of such a position is in Appendix B.

Recruitment and Retention of ITS Professionals

Hiring ITS professionals is an ongoing challenge for any local government. It is critical to hire the levels of professional services needed but not to overhire. Great ITS people are those who can see the big picture and realize how technology can empower (not drive) an organization.

It might be better to hire a local person who loves the community and really wants to work for the government than to hire a top-notch outsider who is using the local government as a stepping-stone to his or her next job.

Seasoned ITS professionals are like other employees—the best way to keep them is to maintain an enjoyable work environment with many opportunities and challenges and offer them ongoing training and development. Most people who work for government are not doing so to get rich; more likely they enjoy the hours, local location, security, and predictability.

It is unlikely that government ITS salaries will increase to compete with private industry. The local government should look for graduates of local two- and four-year colleges. Candidates should have a strong service orientation, want to be close to their families, and have rigorous training in specialty areas as well as an aptitude for growth. They must be offered training opportunities and a dependable growth path.

In some metropolitan regions, it is next to impossible for small municipalities to keep ITS staff. Salaries vary dramatically, but some municipalities with budgets of $200 million pay as little as $25,000 to $50,000 for an ITS director who also is the network administrator. The same position in a metropolitan region could be paid $80,000 to $160,000. Top-notch ITS professionals can command more money than the city manager and more than almost any other professional in the government.

As a consequence, keeping and recruiting ITS staff is becoming very difficult for local governments.

It can take two years before new ITS professionals are familiar with the various municipal-specific systems. But after two years, these employees can often move 20 miles and double their salaries. As a result, half the ITS department may be training the other half at any given time.

Several strategies can help the local government address the staffing crisis:

Outsourcing. The local government can procure a turnkey software system from a vendor that specializes in government-specific needs (for example, software for municipal financials, or parks and recreation, or police and fire). It can also outsource specialized services such as WAN, LAN, or fiber-optic installations; office automation training; personal computer maintenance; and hardware and communications maintenance. Outsourcing is often more cost-effective than maintaining a staff of highly trained professionals. In general, procurement of turnkey systems supported by private vendors makes it easier to assure ongoing support of operations in the midst of changing application demands. Outsourcing is considered in detail on page 10.

Consortiums. Many local governments sign intergovernmental agreements with other local governments or public entities, agreeing to share ITS professionals. One city arranged to share it ITS professionals with the county, the school district, the city hospital, a community college, and a local university.

Superusers. Another option is to empower superusers throughout the organization (in the police department, in finance, in parks and recreation, and so on) to operate as first responders. These first responders are the first line of defense for end users having problems with hardware, software, or communications. Many departmental superusers are not fully trained ITS professionals, but through the school of hard knocks they have mastered many of the tasks required to maintain the technologies they are using.

Succession planning. In many local governments, the ITS professionals seem to cluster in three groups: half the staff has been with the local government 25 years or more, a quarter of the staff 15 years or more, and the remainder fewer than 2 years. Often many of the older employees retire at close to the same time. Without succession planning and staggered levels of professionals, an ITS department might be decimated within two or three years. Human resources must carefully track employee longevity and skills to ensure that this does not occur.

Training contracts. If you offer technical training, you may want to attach strings. For example, training a high-end ITS professional to become a network engineer costs $10,000 to $20,000. After this employee is fully trained, has gained some experience, and is certified as a network engineer, the employee can possibly double or triple the government salary elsewhere. It may be prudent to require the employee to sign a contract for a specified number of years of employment in return for the training and a commensurate increase in salary. Under this arrangement, the cost of training is considered conditional and it is taxed as ordinary income to the employee.

MANAGEMENT AND MAINTENANCE OF TECHNOLOGY ASSETS

Labor surrounding the support of a distributed technology base is by far the largest single cost component over the installed life of computing and network assets. The cost of labor and loss of staff productivity when a single desktop is upgraded often exceeds the cost of the upgraded hardware or software.

