

Town of Lincoln, Massachusetts
Information Technology Strategic Plan
for FY 2010 – FY 2014



Prepared for:

Lincoln Capital Planning Committee
Lincoln Finance Committee
Lincoln Board of Selectmen

Prepared by:

eGov Consulting Services

November 1, 2009

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Preface

Lincoln is a very unique town. Its quaint New England charm suggests days gone by, however, it is a progressive town that always has an eye towards the future.

This is most evident in the fervor for volunteerism in community affairs, coupled with a strong will to control its own destiny through thoughtful and deliberate planning. This is a Lincoln tradition that requires a great deal of dialogue, time and effort to achieve reasonable consensus in charting the course for our future.

This holds true whether we are considering education, land use, governance or technology.

That sets the stage for the purpose of this study. After a decade of tremendous success in adopting new technologies, an assessment of our current situation needed to occur in order to make thoughtful decisions on the future direction of Information Technology. What has been the impact of technology on how we conduct business in Town offices? How has technology affected how Town workers and officials communicate with constituents? And perhaps more important, how can we improve what we are doing to increase efficiencies and to better serve the taxpayers and citizens of Lincoln?

This plan strives to answer those questions and more. The recently published Comprehensive Long Range Plan serves as a reference document to the IT Strategic Plan. The Governance section of the CLRP identifies areas where the Town would like to make more effective uses of Information Technology. Our desire is to determine how the needs and desires of various constituencies within the community can be facilitated through the use of technology.

Information Technology Vision

The Town of Lincoln's information technology strategic vision and principles provide guidance for the community when forced to prioritize IT goals and projects.

IT Vision: To meet or exceed the expectations of our citizens through the use of appropriate technologies that may enhance quality and efficiency in delivering municipal services.

To achieve that vision, we are committed to the following principles:

- Enhancing the Town's business transparency
- Empowering self-sufficiency for Citizens and Town staff
- Adopting standards to reduce technical complexity and support costs without compromising quality of service
- Promoting technical competency of Town staff

Acknowledgements

The following Town staff, residents and committees contributed in some fashion to the development of this plan, whether through encouragement, support, funding or active participation.

Finance Committee

- John L. Koenig – Chair
- Peter Braun
- Karl Geiger
- Sanj Kharbanda
- Ellen Meyer Shorb
- Laura Sander
- Robert Steinbrook

Capital Planning Committee

- Jacqueline Apsler
- Andrew Beard
- Mary Hartman
- Jim Henderson
- Anita Scheipers
- Al Schmertzler
- Gary Taylor

Board of Selectmen

- Sarah Cannon Holden, Chair
- Sara A. Mattes
- Gary Taylor

March 2009 Annual Town Meeting

Information Technology Steering Committee

- Jacqueline Apsler – Capital Planning Committee & Library Trustees
- Susan Brooks – Town Clerk
- Glenn Gustafson – Citizen Volunteer
- Timothy Higgins – Town Administrator
- Ellen Meadors – Board of Assessors
- Chuck Miller – Information Technology Director
- Barbara Myles – Library Director
- Colleen Wilkins – Finance Director

Departmental Staff and Cross-Functional Teams

- Accounting and Finance
- Assessor's Department
- Building & Engineering Dept
- Communications/Dispatch
- Conservation Department
- Council on Aging
- Department of Public Works
- Fire Department
- Geographical Information Systems
- Health Department
- Information Technology Dept.
- Lincoln Library
- Pierce House
- Planning Department
- Police Department
- Recreation Department
- Selectmen's Office
- Town Clerk's Office
- Treasurer/Collector
- Water Department
- Zoning Board of Appeals

Photography

- Chuck Miller, Director of Information Technology

Introductory Letter

Thank you for your interest in the Town of Lincoln and its technological evolution.

Town Leadership is eager to take a more strategic view of our technology investments to ensure that we maximize the benefits of these projects. To that end, the Town of Lincoln has secured the expertise of eGov Consulting Services to assist in the development of a 5-Year Information Technology Strategic Plan. This plan is the culmination of months of hard work by many Town staff members and volunteers. These individuals served the community diligently, striving to deliver effective technology initiatives for your consideration.

Time constraints imposed upon everyone by the annual capital planning process, made this an intense exercise, yet we managed to develop the Plan in a consensus-oriented fashion. Every Town department provided input, clearly articulating their requirements, to more effectively serve the community.

The resulting Information Technology Strategic Plan provides the Town with a vision of the future and it prioritizes actions required to move us forward in a practical manner. Though we have made a considerable effort to minimize technical jargon, there are times it is unavoidable. Therefore we have included a Glossary of Terms in the back of this document.

The costs provided in the Plan are estimates for budgeting and planning purposes. Given that technology is always changing rapidly, a five-year planning horizon is typically as far as one can forecast before there are fundamental shifts in the marketplace. In addition, the Plan is a snapshot based upon present needs. As the Town's strategies and priorities shift, it may be necessary to adapt the technology initiatives accordingly.

Because of these dynamics, the IT Strategic Plan is a living document that must be reviewed and refreshed regularly to ensure that the technology strategies remain in sync with the values of the community.

We are always interested in your feedback. Please forward any comments you may have to Chuck Miller, the Town's IT Director: millerc@lincolntown.org.

Again, thank you for your interest.

Regards,

Timothy S. Higgins
Town Administrator

Background

On March 28, 2009, the Annual Town Meeting overwhelmingly approved Warrant Article 11, authorizing the sum of \$30,000 for the development of a 5-Year Information Technology Strategic Plan.

The Information Technology (IT) Department worked diligently to develop a Request for Proposal (RFP) document that clearly described Lincoln’s requirements that could be used to solicit bids from capable consultants to assist in this venture.

The successful development of our RFP has been used as a model in other communities as they initiate their own Information Technology Strategic Planning process.

The Board of Selectmen assigned several department heads and volunteers to form an IT Steering Committee to oversee the selection process and to guide the development of the plan. The members of the IT Steering Committee are detailed on the Acknowledgements page in the beginning of this document.

The RFP was released on April 30, 2009 and responses were submitted by May 15th, with six consultants submitting proposals. During the first week of June, the IT Steering Committee interviewed the following vendors:

- Webb Consulting Services – Canton, MA
- JFK Systems, LLC – Somerset, MA
- Berry, Dunn, McNeil & Parker (BDMP) – Portland, ME
- eGov Consulting Services – Fairview, TX and Reading, MA
- LBL Technology Partners – Minneapolis, MN
- Plante & Moran – Southfield, MI

When all the scores were tabulated, three vendors, Webb, BDMP and eGov, were tied on points. At that time, eGov Consulting and BDMP were chosen as the best fit for Lincoln, and then BDMP was eliminated due to their proposal price being over budget. The contract was then awarded to eGov Consulting Services out of Fairview, Texas, with a local office in Reading, Massachusetts.

By the first week in June, the work began in earnest as the eGov consultants gathered volumes of data from the IT Department and began scheduling interviews with departments, developing surveys and working with the IT Director to meet the aggressive timeline required by the Capital Planning Calendar.

By the end of July all the interviews were complete, the surveys were tabulated and the benchmarks had been done. With the data having been collected, eGov began assessing their findings and on

September 22, 2009, they presented their preliminary findings to the IT Steering Committee with estimated budgetary figures.

During that meeting, the IT Steering Committee critiqued the draft and offered suggestions which were then incorporated into the Findings Report as published on October 5, 2009. That report lays the foundation for the recommendations that are put forth in this Strategic Plan.

Chuck Miller
Director of Information Technology

Executive Summary

In May, 2009, the Board of Selectmen assigned a team of staff and volunteers to a newly formed IT Steering Committee, to assist the IT Director in crafting a technology plan. The Committee would oversee the process and guide it to completion. In June 2009, the committee selected eGov Consulting Services and awarded them the bid to assist the Town of Lincoln in developing a 5-Year IT Strategic Plan.

The initial phase of the project was to assess the current computing environment for all departments. The purpose of this was to determine how effectively the solutions that are already in place are serving departments and staff in the performance of their duties?

Industry standards (ITIL – Information Technology Infrastructure Library) were used to benchmark the entire IT infrastructure, including the facility, hardware, software, staffing, policies and procedures. This was accomplished through a battery of interviews, surveys and visits with the IT Director.

In addition, a series of more than three dozen interviews and meetings took place with department heads and key staff to determine their satisfaction or frustration with their currently technology toolset for their specific work discipline.

A survey was also placed on the Town website for four weeks to solicit public input in regard to how web-based services would be embraced by citizens.

Historic Background of IT in Lincoln

In the late 1990s, the Town of Lincoln recognized the need to modernize many of its administrative processes. Accounting and other operational processes were still being performed manually.

As a result, the IT Director was hired eleven years ago to drive the implementation of the first financial management system called Pentamation. At that time, few staffers had PCs, there was no e-mail or Internet.

Since that time, all municipal offices in Lincoln have rapidly progressed from having little technology to a full array of server-based applications. Over the past decade most key functions have been automated and most employees are using computers in the performance of their duties. Key facilities are connected via a fiber optic cable network and communications are enhanced through e-mail. The Town's web presence is already in its third generation.

The Information Technology Department was established to be a centralized support function, thereby allowing departments and staff to focus their attention on their core business responsibilities. As such, IT frees up departments from being distracted by daily operations such as: data backups, moves, adds, changes, systems patches, antivirus, SPAM.

In addition, IT manages all upgrades of Hardware and Software, ensuring compatibility with all other devices on the network. The IT Department handles the Capital Planning Function; and IT represents all Municipal Departments (excluding Academic & Faculty support at the Schools). This budgeting function includes, purchasing and deployment of all network, hardware and software solutions, as well as ongoing maintenance.