Quite often a new technology system that starts out as a work-enhancing noncritical office tool evolves into a mission-critical element of the government's operation. Downtime becomes intolerable and must be minimized. In this environment, ITS must concentrate

Sample advertisement for an ITS director

Manager of Information Technology Services

Government seeks a Director of Information Technology Services who can effectively and efficiently manage the information technology resources of the government.

The director must have expertise to manage the migration from a proprietary system to Unix and PC-based local area networks, and must be able to provide and maintain a productive infrastructure of efficient networks with remote access capability.

The director must have a customer service orientation to provide information support and training to the end-user community.

The director must be an innovative manager, an effective leader, possess demonstrable managerial skills, and possess strong analytic and communication skills. Hands-on technical experience may actually be a drawback if it leads the manager to focus on means (technology) rather than the ends (service and operations).

Candidates should have at least a bachelor's degree, preferably a master's degree, from an accredited college or university in computer science, business administration, public administration, engineering, or a related information technology field. In addition, candidates should have at least five (5) years of experience in a managerial capacity, which included responsibility for supervision and training of assistants, project management, and exposure to diversified software and hardware configurations including mainframe, mini, macro, and personal computers and computer networks. Salary $xx,xxx–$xx,xxx. Please send resume by September 30, 2001, to the Administrator, City of XYZ. The government is an EEO/AA employer.

Reducing the cost of computer support

Sixty percent of the cost of information technology over its useful life is labor. Whether the local government outsources the support of technology or handles it in-house, minimizing labor support costs can prove very cost-effective. The largest and most fickle part of the local government's technology portfolio consists of desktop computers, printers, and other user appliances. Each of these appliances has a user (labor) and the equipment demands time-consuming support (once again labor).

It pays to focus on support of these end-user tools, for when one is out of service, at least two people are affected: the department user whose productivity suffers and the ITS technician who must fix the problem. The impact on service and operations is another cost.

Several local governments have developed creative solutions to reduce the cost of user support:

- A southern municipal utility challenged with supporting more than 500 user devices distributed throughout the city spent money to equip its client server technology with software tools that allow diagnosis of problems from the ITS technician's desk. Travel to the physical locations of the computer was reduced by 90 percent and the mean time to repair equipment decreased significantly. The result: shorter outages, higher technician productivity, higher user productivity, and better service.
- A southwestern city implemented a similar tool that allowed ITS personnel to "shadow" users from the help desk. The help desk was able to see exactly what the user saw and did, and was also able to remotely operate the user's computer. Meanwhile, the user could see what the help desk technician did and thus received training and guidance on the spot. The result: higher user productivity, higher help desk productivity, and effective just-in-time user training.
- Another city chose to minimize desktop support by imposing a rigid set of standards concerning the proper placement of city (and user) data and the programs (e.g. word processing, desktop publishing) that could or should not be resident on any desktops computers. When computers (or users) misbehaved, ITS staff completely refreshed the computer's disk to eliminate any nonstandard configurations; this was done over the network and without the need for travel to the desktop site. The result was near total elimination of the need for problem diagnoses, short outage times, and more disciplined and self-sufficient users. But this policy was not without its disadvantages: some users lost work and others wasted time trying to work around problems rather than call for help and risk losing their changes or being discovered.

on reducing disruption in the workplace. Appropriate strategies could include moving inadequate equipment to another spot in the infrastructure where its capacity will be more than adequate.

ITS must also provide proactive maintenance, which minimizes outages due to component failure.

OUTSOURCING

Can private vendors manage ITS functions better than in-house ITS professionals? Governments have tried ITS outsourcing with varying degrees of success, and in the private sector failed attempts to outsource ITS abound. Few vendors are available 24 hours a day, on-site, to service the system or assist and train local government users.

The municipal ITS manager will be a manager of service provider assets. Some of the service providers will be in-house technical staff, but many will be outside special consultants, technical service providers, and software turnkey providers. Some may be units of another government or a department within the manager's own government.

Outsourcing must be viewed from a cost-benefit perspective. Just as leasing equipment is always more costly than purchasing, so is outsourcing. However, there are appropriate reasons to outsource:

- To bring in specialized skills
- To maintain a focus on the business of government rather than the technology
- To reduce costs when full-time support is not needed.

Appropriate tasks to consider for outsourcing include:

- Maintenance of the desktop environment
- Highly technical network support
- Help desk support
- Training
- Workload overflow
- One-time projects
- Internet Web management and management of electronic interfaces.

A local government takes serious risks when it outsources

- Data assets
- Business functions along with the technology (i.e., direct customer service, improving the design and usefulness of the general ledger)
- Application services by way of experimental or innovative application service providers (ASPs) (for example, Internet-based applications and browser-based transactions such as building permits).

These latter two examples are risky because outsource workers tend to be well versed in technology but may be less savvy about the business of government. Keep in mind that reengineering business processes and working with users to design new applications require expertise that can be very valuable for the local government to develop and keep in-house for further evolution of the technology and technology plans.

Finally, keep in mind specific outsourcing considerations:

- Vendors must be carefully managed
- Expectations and deliverables must be clearly defined
- The work must be spread around; it is important not to rely on one vendor
- Vendors face the same problems of recruiting, retaining, and training staff that governments do.

Governments should examine the costs of outsourcing in the context of value. Where is value gained by outsourcing, and where is value gained by keeping functions in-house? Few local governments can afford to invest in the training of highly technical personnel, compete for skills with the private sector, and acquire the comprehensive set of hardware and software tools required to productively diagnose problems. Furthermore, outsourcing addresses one of the fundamental issues that all internal support organizations face: the issue of supply and demand. Outsourcers are ready, willing, and able to satisfy the service demands of all the local government's users—and of course they will charge for each task.

Outsourcing forces managers to attach an actual cost to the level of support the local government wants. Although appropriate to the legacy technology environment, internal service funds to charge back ITS costs to users are no longer useful. Neither ITS nor the departments derive value from this accounting method because it does not address service expectations and limits. In today's technology environment, the internal service fund has been effectively replaced by the total-cost-of-ownership model.

Many costs that were indirect in the legacy era are now accounted for directly and are assigned to a specific department cost center. These direct costs appropriately belong in the department's budget, and it is up to the departments to justify them during the budget process. Outsourcing forces departments to understand, and manage, the total cost of technology ownership. Perhaps its greatest benefit to local government technology management is that it offers a mechanism to keep the government from overcommitting to technology it cannot afford to support.

Two examples will illustrate the pitfalls and the possibilities of outsourcing:

One local government decided it wanted to automate the permit application process by putting it on the Internet. Because it had no expertise in-house and no desire to develop and maintain expertise, it contracted with an Internet ASP to extend these online services to the community. The government quickly learned that:

- ASP personnel were technical wizards but knew nothing about permitting and nothing about the nuances, operational demands, and work flow necessary to support the permitting process
- The existing automated permitting system would be rendered virtually useless
- The ASP's need for access to the government's permitting data presented security and integrity problems.

In another local government, the ITS help desk was deluged by requests for desktop support that would have required at least two additional full-time ITS staff members to handle. Rather than continue the trend of adding staff to meet demand, the county executive pursued a different strategy:

- Outsourcing hardware support to local vendors
- Outsourcing desktop software support to the departments
- Retention of responsibility for the infrastructure in ITS
- Transforming the help desk from a support function to a triage function
- Assigning the costs of the support services to departmental budgets.

The results included an 80 percent reduction in calls to the help desk and greater user satisfaction.

The lesson here is that selective outsourcing used as an asset, and managed well, can help satisfy the voracious and increasing demand of user constituents. The extent of outsourcing is highly dependent on the strategic technology plan, the availability of talent, and the centrality of information technology in the provision of government information services.