The IT Department maintains ten physical servers and four virtual servers. Server-based applications include MUNIS, Vadar Systems, Patriot Properties, Exchange Mail, Public Safety, Pamet Systems, Library, Pictometry, and Outlook Web Access. IT also supports over 110 PCs (desktops and laptops) for over 100 users in ten locations; Town Offices, Public Safety, DPW, Bemis Hall , the Library, the Water Department, the Water Treatment Plant, the Lincoln School Campus and the Hanscom School Campus, as well as Pierce House.

To keep all this equipment and these software applications running effectively requires a great deal of effort. All vertical software applications are maintained under software agreements with developers. In all cases, this provides the Town with access to upgrades to the latest versions, as well as patches. In some cases, it also includes remote access support with their technical staff directly accessing the applications server for maintenance and upgrades via a secure remote connection.

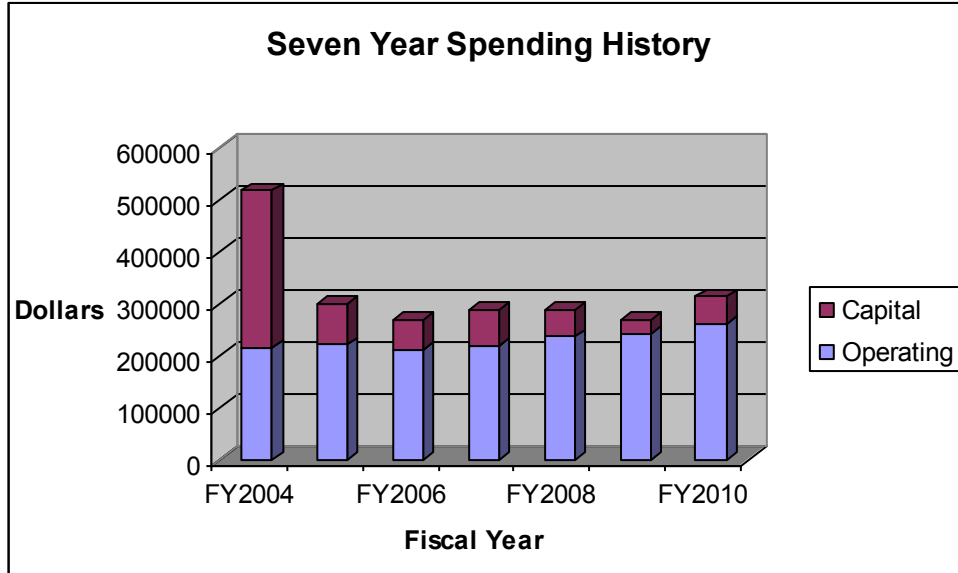
For hardware maintenance, the IT Department handles all initial calls. For problems which may be more complex, or if time constraints require more immediate resolution, outsourced technical staff may be brought in to resolve issues remotely or on site.

Training is an area that is lacking at this time. The IT Department has not had funding for technical training or staff training for several years. As users are getting more sophisticated, they are imagining more ways to use technology but they do not have the benefit of any formalized training to facilitate the need.

As the Town looks to build upon its technology investments, it is eagerly looking towards increased web capabilities to enhance citizen self-service capabilities and improved government transparency and communication. This is evident from the responses to the web survey and is corroborated by comments through the Comprehensive Plan dated September 22, 2009.

Technology Spending

The bar chart below illustrates IT spending history. It is apparent that the budget has been relatively flat. This has made it difficult to manage the increase in vendor software service costs, which rise 5% per year on average, with increased demand for IT services. Coupled with current vendor software service contract increases, any addition of a new vendor software contract, resulting from the previous year's approved capital request, becomes part of the operating budget in the subsequent year. IT spending has not kept up with the demand for new services and the rising cost of software service contracts.



Software service contracts rise about 5% per year on average. With Operating Budgets requiring near level funding in recent years, there has been strain on the IT budget. This is further compounded by delayed replacement cycles for hardware, resulting in increased failures, further eroding the effectiveness of the Operating Budget.

Departmental Interviews

In general, departmental interviews indicate that they are growing increasingly frustrated by the frequency of desktop PC failures and the negative impact this has upon their productivity. They are also concerned about the time that it sometimes takes to get issues resolved as there is only one person servicing the equipment.

The staff speaks well of the IT Department, and is sympathetic to the current constraints imposed upon IT.

General Assessment

Over the years Lincoln has successfully deployed more servers and applications to increase departmental efficiencies. This has resulted in more effective and timely information and has increased service offerings with no increased municipal headcount.

Unfortunately, in spite of the fervor for implementing new technology and more equipment, reasonable life-cycle considerations and associated maintenance costs were deferred due to difficult budgetary priorities over the past several years. This has been particularly evident in desktop PCs which are now primarily being replaced on an as-needed basis.

The effects of deferred maintenance have been compounded by inadequate staffing and a lack of user training and technical training. Near level operating budgets in recent years have caused continual erosion of the operating budget's effectiveness and with each new capital initiative that is adopted subsequent year's operating budgets have not been equipped to sustain maintenance schedules.

The budgeting process must give consideration to the impact of each capital project's impact on subsequent year operating budgets. There appears to be little or no synchronization of capital and operating budget processes in regards to product life cycle management. The result is a cumulative effect of degraded service and increased frequency of equipment failures, further eroding the operating budget and increasing the burden on staff.

The IT infrastructure that is currently in place (networks, hardware, software, and staff) cannot continue to operate under current budgetary constraints.

The Governance section of September 22, 2009 Comprehensive Plan acknowledges that the increased demand for public information, communication and web-based services will require significant investments in technology in the coming years.¹

Summary of Findings

Both the Applications and Network infrastructures need attention due to deferred maintenance and inadequate staffing. These are examined below in light of required upgrades as well as potential to bring about the greatest improvement in efficiency and service for the Town. Staffing is examined in the next section of the Plan.

¹ See the Lincoln Comprehensive Plan for more details regarding technology investment needs, specifically pages 237, 249, 250, 251, 253 and 254.

Applications

Applications are the operating systems and software that is run on the servers and desktops throughout the Town. The state-of-the-art in municipal applications is highly integrated systems that support the three key, day-to-day functional areas of Town government: Administrative (e.g., Finance, Human Resources, Assessing), Operational applications (e.g., GIS, Public Works, Planning/Zoning/ Building), and Public Safety (e.g., Computer Aided Dispatch, Police Records, Fire Records). There are departments that the Town supports, such as Library, Council on Aging, and Recreation, that are not related to the Town government's functioning but are important to the quality of life of residents.

These state-of-the-art integrated municipal applications also have the inherent ability to

- Leverage key data, such as GIS, that could be used to link disparate systems together, and
- Streamline operational workflows for improved process efficiency.²

Ideally, with each of these application areas, the system shares a common architecture and database to simplify reporting and to minimize reentry of information.

Upon completion of the goals and projects in this Plan, the Town's core municipal systems (Administrative, Operational, Public Safety) will be highly integrated around GIS. This is illustrated on page 7 and the core systems are described in more details below.

Administrative Systems

Lincoln was one of the communities in the Commonwealth to support the Community Preservation Act (CPA). At the time, the Town was using the Pentamation System for its financials which did not support CPA. After reviewing available applications in the market, the only system available that could support CPA within the following year was Vadar. Vadar was purchased in 2003 and all the revenue applications (i.e., excise tax, property tax, CPA and water billing) were migrated to Vadar.

In subsequent years, it was clear that Pentamation was not keeping up with Massachusetts statutes. The Town decided to purchase a new general ledger application, went out to request for proposal, and the Munis System was selected.

Though the Munis System is now capable of supporting the CPA, there has been no effort to migrate the Vadar applications to MUNIS to provide a unified applications platform. Vadar presents technical challenges for the Town due to its primitive database architecture. Every transaction performed in the Vadar system requires ever increasing network traffic load requirements, thus overtaxing the Town's wide area network. In addition, since the databases are different between Vadar and Munis, additional knowledge is required by the limited support staff to support both.

² The characteristics of state-of-the-art integrated applications are detailed in Appendix A of this document.

In order to complete the migration process begun by the Town when the CPA was passed, to maximize the efficiency of the Town staff, and to address the architectural limitations noted above, the Town should move the remainder of its Administrative application modules to Munis. This will allow the Town to leverage the power of a state-of-the-art municipal administrative system that it has already invested in while at the same time improving efficiency.

Operational Systems

Lincoln has developed a sophisticated GIS system, largely through the efforts of a volunteer, supported by a staff member. GIS was originally developed to support Conservation; their success has caused others to request assistance as well, which they have gladly provided. In the process, they are replicating functionality that could be provided in a GIS-based Operational System if the Town acquired one. Given the dependence of this approach on a volunteer, and considering the database architecture limitations similar to those involved with the Vadar system, the Town should invest in an Operational System that leverages the Town's investment in its GIS. This system would allow the Town to expand its capabilities to include Public Works and Water, which currently have limited functional automation. The work with GIS has laid a strong foundation for the acquisition of this type of system.

eGovernment

The Town of Lincoln has begun to implement eGovernment on a limited basis with the advent of electronic commerce on the Internet, expectations of effective customer service and access to services have fundamentally changed. The community expects that information can be acquired on-demand, and goods and services can be purchased whenever and wherever they are.

eGovernment promises reliable and secure electronic service options to help improve traditional channels (e.g., in-person, telephone, mail). The community will be able to access the Town 24 hours a day, 365 days a year to find information about services, conduct business or personal transactions, and participate in the democratic process. Based on experiences in other local governments, it is expected that use of these alternative channels will lower stress on the traditional channels, thereby reducing the number of people waiting in lines or placed on hold. In addition, planned, prudent investment in technology will enable the community to conduct transactions with minimal Town staff intervention and should lessen the effects of demands from a diverse and growing population on the size of the Town staff.