DATA AND TELECOMMUNICATION CHALLENGES

The ITS department will soon be expected to serve not only internal departments but also the greater community. To do this, ITS technologists will have to work closely with department information providers. For

example, many building permit systems allow the taxpayer to request a building permit online via a computer, a telephone touch pad, or a voice-activated system. The customer can call 24 hours a day to monitor the progress of the various steps of the approval process. Similarly, water and electric utility customers can enter their meter readings with the same tools. Many utilities are eliminating meter readers and replacing them with meter reading technology linked to cable TV lines, telephone lines, or radio frequencies.

ITS professionals must plan to provide the most versatile technologies available. For example, in many local governments basic ethernet communications may be more than adequate to move text such as letters and memos. But many local governments are already using more robust technology such as optical fiber to transmit GIS data and maps; photos of staff, inmates, and recreation facility users; training videos; and other high-bandwidth material.

ITS managers are discovering that they are the logical providers or arrangers for assessment of telephone bills and operations and for the replacement, upgrading, and reconfiguration of currently deployed voice facilities. Telephony is becoming a networking application, and ITS must be able to look at alternatives for combining voice with data, video, and audio transmission to reduce costs and leverage the government's network assets and still maintain quality and functionality.

Connectivity and access to data have become prerequisites for both centralized and distributed technology within the local government organization. ITS must be able to design and implement functional, reliable, and sustainable LAN systems on the basis of sources and destination of data. In addition, on the basis of geography and the location of numerous government facilities, ITS will be expected to design a WAN strategy to link these facilities together. Competition among cable television and local telephone service providers and the new wireless companies can create opportunities for local governments that are seeking to include these technologies in their own technology plans. Wireline, cable, wireless, and competitive provider alternatives must be evaluated and matched with the connectivity needs of the local government. The various connectivity challenges will drive which technology is appropriate for the intended solution.

The public demand for network services seems insatiable. Virtually any government agency with intelligent desktop workstations, such as PCs, can avail itself of a LAN where these emerging technologies can be attached and accessed for a much lower price. Multiple LANs within a government are no longer uncommon. And, with the explosive growth of Internet access, communication with the outside worlds of commerce, education, research, other governments, and the community is common for even the smallest local governments.

The ever decreasing costs and increasing advantages of networked computers combined with the increased functionality of software and services have led to a proliferation of a variety of LANs, network protocols, and distributed systems at the departmental level within local government. In turn, the incorporation of core technologies such as imaging, audio, video, and fax has become routine. Departmental LANs often have their own administrator and serve the local and parochial needs of the department, however; and support costs may be hidden. Once limited to specific and special shared functions and, more recently, e-mail, LANs are taking on an expanding role that extends beyond departmental boundaries and encompasses the entire government as well as suppliers, governments and their agencies, and, perhaps most important, citizens and businesses.

Local governments are now tapping the vast potential value of the intelligent desktop and building WANs that link internal and external users. Many local governments that have several distributed systems find that the technologies and protocols used by these systems are different; that few standards have been defined and followed; that the technologies have become corporate assets but are not managed as such; and that melding the different agency systems into a unified, seamless, interoperable network is a complex, expensive, and sometimes impossible task.

A government-wide architecture plan encompassing design, standards, governance, and operation is essential if various and disparate systems are to seamlessly serve the government as a whole. Now is the time to identify the benefits new utility companies can provide, include them in the technology plans, and account for these benefits in the contract negotiation process. A strategic technology plan must accommodate the integration of the installed technology and current products and allow for inclusion of future technologies as well. With convergence of information technologies, networks must be ready to handle increases in bandwidth to concurrently transport voice, image, data, audio, and video traffic in a true multimedia environment. The need for transmission services between government facilities cannot be overlooked.

INFORMATION TECHNOLOGY SERVICES IN THE 21ST CENTURY

ITS staff, in many instances in collaboration with department constituencies, must possess the following skills:

- People skills (as management consultants, trainers, facilitators, sociologists, initiators, and leaders)
- Business skills (knowledge of the applications and the various business requirements, such as financials, utility deregulations, police or fire dispatch and records, GIS and remote sensing, mapping for engineers, records management, Internet and Web-enabling opportunities, handheld data entry and dispatching tools)

- Technology skills (telephony, radio, LANs and WANs, personal computer technologies and peripherals, operating systems, various programming languages, point-of-sale devices, and fingerprint ID system)

In addition, ITS managers will have to be headhunters who constantly seek people and resources to support software systems, communication systems, training, workshops, and consulting.

By far the greatest enemy of customer satisfaction for both ITS and users is the lack of a detailed common set of expectations. A close second is the users' belief that they can unilaterally define the services ITS will provide to them, and that the services will be provided at no cost to the department. Third is users' failure to realize that they must assume partial responsibility for managing their government technology vendor, ITS, rather than foisting all accountability onto ITS! Attacking these and issues like them falls to the new generation of ITS managers, who must:

- Define and publish a menu of services that explains how to request provided services and where and how to seek those not provided
- Set and meet expectations for common services ITS does provide to all its customers
- Collaboratively develop with each customer a specific and appropriately detailed set of bilateral expectations—roles and responsibilities that apply to the department and its relationship with ITS—and review attainment of these expectations and update them at least quarterly
- Help users become self-sufficient by establishing alliances with vendors that the customers can go to for support, providing guidance for this practice, and developing a curriculum and negotiating schedules with qualified firms so that departments can schedule training on generic technology hardware, software, and conceptual topics.

The new ITS team members must think of themselves as entrepreneurial managers. Careful attention to service provision balanced by smart cost-benefit analysis and collaboration with the user community will make ITS a valuable asset rather than a begrudged expense.

APPENDIX A
JOB DESCRIPTION: MANAGER OF INFORMATION TECHNOLOGY SERVICES

General description

Plans, directs and organizes the municipality's information processing, computerization, telecommunication, Inet, and miscellaneous related activities.

Essential job functions

- Prepares feasibility studies; requirements analyses; procurement, development, implementation, and maintenance plans for organization-wide information technology services
- Confers with departmental officials and directors to determine feasibility of new systems
- Reviews existing systems and procedures to define any problems and corrective action
- Supervises application development; computer operations; and system support, networking, telecommunications, and personal computer functions
- Confers with subordinates on unusual and difficult procedures and offers advice and assistance as needed
- Devises complete computer hardware requirements
- Develops major areas of operating procedures and schedules workflow
- Develops standards and procedures for programming, operations and related information processing functions
- Assists in preparation of budget estimates for current and proposed projects
- Writes and administers proposals for procurement of all computer, Inet, and telecommunication systems and related maintenance services
- Maintains inventories, solicits supplies, reviews bids/quotations for all computer and telecommunication materials, supplies, and consumables
- These essential job functions are not to be construed as a complete statement of all duties performed. Employees will be required to perform other job-related marginal duties as required.

Knowledge, skills, and abilities

Knowledge of the development of application software, utilizing online real-time concepts. Knowledge of common business programming languages, operating systems, and systems design techniques. Ability to evaluate system requirements and develop methods and procedures necessary to accomplish objectives. Ability to plan, schedule, coordinate, direct, and review the work of subordinate technicians, professionals, and supervisors in a manner conducive to full performance and high morale. Supervisory skills.