The Town of Lincoln has begun to implement eGovernment on a limited basis. Unlike other local governments that have tried eGovernment, Lincoln will take a planned approach in order to get it right the first time. This Plan uses lessons learned from the successes and failures of others. These include:

- A secure and reliable technology infrastructure
- Municipal applications that conform to a standard architecture and are internet-ready, and
- IT staffing to support citizen-facing departments as their technology-based interactions increase.

These factors, carefully planned and executed, will enable Lincoln to have a smooth transition to full eGovernment.

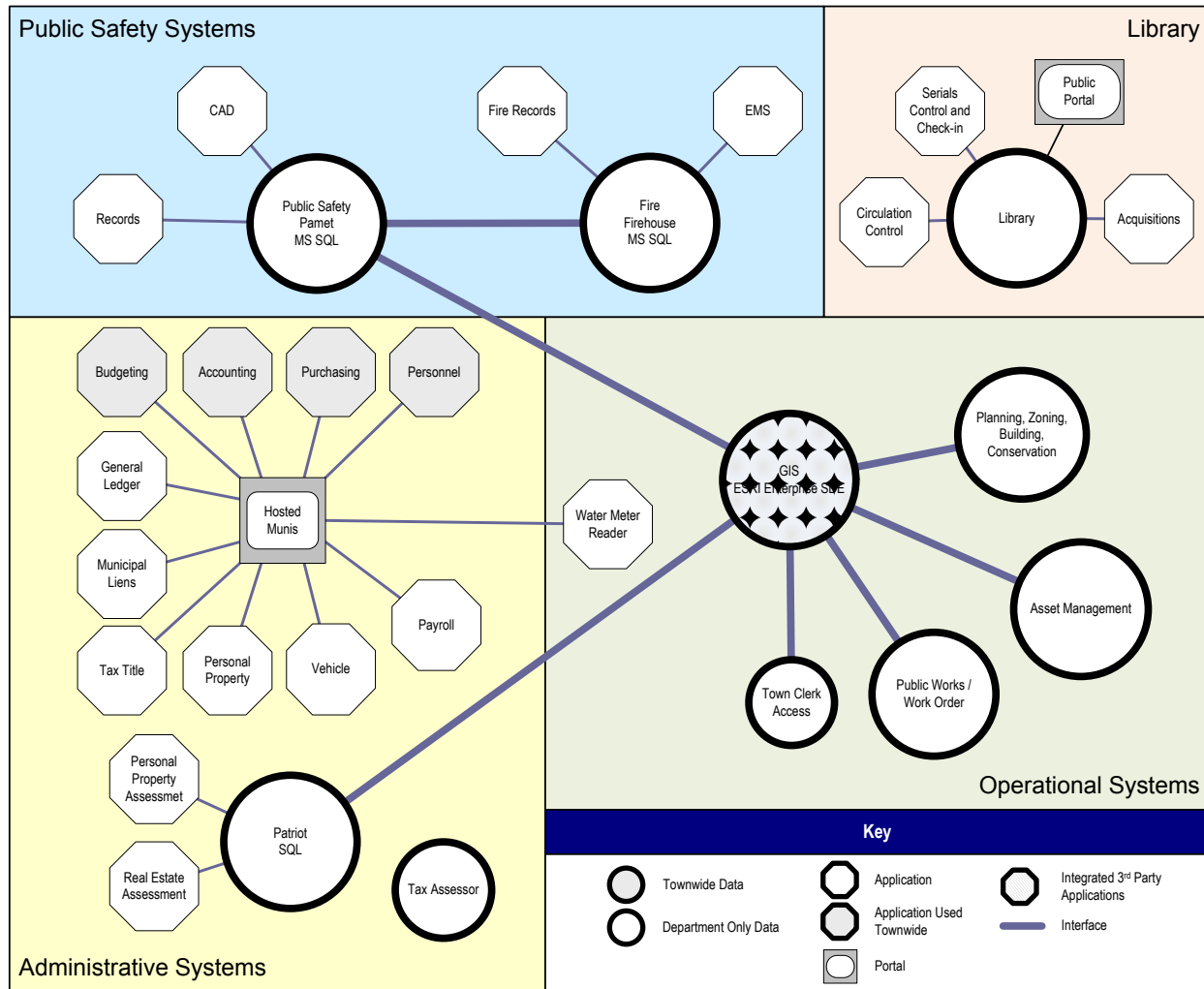
The Town should update its website to provide advanced content management capabilities for end users in departments. This will provide the community with improved access to town government information and services. Once the town's data systems are more integrated and web-capable the town should develop online bill payment, permit applications and work orders.

Public Safety Systems

The Town uses Pamet for computer-aided dispatch and Police records management; and Firehouse for Fire records management. The Town deployed this system in 2001 before the development of the Town's GIS capabilities. The Town should explore Pamet's intentions to better integrate its software with GIS capabilities. In this way, the Town would be able to leverage its GIS capabilities to provide more advanced crime mapping and crime analysis capabilities. Once Pamet's computer aided dispatch becomes GIS based, it could provide accurate call record information to police and fire without requiring the re-entry of the same information into the respective Records Management Systems. The integrated system would also allow the CAD system to draw from the Police and Fire records management systems to inform first responders about the history of locations being visited, as well as any hazardous materials or other items that may pose a risk.

Applications Interaction Diagram

The diagram below illustrates the Town's application interaction as it will look at the end of the planning horizon.



Recommendations

In order to achieve the future state of the applications interaction diagram, shown above, the Town must first address challenges with the current environment that place the Town at risk. These include:

- Consolidating Administrative applications into the integrated Munis system and outsource this system to an off-site computing model
- Modernizing the Town’s website design and navigation to enable improved access to information, and
- Given the pivotal nature of GIS to the Town’s future applications interaction, formalize GIS on a sustainable development platform.

Once the Town's current applications infrastructure is secured, the Town can examine expanded services and efficiency improvements that can be derived from improved applications. These include:

- Once the backend systems are capable, integrate transactional capabilities of these systems through the website to improve citizen services
- Deployment of an integrated Operational system to provide online permitting, online work order entry and tracking, and asset tracking and management, and
- Deployment of call center capabilities for the Department of Public Works.

Network

The Network is the computer hardware and wired/wireless connectivity that allows the Town's systems to talk with each other, as well as with those outside. The Town has made significant investments in its network and personal computer infrastructures over the last decade.

Today, four buildings are connected to Town Hall via Comcast fiber (Public Safety, Bemis Hall, Library and the School) and two are connected by VPN (Water and DPW).

As with any dynamic system, the Town's network is a work-in-process that is continually challenged by the introduction of new technologies and external security threats. As with any infrastructure, maintenance must be provided to keep it functioning at peak performance; this is especially true with a technology infrastructure whose operational lifespan is typically measured in 3 or 4 year increments. With tight fiscal circumstances over the last several years, Lincoln has had to make difficult choices and technology maintenance often received funding to keep existing equipment going, but not to replace it when it reached practical end of life. This includes network switches and personal computers.

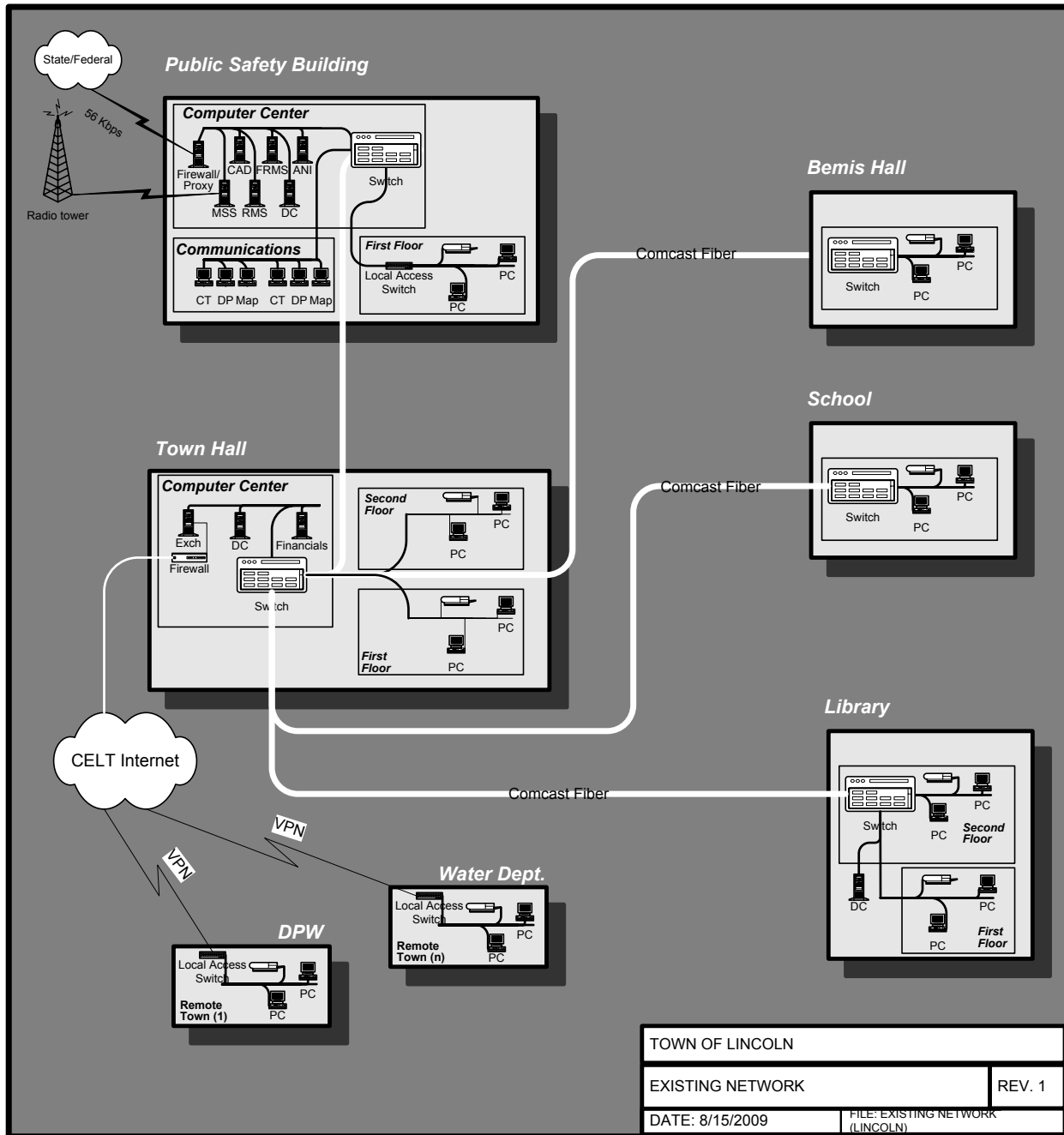
In addition, the rate of growth in the Town's technological capabilities has outpaced the ability of the existing data center in Town Hall to support it in terms of space and power. As is illustrated in the network diagram shown on the following page, all lines feed back through Town Hall. This makes power management in the Town Hall data center a particular concern, especially in terms of business continuity and disaster recovery.

This rate of growth has also outpaced the time, funding and staff required to adequately document systems processes, policies, procedures and the development of a Continuity of Operations Plan (COOP).

With the Town Hall Building Renovation project planned towards the end of the planning horizon, it does not make fiscal sense to invest in building out a new data center in Town Hall at this time. However, given the constraints of the current facility, an upgrade to data center capabilities must be accomplished to support the municipal systems until such a permanent build-out can occur.

The Town needs to protect the technology investments it has made. As Lincoln looks forward to increased technological integration of Town services, especially electronic services, Lincoln must continue to invest in the backbone that makes those services possible.

The diagram on the following page illustrates the Town’s network.



Recommendations

The current network infrastructure places the Town at risk. The Town must secure the existing network infrastructure before placing increased demand on it for additional projects. The challenges are identified below.

- The data center facility is not secure and is inadequate; this is both mission critical to Town operations and at risk for minor and major disruptions in service.
- There is currently no plan for information technology continuity of operations, allowing timely restoration of the Town's major business processes.
- There is no replacement cycle for network hardware.
- Replacement cycles for computers, laptops and mobile data computers have not been budgeted for on a consistent basis.

Role of the Information Technology Department

Overview

With the advent of electronic government (eGovernment), the role of the Information Technology (IT) Department is changing. The IT Department has traditionally been a provider of PCs and the networks. However, for the Town to fully make the transition to eGovernment, the IT Department must also be staffed to provide more technology leadership to the functional, citizen-facing departments.

The Town of Lincoln has been supported by an Information Technology Department staffed by one (1) individual for the last decade. During that time period, the Town has experienced tremendous growth in its technological capabilities.

During interviews with end users, they were quick to point out that the IT Department has been very supportive of their needs. When available, the IT Department provides both consultative assistance as well as basic technical support. The departments want more of the Information Technology Department's time, but there is none to go around. The IT Department spends nearly all of its time today maintaining the aging infrastructure and these demands are increasing as the infrastructure ages further. Due to these constraints, there is little time for proactive planning and consultative assistance.

Expansion of Town services to include eGovernment is dependent upon effectively staffing the IT Department. Technology is integral to the function of every department's business processes. The IT Department must continue to provide support for core business functions while providing leadership and facilitation of cross-departmental and Town information management and technology functions.

Services to be Provided by IT

The quality management system that has become a standard for Information Technology is called the Information Technology Infrastructure Library (ITIL). Developed by the British Government, ITIL has been recognized internationally and has become a standard for IT organizations in the United States. ITIL provides structure for the successful performance of the complex processes involved in IT operations.

Consistent with the requirements of an ITIL best practices implementation, the Town has defined the services it expects the IT Department to provide (i.e., IT's Service Catalog) and its role in providing them, either as service provider or vendor management. These are identified below.

Service	Description	IT's Role
Wide Area Network	Connectivity to applications and devices throughout the Town over wired and wireless methods.	Manages Vendor
Internet Access	Secure connectivity to the internet.	Manages Vendor

Service	Description	IT's Role
Network Storage	Capacity to store and retrieve data and files on a network server; backup those files regularly to protect data from being lost or compromised.	Provides Service
Service Desk Support	Centralized point of contact for help requests on printer, connectivity and software issues. Support includes resolution or escalation to specialized resources.	Manages Vendor
Printer Support	Maintenance of Town-owned, network connected printers.	Manages Vendor
Telephony Support	Cell Phones – Not in the IT Department's scope of services.	None
	Desk Phones – Comes into the IT Department's scope after the move to VoIP.	Manages Vendor
Desktop Automation Support	End-user assistance with standard desktop applications, such as Microsoft Office and Adobe software.	Manages Vendor
Database Administration	Management and optimization of applications-related databases to ensure maximum availability, optimum performance/ responsiveness, and recoverability.	Manages Vendor
Project Management	Oversight assistance of budget, schedule and tasks of technology projects.	Provides Service
Vendor Management	Oversees technology vendors, related contracts, statements of work and service level agreements.	Provides Service
Information Security	Control of access to network, data and application resources.	Provides Service supported by Vendor
Applications Support	Systems administration and application usage support.	Provides Service
Applications Maintenance	Ensures that the application systems are licensed and are patched/supportable.	Provides Service
Technology Planning	Work with departments to identify technologies they could leverage to enhance service quality, efficiency.	Provides Service
Business Analysis	Develop specifications for potential technologies that could enhance service delivery quality, efficiency. Guide technology selection and acquisition.	Provides Service

Organizational Structure

The IT Department is required to provide customer support to the other Town departments at two levels:

- Strategic, Proactive – IT works with the departments to ensure that each department's needs are communicated to IT and solutions are crafted within the framework and standards that have been

adopted by the Town’s as its information technology architectures.

- Tactical, Reactive – The Help Desk responds to support requests in a tiered, structured manner in order to ensure that all calls are handled consistently and in a timely manner based upon their urgency to the Town. In addition, IT uses the Help Desk to weed out non-critical or extraneous support requests so that limited Applications and Infrastructure resources are only engaged when necessary.

Functions of the IT Department

Following this segregation of proactive and reactive elements within the IT Department’s organizational structure, further definition of Information Technology functions is required based on groupings of skill sets.

These are described below.

Function
Planning/Business Analysis
<ul style="list-style-type: none"> ▪ Business Needs Identification: Identify the business process needs requiring computerization, and work with the end user community to build a business case and justify the desired system(s). ▪ System Functional Evaluation: Work with project management to ensure that the selection of packaged systems meets the Town’s technical architecture by assisting in the evaluation of technical and business characteristics. For example: the amount of throughput and storage required and the software and hardware interfaces planned. ▪ System Acquisition: Assist project management with the acquisition of system components. ▪ Vendor Management: Coordinate with and acquire vendor services in conjunction with other Departments and as needed to support ongoing projects. ▪ Purchasing Process: Work with Purchasing to develop and maintain an efficient and effective acquisition process for distributed systems and the associated projects. ▪ Budgetary Control: Assume budgetary responsibility for hardware, software, operations, and maintenance for departmental distributed systems. ▪ Hardware/Software Standards Definition: Establish a distributed system, through the use of standards in hardware and software, to ensure compatibility with the operations of the town. These standards are reviewed and revised periodically, as appropriate.
Applications Support
<ul style="list-style-type: none"> ▪ Application Systems Support: Provide specific application support (e.g., Police, Finance, GIS). Provide Tier 2 application maintenance support and assist the Help Desk with management of passwords, user logons, data management issues and user requests. ▪ System Functional Evaluation: Assist in the selection of packaged systems by evaluating technical characteristics, such as the amount of throughput and storage required, and the software and hardware interfaces planned.

Function
<ul style="list-style-type: none"> ▪ Applications System Documentation: Prepare and maintain appropriate application documentation including documentation on security and backup procedures. ▪ Departmental Applications Inventory: Maintain an inventory of applications running on the town distributed system.
Systems and Database Administration
<ul style="list-style-type: none"> ▪ Systems Administration: Perform necessary backups. ▪ System Acquisition: Install equipment and software. ▪ Technical Support: Provide assistance to Town users planning for or acquiring hardware, software, networks, or services. Administer troubleshooting and maintenance requests. ▪ Maintenance Guidelines: Continuously update and distribute maintenance guidelines for systems and databases. ▪ Repair and Maintenance Program: Coordinate repair and maintenance of equipment. ▪ Systems Inventory: Maintain inventory of Town equipment, users, applications, and software.
Network Administration
<ul style="list-style-type: none"> ▪ Network Systems Support: Establish standards and maintain connectivity of the distributed system equipment and software with other distributed systems, office automation systems, and mission critical servers. ▪ Technical Support: Provide assistance to Town users planning for or acquiring hardware, software, networks, or services. Administer troubleshooting and maintenance requests. ▪ Security Standards Implementation: Implement security standards in firewalls and routers. ▪ Information Security: Protect information and information systems from unauthorized access, use, disclosure, disruption, modification or destruction. ▪ Maintenance Guidelines: Continuously update, distribute and otherwise maintain this guideline with revisions as needs arise. ▪ Repair and Maintenance Program: Coordinate repair and maintenance of equipment. ▪ Application Security Standards Definition: Security Administration for all Town applications in conjunction with network layer security. ▪ IT Policy: Establishing policies related to the secure development and use of technology and related data. ▪ Compliance: Monitoring adherence to information technology policies. ▪ Audit: The Process of inventorying and evaluating the Town's information systems, practices, and operations in order to examine the controls within the Information Technology infrastructure. ▪
Help Desk
<ul style="list-style-type: none"> ▪ End-User Support: Provide assistance in troubleshooting and in end-user application development. This assistance takes the form of help and advice through the help desk, and may involve some desktop applications integration. The preferred development approach should be to integrate existing applications, such as Microsoft Word and Excel, to produce end-user applications that integrate with each strategic application such as Finance or Records

The Applications Support positions should be on staff:

- Applications Support Manager / Administrative Applications Analyst – supervises the other Applications Analyst and provides systems administration and application usage support to the end-users of the Administrative applications (e.g., Finance, Human Resources, Assessing) and other functional areas (e.g., Library), and
- Operational & Public Safety Applications Analyst – provides systems administration and application usage support to the end-users of the Operational applications (e.g., GIS, Public Works, Planning/Zoning/Building) and Public Safety applications (CAD, Police RMS, Fire RMS).