- Strong management visionary skills to understand the importance and the requirements of future technology end users
- Customer service experience or business experience in responding to customer needs; a strong customer ser-

vice orientation is critical
- The individual must have self-starting and self-initiating skills
- Experience with current technologies (i.e., TCP/IP communications, Novell, NT, Unix, Linux, fourth-generation languages and voice/data communications and networking)
- Willingness to be constantly retrained and to have job duties evolve as the then-current technology dictates (for example, initially the goal will be for a person who will be preoccupied with computerized information systems; later, more involvement with communications, imaging, and other forms of technology)
- Thorough knowledge of and ability to apply rules, regulations, policies, and procedures relative to all aspects of information technology services operations
- Comprehensive knowledge of applicable provisions of regulating agencies and government
- Thorough knowledge of the operation of business
- Ability to communicate effectively, both orally and in writing, with people on all levels
- Thorough knowledge of contract management and negotiations, budget, purchasing and bidding, disaster recovery, computer technology, project management, personnel practices, and planning
- Superior ability to effectively and efficiently lead, direct, and manage personnel to achieve the common goal of quality information technology services management
- Knowledge of and ability to develop a proposed budget, obtain budgetary approval, and to operate within budgetary constraints in conjunction with overt efforts to reduce costs through managerial actions
- Comprehensive knowledge of information technology services administration as evidenced by a relevant bachelor's or master's degree in computer science, or a master's degree in public administration, and a minimum of five (5) years of management and supervisory experience
- Ability to make appropriate and prudent decisions in a timely manner regarding personnel issues, application of regulations, and financial considerations.

APPENDIX B
JOB DESCRIPTION: DIRECTOR OF VOCATIONAL TECHNOLOGY SERVICES

General responsibilities

Collaborates with departments in the acquisition and support of departmental hardware, software, and network beyond the DPOP. Consults with departments on all issues related to departmental application systems.

Specific responsibilities

- Line manager for department's technology staff
- Hires, guides, coaches, disciplines, and directs departmental technology staff
- Writes and conducts annual performance reviews for departmental technology staff

Planning

- Researches vocational applications specific to the department and develops technology plans
- Stays abreast of developments in vocational methodologies, strategies, and functions and builds them into department technology plans
- Works with departments and ITS staff to synchronize internal and municipality-wide planning.

Communication

- Chief technology ombudsman
- Communicates and collaborates with other department staff and ITS
- Participates on the enterprise technology committee
- Provides advice and counsel to department staff on vocational technology issues
- Maintains and manages relationships with departmental technology vendors and outsourcers.

Service provision

- Provides technology application services to internal and external users of the departmental systems and oversees development and maintenance of departmental applications
- Publishes systems documentation for system users
- Departmental LAN administration.

Technology administration

- Ensures compliance with enterprise technology standards, policies, and procedures
- Manages departmental hardware, software and network
- Benchmarks departmental systems and services against peer local governments.

Technical

Performs technical tasks as required.

Requisite experience

- Bachelor's degree in a relevant discipline or equivalent experience
- A minimum of five years of experience with information technology
- A minimum 10 years of experience in the related vocational applications
- Excellent interpersonal, verbal, and writing communication skills
- Three years of experience managing technology staff.

Desired experience

Master's degree in public administration.

APPENDIX C
JOB DESCRIPTION: BUSINESS ANALYST

Reports to

Director of Vocational Services or Director of Information Technology Services

General responsibilities

Departmental system(s) support. Departmental representation and liaison. Business analysts are the technology ombudsmen of the organization and collaborate with the departments in developing requirements and specifications.

Specific responsibilities

Develops internal ITS department plans. Acts as project manager for ITS projects. Develops ITS department plans in tandem with vocational department technology plans.

User support

Coordinates departmental system plans and priorities on behalf of the municipality. Serves as a member of departmental technology project teams. Assists departments to identify and document their system requirements, needs, and wants. Collaborates with departments and contributes to their departmental system RFPs. Assists departments in researching available, relevant technology.

Communication

Participates on the enterprise technology committee. Acts as liaison between ITS and other departments.

Requisite experience

A bachelor's degree in an appropriate discipline. Five or more years experience with local government application systems. A minimum of two years of experience in systems analysis. Above average interpersonal skills.

Desired experience

A master's degree in an appropriate discipline. RFP development and evaluation. System development methodology.

Transforming Information Services: New Roles, New Strategies

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