The staffing changes identified above represent a minimum increase of two (2) FTEs for the Town. These numbers are consistent with external industry benchmarks. When compared with neighboring towns, Lincoln was found to be understaffed; Wayland has 1 FTE, but she supports fewer municipal functions; Bedford has 2 FTEs and supports fewer municipal functions. Without the added staff, these functions will go largely undone. With these positions filled, the Town will be able to secure the technical infrastructure and see a town-wide improvement in productivity and quality of service as end users/departments receive support on existing applications.

Strategic Direction and Goals

After compiling and evaluating the various issues put forth in the Finding Summary of October 5, 2009, eGov Consulting Services recommends that the Town of Lincoln consider the risks that are inherent in the present IT environment, the potential consequences to the Town of a failure of that environment, and the opportunities for improved services through new projects once the current Information Technology environment has been secured.

The Town has made significant investments in its technology infrastructure over the last decade; however, funding has not been available to maintain that infrastructure adequately. As a result, the Town must make investments in the first two years of the 5 Year Plan to solidify and secure its technology infrastructure.

Looking to the subsequent three years of the Plan, the citizens have requested an expansion of the Town's services through improvement of existing technology and inclusion of new technology. These will be addressed at this time.

Accordingly, the Town's technology direction and goals will reflect this two tiered strategy in order to solidify its technology foundation and build upon its investments. These goals and projects lay the groundwork for effective and efficient eGovernment services.

Goal 1: Secure Technology Infrastructure

Overview

The focus of the IT Department for the first two years of the 5 Year Plan will be to establish a secure technology infrastructure by

- Upgrading the technical hardware of the data center and end users and placing these on planned four-year replacement cycles
- Enabling the Town to withstand business interruption due to technology disruptions or catastrophic events
- Integrating the Town's two Financial Systems into a single database platform and application suite
- Updating the Town's website Content Management Capability and ease of navigation
- Formalizing GIS on a sustainable platform
- Providing the IT Department with one incremental staff member to enable effective support of the above improved technology environment
- Providing the staff the training required to begin development of policies and procedures that

are consistent with the Information Technology Infrastructure Library (ITIL) best practices approach, and

- Development of an information technology continuity of operations plan.

Goal 1 Elements, Strategic Initiatives and Projects

In order to achieve *Goal 1: Security the Technology Infrastructure*, the Town will pursue the following elements, strategic initiatives and projects. These are identified with the estimated 5-year cost of ownership assuming implementation in the first two years of the Plan. An itemized list of costs by project is included later in this Plan (see *5 Year Implementation Plan*).

Element	Strategic Initiative	Project	5 Year Cost of Ownership
Data Center	Upgrade the Town’s data center domain, storage, and server management capabilities. In conjunction with the Town Hall Building Renovation, upgrade the data center facilities to enable business continuity capabilities and minimize the likelihood of a catastrophic data loss.	Data Center Capability Upgrades. Make improvements to the Town’s data center to improve and secure the current technical infrastructure. <ul style="list-style-type: none"> ▪ Self-Contained Racks with Uninterrupted Power Supply (UPS) and Air Conditioning ▪ Domain Controller ▪ Servers ▪ Server 2008 with Virtualization (included with Microsoft Enterprise Agreement) ▪ Centralize Domain – Services ▪ Outsource Service Contract ▪ 4-Year Server Hardware Replacement Program 	\$694,900
		Data Center Facility Upgrades. In conjunction with the Town Hall Building Renovations, upgrade the data center facility to enable it to withstand disruptions, thereby providing business continuity capabilities. <ul style="list-style-type: none"> ▪ Power/Uninterrupted Power Supply (UPS) ▪ Generator ▪ Air Conditioning ▪ Wiring and Installation ▪ Physical Security (locks, card access) ▪ Racks 	\$87,600
Computers	Place all computers on a four-year replacement cycle and on a planned cycle for software upgrades.	<ul style="list-style-type: none"> ▪ 4-Year Computer Replacement Program ▪ Microsoft Enterprise Agreement ▪ Windows 7 Adoption, Office 2010 Rollout ▪ Windows 7, Office 2010 User Training ▪ Outsourced End User Support 	\$530,000

Element	Strategic Initiative	Project	5 Year Cost of Ownership
Munis	Move Finance from the outdated system that uses an Informix database to a hosted SQL database version of Munis. In a second phase, move Treasury off the current Vadar system to hosted Munis system; this will place the Town on a single, integrated financial system.	<ul style="list-style-type: none"> ▪ Phase 1: Move Finance to Hosted Service ▪ Phase 2: Migrate Treasury to Munis Hosted Service ▪ Convert Vadar from Access to SQL database ▪ Hosted Service ▪ Data Conversion ▪ Savings from Vadar Maintenance 	\$292,817
Enterprise GIS Formalization	Adopt ESRI GIS as the Town's standard and implement the enterprise version capable of supporting interaction with the Town's core systems; finalize cadastral layers (topography, orthogonal).	<ul style="list-style-type: none"> ▪ Upgrade to Spatial Data Engine ▪ Application Server ▪ SQL Server ▪ Finalize Cadastral Layer (topography, orthogonal) 	\$184,640
Website Phase 1	Provide the Town's website with an improved design.	<p>Outsource the design, development and hosting of the Town's website. Contract must include basic and advanced content management capabilities for end users in departments and training on same. Launch new site in 2010.</p> <ul style="list-style-type: none"> ▪ Website – Design, Build & Host Contract ▪ Interface Development ▪ Content Management System Training 	\$106,000
Applications Support Manager	Hire an Applications Analyst in 2010 to assist in the Munis consolidation and migration and provide systems administration and application usage support to the end-users of the Administrative applications (e.g., Finance, Human Resources, Appraisal) and other functional areas (e.g., Library) not covered by the Operational and Public Safety Analyst..		\$520,000
Staff Development	Provide the IT staff with ITIL training and begin development of policies and procedures.	IT staff members attend ITIL practitioner level training. Begin development of IT's policies and procedures.	\$10,000
IT Continuity of Operations Plan (COOP)	Develop an information technology continuity of operations plan.	Work with an external consultant to assist in the development of an information technology continuity of operations plan, including definition of restore time objectives for all technology related systems.	\$50,000

Goal 2: Enhance Services and Improve Efficiency

Overview

The focus of the IT Department for the last three years of the 5 Year Plan will be to enhance service and improve efficiency being delivered by the Town’s Departments by better leveraging the use of technology. This includes:

- Updating the Town’s website for Web 2.0 and interfacing it with key backend systems to allow for online registrations and payments
- Implementing technology required to enable online permitting
- Implementing technology required to enable a Department of Public Works Call Center
- Providing the IT Department with one incremental staff member to enable effective support of the above improved technology environment.

Goal 2 Elements, Strategic Initiatives and Projects

In order to achieve *Goal 2: Enhance Services and Improve Efficiency*, the Town will pursue the following elements, strategic initiatives and projects. These are identified with the estimated five year cost of ownership assuming implementation during the last three years of the Plan. An itemized list of costs by project is included later in this Plan (see *5 Year Implementation Plan*).

Element	Strategic Initiative	Project	5 Year Cost of Ownership
Website Phase 2	As the Town’s systems become more integrated and web-capable, redesign the Town’s website to provide improved transactional (Web 2.0) capabilities.	Outsource the design, development and hosting of the Town’s website. Contract must include integration to key Town backend systems, including Administrative and Operational. Launch redesigned site when the 2010 site reaches end of life in 2013. <ul style="list-style-type: none"> ▪ Website – Design, Build & Host Contract ▪ Interface Development ▪ Content Management System Training 	\$94,000
Operational System	Deploy an integrated, GIS-based Operational System that provides the following capabilities: <ul style="list-style-type: none"> ▪ Work orders ▪ Planning, Zoning, Building and Conservation ▪ Asset Management. 	<ul style="list-style-type: none"> ▪ Public Works/Work Order Module ▪ Planning/Zoning/Building/Conservation Module ▪ Asset Management Module ▪ Application Server ▪ Interfaces ▪ 2 Tablets for Field Personnel ▪ Digital Signature Pads 	\$334,085

Element	Strategic Initiative	Project	5 Year Cost of Ownership
		<ul style="list-style-type: none"> ▪ In-Car Printers for Field Personnel ▪ Project Management ▪ System Training ▪ Performance Bond 	
Citizen Relationship Management System	Deploy a citizen relationship management (call center) system that can integrate with the Operational System (work orders).	<ul style="list-style-type: none"> ▪ Application ▪ Application Server ▪ Web Interface Module ▪ Project Management ▪ Performance Bond 	\$80,240
Operational & Public Safety Systems Analyst	Provide systems administration and application usage support to the end-users of the Operational and Public Safety applications. Consider creating this position after 2012 in order to assist with purchase of the Operational and Citizen Relationship Management Systems.		\$234,000

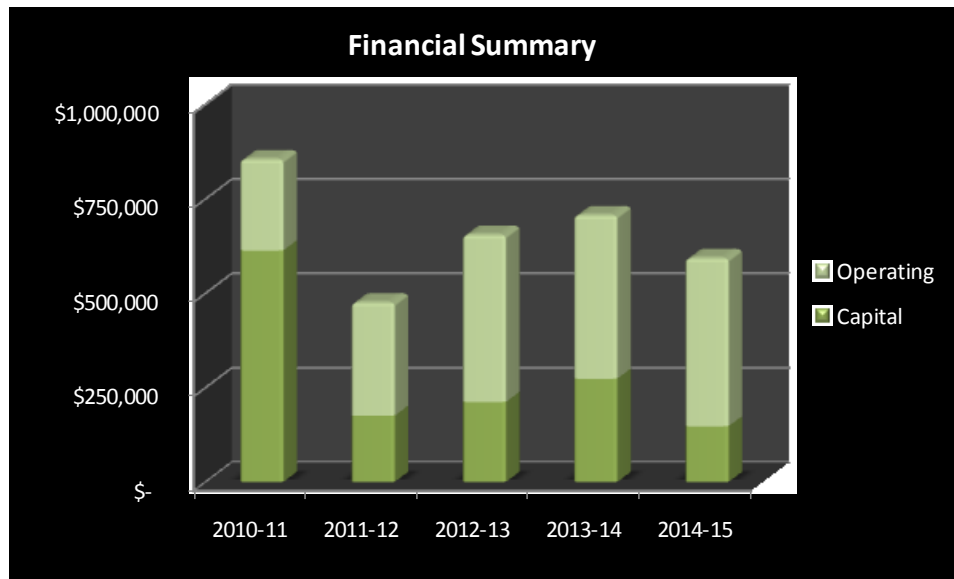
Five Year Implementation Plan

Overview

The information in this section provides a financial summary and detail based on the implementation of Goal 1 in years 1 and 2 of the Plan, and Goal 2 in years 3-5 of the Plan. This implementation timeline is also detailed in this section.

Financial Summary

The goals and projects discussed in the Information Technology Strategic Plan call for the Town to invest \$3.29 million over a five-year period. The capital costs total approximately \$1.42 million and the average annual operating cost for each of the five years is \$372,975. This is shown below. Detailed costs are provided later in this section.



Financial Summary						
Area	2010-11	2011-12	2012-13	2013-14	2014-15	Total
Capital	\$ 613,500	\$ 175,500	\$ 212,143	\$ 273,722	\$ 147,740	\$ 1,422,605
Operating	\$ 242,000	\$ 300,464	\$ 443,064	\$ 433,674	\$ 445,674	\$ 1,864,877
TOTALS	\$ 855,500	\$ 475,964	\$ 655,207	\$ 707,396	\$ 593,414	\$ 3,287,482

Detailed Capital and Operating Expenditures

The detailed expenditures, both capital and operating, in support of the goals are provided in the spreadsheet below.

Goal / Project	2010-11		2011-12		2012-13		2013-14		2014-15	
	Capital	Operating	Capital	Operating	Capital	Operating	Capital	Operating	Capital	Operating
Goal 1: Establish Secure Technical Infrastructure										
Data Center	\$ 286,500	\$ 35,000	\$ 100,500	\$ 70,850	\$ 22,500	\$ 80,450	\$ 22,500	\$ 80,450	\$ 22,500	\$ 80,450
Data Center Capability Upgrades										
Self-Contained Racks with UPS and Air Conditioning	\$ 60,000	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ 9,000
Domain Controller	\$ 10,000	\$ -	\$ -	\$ 1,500	\$ -	\$ 1,500	\$ -	\$ 1,500	\$ -	\$ 1,500
Servers	\$ 12,000	\$ -	\$ -	\$ 1,800	\$ -	\$ 1,800	\$ -	\$ 1,800	\$ -	\$ 1,800
Server 2008 with Virtualization (included with MS EA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Remote Access Server (with VPN access)	\$ 7,000	\$ -	\$ -	\$ 1,050	\$ -	\$ 1,050	\$ -	\$ 1,050	\$ -	\$ 1,050
Storage Area Network (2 @ 4 TB), Tape Backup and Email Archiving	\$ 150,000	\$ -	\$ -	\$ 22,500	\$ -	\$ 22,500	\$ -	\$ 22,500	\$ -	\$ 22,500
Centralize Domain - Services	\$ 25,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Outsource Service Contract	\$ -	\$ 35,000	\$ -	\$ 35,000	\$ -	\$ 35,000	\$ -	\$ 35,000	\$ -	\$ 35,000
4-Year Server Hardware Replacement Program	\$ 22,500	\$ -	\$ 22,500	\$ -	\$ 22,500	\$ -	\$ 22,500	\$ -	\$ 22,500	\$ -
Data Center Facility Upgrades (with Town Hall Renovations)										
Power/UPS	\$ -	\$ -	\$ 35,000	\$ -	\$ -	\$ 5,250	\$ -	\$ 5,250	\$ -	\$ 5,250
Generator (unless accommodated by Facilities budget)	\$ -	\$ -	\$ 25,000	\$ -	\$ -	\$ 3,750	\$ -	\$ 3,750	\$ -	\$ 3,750
Air Conditioning	\$ -	\$ -	\$ 4,000	\$ -	\$ -	\$ 600	\$ -	\$ 600	\$ -	\$ 600
Wiring & Installation	\$ -	\$ -	\$ 2,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Physical Security (e.g., locks, card access)	\$ -	\$ -	\$ 8,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Racks	\$ -	\$ -	\$ 4,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Computers	\$ 45,000	\$ 50,000	\$ 45,000	\$ 50,000	\$ 45,000	\$ 105,000	\$ 45,000	\$ 75,000	\$ 45,000	\$ 75,000
4-Year Computer Replacement Program	\$ 45,000	\$ -	\$ 45,000	\$ -	\$ 45,000	\$ -	\$ 45,000	\$ -	\$ 45,000	\$ -
Microsoft Enterprise Agreement	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 25,000	\$ -	\$ 25,000	\$ -	\$ 25,000
Windows 7 Adoption, Office 2010 Rollout	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Windows 7, Office 2010 User Training	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -
Outsourced End User Support	\$ -	\$ 50,000	\$ -	\$ 50,000	\$ -	\$ 50,000	\$ -	\$ 50,000	\$ -	\$ 50,000
Munis	\$ -	\$ 53,000	\$ 30,000	\$ 52,454	\$ -	\$ 52,454	\$ -	\$ 52,454	\$ -	\$ 52,454
Phase 1: Move Finance to Hosted Services	\$ -	\$ 53,000	\$ -	\$ 53,000	\$ -	\$ 53,000	\$ -	\$ 53,000	\$ -	\$ 53,000
Phase 2: Migrate Treasury to Munis Hosted Service										
Convert Vadar from Access to SQL Database	\$ -	\$ -	\$ 20,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Hosted Service	\$ -	\$ -	\$ -	\$ 20,000	\$ -	\$ 20,000	\$ -	\$ 20,000	\$ -	\$ 20,000
Data Conversion	\$ -	\$ -	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Savings from Vadar Maintenance	\$ -	\$ -	\$ -	\$ (20,546)	\$ -	\$ (20,546)	\$ -	\$ (20,546)	\$ -	\$ (20,546)
Enterprise GIS Standardization	\$ 140,000	\$ -	\$ -	\$ 11,160	\$ -	\$ 11,160	\$ -	\$ 11,160	\$ -	\$ 11,160
Upgrade to Spatial Data Engine (SDE)	\$ 30,000	\$ -	\$ -	\$ 5,400	\$ -	\$ 5,400	\$ -	\$ 5,400	\$ -	\$ 5,400
Application Server	\$ 8,000	\$ -	\$ -	\$ 5,400	\$ -	\$ 5,400	\$ -	\$ 5,400	\$ -	\$ 5,400
SQL Server	\$ 2,000	\$ -	\$ -	\$ 360	\$ -	\$ 360	\$ -	\$ 360	\$ -	\$ 360
Finalizing Cadastral Layers (topography, orthogonal)	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

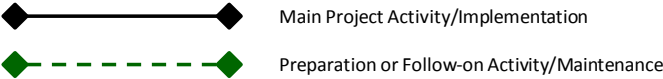
Town of Lincoln
Information Technology Strategic Plan
FY 2010 – FY 2014

Goal / Project	2010-11		2011-12		2012-13		2013-14		2014-15	
	Capital	Operating	Capital	Operating	Capital	Operating	Capital	Operating	Capital	Operating
Goal 1: Establish Secure Technical Infrastructure										
Website Phase 1	\$ 82,000	\$ -	\$ -	\$ 12,000	\$ -	\$ 12,000	\$ -	\$ -	\$ -	\$ -
Website - Design, Build, Host Contract	\$ 75,000	\$ -	\$ -	\$ 11,250	\$ -	\$ 11,250	\$ -	\$ -	\$ -	\$ -
Interface Development	\$ 5,000	\$ -	\$ -	\$ 750	\$ -	\$ 750	\$ -	\$ -	\$ -	\$ -
Content Management System Training	\$ 2,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Applications Support Manager/Administrative Analyst	\$ -	\$ 104,000	\$ -	\$ 104,000	\$ -	\$ 104,000	\$ -	\$ 104,000	\$ -	\$ 104,000
Staff Development	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ITIL Training	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Develop Repositories of Policies and Procedures	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
IT Continuity of Operations Plan	\$ 50,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Goal 2: Enhance Services and Improve Efficiency										
Website Phase 2	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 82,000	\$ -	\$ -	\$ 12,000
Website - Design, Build, Host Contract	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75,000	\$ -	\$ -	\$ 11,250
Interface Development	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,000	\$ -	\$ -	\$ 750
Content Management System Training	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,000	\$ -	\$ -	\$ -
Operational System	\$ -	\$ -	\$ -	\$ -	\$ 144,643	\$ -	\$ 124,222	\$ 32,610	\$ -	\$ 32,610
Public Works/Work Order Module	\$ -	\$ -	\$ -	\$ -	\$ 35,000	\$ -	\$ -	\$ 5,250	\$ -	\$ 5,250
Planning/Zoning/Building/Conservation Module	\$ -	\$ -	\$ -	\$ -	\$ 65,000	\$ -	\$ -	\$ 9,750	\$ -	\$ 9,750
Asset Management Module	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 80,000	\$ 12,000	\$ -	\$ 12,000
Application Server	\$ -	\$ -	\$ -	\$ -	\$ 8,000	\$ -	\$ -	\$ 1,200	\$ -	\$ 1,200
Interfaces	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 20,000	\$ 3,000	\$ -	\$ 3,000
Tablets	\$ -	\$ -	\$ -	\$ -	\$ 8,000	\$ -	\$ -	\$ 1,200	\$ -	\$ 1,200
Digital Signature Pads	\$ -	\$ -	\$ -	\$ -	\$ 400	\$ -	\$ -	\$ 60	\$ -	\$ 60
In-Car Printers	\$ -	\$ -	\$ -	\$ -	\$ 1,000	\$ -	\$ -	\$ 150	\$ -	\$ 150
Project Management	\$ -	\$ -	\$ -	\$ -	\$ 18,243	\$ -	\$ 12,162	\$ -	\$ -	\$ -
System Training	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 6,000	\$ -	\$ -	\$ -
Performance Bond	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6,060	\$ -	\$ -	\$ -
Citizen Relationship Management System	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 80,240	\$ -
Application	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 50,000	\$ -
Application Server	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 8,000	\$ -
Web Interface Module	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,000	\$ -
Project Management	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,200	\$ -
Performance Bond	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,040	\$ -
Operational & Public Safety Systems Analyst	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 78,000	\$ -	\$ 78,000	\$ -	\$ 78,000
TOTAL										
Goal 1	\$ 613,500	\$ 242,000	\$ 175,500	\$ 300,464	\$ 67,500	\$ 365,064	\$ 67,500	\$ 323,064	\$ 67,500	\$ 323,064
Goal 2	\$ -	\$ -	\$ -	\$ -	\$ 144,643	\$ 78,000	\$ 206,222	\$ 110,610	\$ 80,240	\$ 122,610
All Investments	\$ 613,500	\$ 242,000	\$ 175,500	\$ 300,464	\$ 212,143	\$ 443,064	\$ 273,722	\$ 433,674	\$ 147,740	\$ 445,674

Implementation Timeline

The implementation timeline for the goals and related projects is shown below.

	2010/11				2011/12				2012/13				2013/14				2014/15			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Goal 1: Establish Secure Technical Infrastructure																				
Data Center	◆————◆				-----◆				◆————◆				-----◆				◆			
Computers	◆-----◆				◆-----◆				◆————◆				◆-----◆				◆			
Munis	◆————◆				◆————◆				◆-----◆				◆-----◆				◆			
Enterprise GIS Standardization	◆————◆				◆-----◆				◆-----◆				◆-----◆				◆			
Website Phase 1	◆————◆				◆-----◆				◆-----◆				◆-----◆				◆			
Applications Support Manager	◆-----◆				◆-----◆				◆-----◆				◆-----◆				◆			
Staff Development	◆————◆				◆-----◆				◆-----◆				◆-----◆				◆			
IT Continuity of Operations Plan	◆————◆				◆-----◆				◆-----◆				◆-----◆				◆			
Goal 2: Enhance Services and Improve Efficiency																				
Website Phase 2	◆-----◆				◆-----◆				◆-----◆				◆————◆				◆-----◆			
Operational System	◆-----◆				◆-----◆				◆————◆				◆————◆				◆-----◆			
Citizen Relationship Management System	◆-----◆				◆-----◆				◆-----◆				◆-----◆				◆————◆			
Operational & Public Safety Support Analyst	◆-----◆				◆-----◆				◆-----◆				◆-----◆				◆————◆			



Appendix A: Characteristics of State-of-the-Art Integrated Applications

Application systems developed or acquired today should exhibit the requirements common to all state-of-the-art, integrated application systems. These are identified below.

Requirement	Brief Description
Shared Database	New systems must share a common database with a variety of applications.
Industry Standard Architecture	New systems' architectures must be flexible and be based on widely accepted standards. This will make it easier to integrate/interface the mission critical applications and other internal and external /modules. It will also improve the systems' ability to interoperate with a number of modern technologies, such as: <ul style="list-style-type: none"> ▪ Document and imaging management systems; ▪ Powerful and flexible ad hoc reporting tools; ▪ Geographic information systems (GIS).
High Availability	New systems' architecture for appropriate mission critical systems (e.g. Public Safety, Core Financials) will need full redundancy and fail-over capabilities, and should contain no single point of failure.
Secure	New systems must incorporate the elements of authentication, authorization, encryption, monitoring/detection, and physical security that adhere to industry and government standards.
Web-Based Data Structures	New systems must take advantage of the integrating capabilities of the web services architecture. This will provide many users the ability to interact with the applications via a Web browser.
Scalable	New systems must be scalable; this is critical to support expansion and workload variability. The system must be designed to maintain overall performance independent of any other operation performed by associated modules or systems.
Full Data Integration	New systems' data needs to be fully integrated, permitting data to be entered once to update applications and relevant portions of associated systems. New systems must facilitate the continued access to existing images/records stored through integration with any existing document management system.
Mobile Computing Environment	New systems' mobile applications must utilize an integrated set of forms that allow for the flow of information among the entry forms in the field. For example, in a Public Safety mobile environment, these would include the components needed for the effective collection and quick dissemination of case information, and those critical to crime resolution, such as: <ul style="list-style-type: none"> ▪ Incident/Offense Collection ▪ Arrest

Requirement	Brief Description
	<ul style="list-style-type: none"> ▪ Accident – Provide the ability to gather and print all of the information required on state-specific accident reports. ▪ Accident Diagramming – Allows the ability to create detailed and scaled accident diagrams or basic roadway and vehicle sketches. Drawings of high accident locations may also be saved as templates to be used for future accident diagrams. ▪ Citation/Summons ▪ Traffic Warning ▪ Field Interview
Workflow Functionality	New systems' in-field applications must be fully integrated with main system data flow, and electronic report capture and electronic review workflow. Electronic workflow and process re-engineering will enable the specification of business rules, roles, and routings that can be used to automatically route electronic documents such to supervisors and management for notification, review, and approval.
Relational Database Management System	The database utilized for new systems should be SQL-based technology that supports ready interface and integration among systems. Existing Informix database will need to be converted to SQL.
Data integrity and Validation Tools	New systems must facilitate the validation of the key parameters of address and personal identity. For example, systems must validate address entries through integration with the system geo database.
External Integration Flexibility	New systems must adhere to the use of industry standards. This will make it easier to integrate mission critical systems and to share data with external systems. For example, public safety systems should adhere to National Information Exchange Model (NIEM) Standards.
Integrated Geo-Based Analysis	New systems should interface with GIS-based analytical software where it is cost effective and justified for specific location based information.
Strong System Administration Capability	New systems must utilize Active Directory and/or LDAP as well as its own administrative capabilities to manage the system. These capabilities allow the system supervisor to manage the database and user functions.

Appendix B: Glossary of IT Terminology

Term	Explanation
ALI	Automatic Location Identification provides for an address display of the subscriber calling 911. With ALI, the public safety answering point (PSAP) receives the automatic number identification (ANI) display and an ALI display on a screen. The ALI display includes the subscriber's address, community, state, type of service and if a business, the name of the business.
ANI	Automatic Number Identification corresponds to the subscriber's telephone number. The ANI displays at the public safety answering point (PSAP) on the digital ANI display console.
API	Application Programming Interface, a set of instructions and functions that programs can use to effect tasks through other systems, such as opening windows, writing files, and completing message boxes – as well as perform more complicated tasks – by passing a single instruction.
ATM	Asynchronous Transfer Mode. Under ATM, multiple traffic types (such as voice, video, or data) are conveyed in fixed-length cells (rather than the random-length "packets" moved by technologies such as Ethernet and FDDI). This enables very high speeds, making ATM popular for demanding network backbones. With networking equipment that has recently become available, ATM will also support wide area network (WAN) transmissions. This feature makes ATM valuable for large, dispersed organizations.
AVL	Automatic Vehicle Locator, a system for tracking mobile units through global positioning system (GPS) satellite technology.
Backbone	The part of a network that acts as the primary path for traffic moving between, rather than within, networks.
Bandwidth	The "data-carrying" capacity of a network connection, used as an indication of speed. For example, an Ethernet link is capable of moving 10 million bits of data per second. A Fast Ethernet link can move 100 million bits of data per second – 10 times more bandwidth.
Blog	The abbreviation of "web log." A journal that is available on the web. The activity of updating a blog is referred to as "blogging" and whoever maintains a blog is called a "blogger." Blogs are typically updated daily using software that allows people with little or no technical background to update and maintain the blog.
Bridge	A device that passes packets between multiple network segments using the same communications protocol. If a packet is destined for a user within the sender's own network segment, the bridge keeps the packet local. If the packet is bound for another segment, the passes the packet onto the network backbone.
Browser	A client program (software) that is used to access and display various kinds of Internet resources.
CAD	Computer Aided Dispatch. The collection of programs that support call taking and emergency dispatch functions for the Fire and Police Department and other dispatched agencies.
Call Detail Record	When the 911 call is terminated by the public safety answering point (PSAP) operator, the automatic number identification (ANI) will automatically print-out on the teletypewriter located at the PSAP. The printout will contain the time the call came into the PSAP, the time it was picked up by an operator, the operator number, the time the call was transferred, if applicable, the time the call was terminated and the trunk group number associated with the call. Printouts of the automatic location identification (ALI) display are now also available, if the PSAP has purchased the required equipment.

Term	Explanation
CJIS	Criminal Justice Information System.
Client	A networked personal computer (PC) or terminal that shares "services" with other PCs. These services are stored on or administered by a server.
CPU	Central Processing Unit, and pronounced as separate letters. The brains of the computer, sometimes referred to simply as the processor or central processor, the CPU is the hardware that performs most calculations.
Database	This is a data structure used to store organized information. A database is typically made up of many linked tables of rows and columns. Examples of database software include Microsoft Access and SQL.
Domain	A common network name under which a collection of networked devices are organized.
DSL	Digital subscriber line. A method for moving data over regular phone lines.
E911	Enhanced 911: Features available include selective routing, selective transfer, fixed transfer, alternate routing, default routing, Automatic Number Display, Automatic Location Identification, night service, default routing, call detail record.
EDI	Electronic Data Interchange. A term referring to the conduct of eBusiness through the exchange of electronic messages.
Ethernet	A popular local area network (LAN) technology that uses collision detection to move packets between workstations and runs over a variety of cable types at 10 Mbps. Also called 10BaseT. Fast Ethernet – Uses the same transmission method as 10-Mbps Ethernet (collision detection) but operates at 100 Mbps – 10 times faster. Fast Ethernet provides a smooth upgrade path for increasing performance in congested Ethernet networks, because it uses the same cabling, applications and network management tools. Variations include 100Base-FX, 100Base-T4 and 100Base-TX.
FDDI	Fiber Distributed Data Interface. A local area network (LAN) technology based on a 100-Mbps token-passing network running over fiber-optic cable. Usually reserved for network backbones in larger organizations.
Frame Relay	Wide area network service that provides switched ("on-and-off") connections between distant locations.
FTP	File Transfer Protocol. A part of the chief Internet protocol "stack" or group used for transferring files from Internet servers to your computer.
GPS	Global Positioning System used for satellite-based location determination for automatic vehicle locator (AVL) and Cellular systems.
GUI	Graphical user interface. Allows users to navigate and interact with information on their computer screen by using a mouse to point, click, and drag icons and other data around on the screen, instead of typing in words and phrases.
HTML	Hypertext markup language. Simple document formatting language used for preparing documents to be viewed by a tool such as a worldwide web browser.
HTTP	Hypertext transmission protocol. Protocol that governs transmission of formatted documents over the Internet.
Hub	A device that interconnects clients and servers, repeating (or amplifying) the signals between them. Hubs act as wiring "concentrators" in networks based on star topologies (rather than bus topologies, in which computers are daisy-chained together).

Term	Explanation
Interface	The process by which a software application interacts with other software or users. In object-oriented programming an (software) “object’s” interface is often described separately from the internal logic in a process known as “encapsulation.” Essentially the interface encapsulates and hides the internal logic. This allows flexibility to change and improve object code without affecting other objects. An interface description is made public so other objects/applications know how to interact. Software is said to “implement” an interface if it conforms to the behavior as defined in an interface description.
Internet	A massive global network, interconnecting tens of thousands of computers and networks worldwide and accessible from any computer with a modem or router connection and the appropriate software.
Intranet	An internal network that leverages some of the same tools popularized on the Internet (e.g., browsers for viewing material, hypertext markup language (HTML) for preparing company directories or announcement).
IP	Internet protocol. A set of rules that define an exact format for communication between systems over the Internet. IP Number – Every device that is on the Internet has a unique IP number that is similar to its address.
ISDN	Integrated Services Digital Network. Communication protocol offered by telephone companies that permits high-speed connections between computers and network in dispersed locations.
Java	A network-friendly programming language invented by Sun Microsystems.
JJIS	Juvenile Justice Information System, the juvenile counterpart to the Criminal Justice Information System (CJIS) statewide crime database, but for juveniles.
LAN	Local Area Network. Typically, a network or group of network segments confined to one building or a campus. Compare to wide area network (WAN).
MCT or MDT	Mobile Computer Terminal or otherwise named Mobile Data Terminal, a mobile device used to support wireless data transfer to/from computer aided dispatch (CAD) and records management (RMS) systems.
Metadata	Data about data. For example, for the data '3000N', the metadata might be 'latitude'. Markup languages such as standard generalized markup language (SGML) and extensible markup language (XML) encapsulate data with tags that contain text describing the metadata. See the example provided in the tags definition.
Modem	Device that enables a computer to connect to other computers and networks using ordinary phone lines. Modems "modulate" the computer's digital signals into analog signals for transmission, then "demodulate" those analog signals back into digital language that the computer on the other end can understand.
MSAG	Master Street Address Guide is a ledger in which are assigned the police, fire or rescue agency will serve a given street and number range.
NAS	Network-Attached Storage appliances are used to help manage large amounts of data by making file storage space available to network clients, gaining benefits similar to sharing printers over a network.
.Net	The brand name for Microsoft's web service architecture. .Net is a set of proprietary Microsoft frameworks and technologies founded on extensible markup language (XML) web services standards.

Term	Explanation
Network	When you have two or more computers connected to each other, you have a network. The purpose of a network is to enable the sharing of files and information between multiple systems.
NFIRS	National Fire Incident Reporting System. A national fire reporting system.
NIBRS	National Incident Based Reporting System. A newer crime reporting format that supersedes the older UCR format developed to provide a reliable set of crime statistics for use in law enforcement administration. It provides the FBI more detailed crime reporting resulting from report entry changes, and additional data collection.
NIC	Network interface card. The card in a computer that you plug a network cable into.
Open System	The goal of open systems is interoperability between hardware and software that is defined by the industry at large and not one or two vendors. Increasingly, the term refers to the Wintel (Windows/Intel) personal computer (PC). Technically, the PC is an open architecture, not an open system, since Intel and Microsoft control the primary hardware and software standards. However, countless third-party vendors have been encouraged to write software for the platform as well as make hardware add-ons and interoperable.
Operating System (OS)	The software that communicates with computer hardware on the most basic level. Without an operating system, no software programs can run. The OS is what allocates memory, processes tasks, accesses disks and peripherals, and serves as the user interface. Examples: Microsoft XP or Vista; Mac OS; Linux.
Packet	A block of data with a "header" attached that can indicate what the packet contains and where it is headed. Think of a packet as a "data envelope," with the header acting as an address.
Port	A place where information goes into or out of a computer, or both (e.g., an ethernet port on a personal computer).
PSAP	Public Safety Answering Point. The police, fire and/or rescue groups as determined by the local municipalities that has typically a "ringing" with ANI and ALI capabilities, but may just receive calls or transferred calls from another PSAP.
RAID	Redundant array of independent disks. A highly reliable storage method for saving data on more than one disk simultaneously. At its simplest, a RAID-1 array consists of two drives that store identical information. If one drive goes down, the other continues to work, resulting in no downtime for users. To save disk space, RAID-3, -4, and -5 "stripe" data and parity information across multiple drives (RAID-3 and -4 store all parity data on a single drive). If a single disk fails, the parity information can be used to rebuild the lost data.
Remote Access server	Device that handles multiple incoming calls from remote users who need access to central network resources. A remote access server can allow users to dial into a network using a single phone number. The server then finds an open channel and makes a connection without returning a busy signal.
RMS	Records Management System. The collection of functional applications that satisfy the bulk of Fire and Police Department data processing and internal and external reporting requirements.
Router	Device that moves data between different network segments and can look into a packet header to determine the best path for the packet to travel. Routers can connect network segments that use different protocols. They also allow all users in a network to share a single connection to the Internet or a wide area network (WAN).

Term	Explanation
SAN	Storage Area Network. Functions similarly to network-attached storage (NAS) systems for backup and storage of data-intensive servers, utilizing devices that are detached from the server, centralized in a Storage Farm, and connected through a high-speed path.
Server	A computer or even a software program that provides services to clients – such as file storage (file server), programs (application server), printer sharing (print server), fax (fax server) or modem sharing (modem server). See also client.
Spam	An inappropriate attempt to use a mailing list or other networked communications facility as if it was a broadcast medium (which it is not) by sending the same message to a large number of people who didn't ask for it.
SQL	Structured query language. A specialized language for sending queries to databases. Most industrial-strength and many smaller database applications can be addressed using SQL.
Switch	A device that improves network performance by segmenting the network and reducing competition for bandwidth. When a switch port receives data packets, it forwards those packets only to the appropriate port for the intended recipient. This further reduces competition for bandwidth between the clients, servers or workgroups connected to each switch port.
T-1	A leased-line connection capable of carrying data at 1,544,000 bits-per-second. That is still not fast enough for full-screen, full-motion video, for which you need at least 10,000,000 bits-per-second. T-1 lines are commonly used to connect large local area networks (LANs) to the Internet.
T-3	A leased-line connection capable of carrying data at 44,736,000 bits-per-second. This is more than enough to do full-screen, full-motion video.
TCP/IP	The suite of protocols that defines the Internet. A computer must have TCP/IP software to be on the Internet.
UCR	Uniform Crime Reporting, involving State and FBI-mandated generation of UCR data to for collection of a reliable set of crime statistics for use in law enforcement administration, operation, and management. Recently, the FBI has developed a new format entitled NIBRS.
URL/URI/URN	Uniform Resource Locators, Uniform Resource Indicators, and Uniform Resource Names are different, related methods of uniformly referencing resources across networked environments. A recently release W3C Note explains the difference.
VoIP	Voice over IP. A set of facilities used to manage the delivery of voice information over the Internet.
VPN	Virtual private network. A network in which some of the parts are connected using the public Internet, but the data sent across the Internet is encrypted, so the entire network is "virtually" private.
WAN	Wide area network. Any internet or network that covers an area larger than a single building.