

Glastonbury
Information Technology Plan and
Standards – 2008 Edition

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Maintaining Technology and Managing Growth

In the last ten years, technology has become an integral part of the daily job functions of more than 80% of the Town of Glastonbury's workforce. In order to provide for this dependency on technology Glastonbury IT approaches the various day to day tasks, as well as, the long-term projects by prioritizing them to the strategic initiatives that are documented in this Plan.

The first and foremost strategic initiative is to maintain the reliability of what is already in place. There are always demands for more technology, but it is important to remember to build only what can be supported. During the budget process, these costs and priorities are satisfied first. Metrics are monitored throughout the year to determine if existing technology is performing adequately and addressed. Equipment refresh policies are in place to ensure that hardware systems are replaced in a responsible manner. Equipment failure rates are also tracked to adjust refresh policies to ensure both reliable operation and cost effective utilization of the equipment.

The 2008 calendar year has seen a dramatic increase in the awareness regarding Green Initiatives. In fact, Glastonbury's IT has been working on a number of Initiatives for several years now. In addition to the existing initiatives several new ones are now underway.

A significant area of growth revolves around the use of the Internet and Web browsers to provide 24 hour access to information. This growth is evident for both the citizens and town staff and new initiatives are underway to bring more services online. Examples include permitting systems, job applications, and updates of employee benefits.

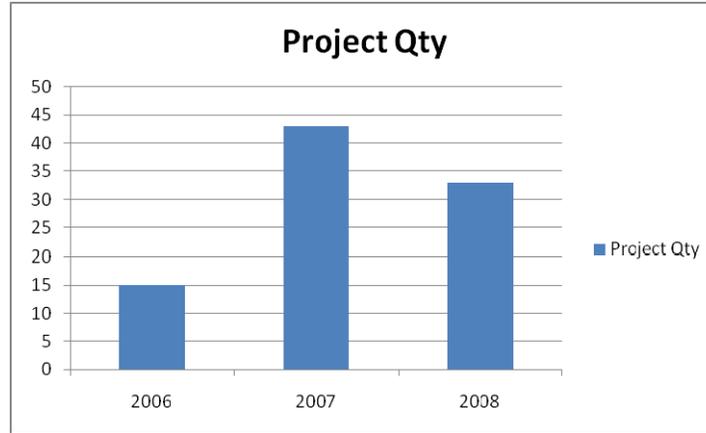
A View Inside Glastonbury's IT

Statistics

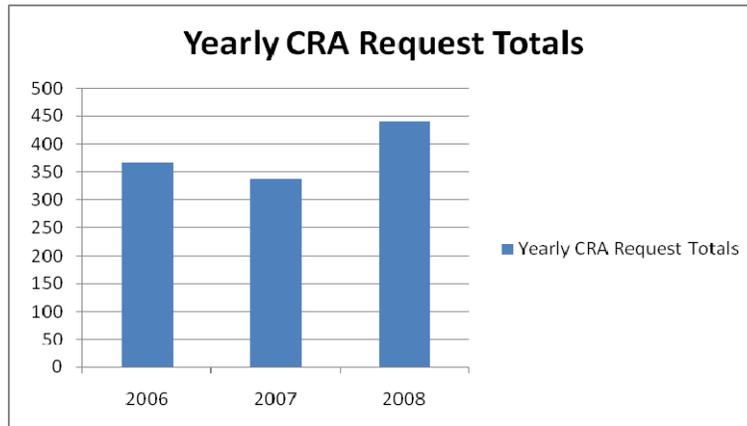
Workstations	367
Servers	29 Physical Servers
Server Rooms	7
Employees/Users	349
Software Applications/Operating systems Supported	94

IT Support Technicians	2.5
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Number of Technology Projects Started Each Year



Number of Help Desk Requests Submitted Yearly



Operational Performance

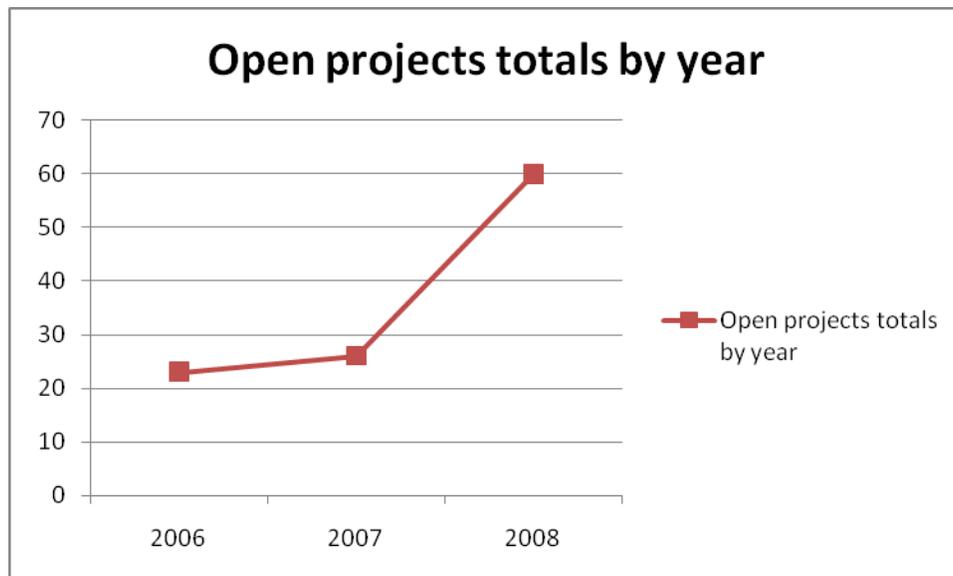
Workstations per Technician	146
Regional Municipal Average	95
Ratio to Regional Average	153%

Workload Levels

What does the workload have to do with the Technology plan? The conversion from Novel to MS is good. I think of technology plan as implementing, taking away, adding

Glastonbury IT initiated and completed a number of special projects in the 2007 fiscal year to convert the town's technology infrastructure from Novell based eDirectory to Microsoft based Active Directory. The effect on the Workload Levels was an additional 12 custom projects above the norm. Taking that anomaly into consideration the net growth in projects between 2006 and 2008 is in excess of 100% growth. It is expected that due to the growth in web based application needs and green initiatives the level of yearly projects will continue at the current levels for two to three years at a minimum.

The following chart shows the number of open projects at the end of each fiscal year. As can be seen, the effect of the increase of projects over the last two years has had a significant impact on projects that are not yet completed. Glastonbury IT is reviewing options regarding existing position vacancies to best alleviate the backlog of projects and maintain a more acceptable backlog for the years to come, including the use of interns and contract employees.

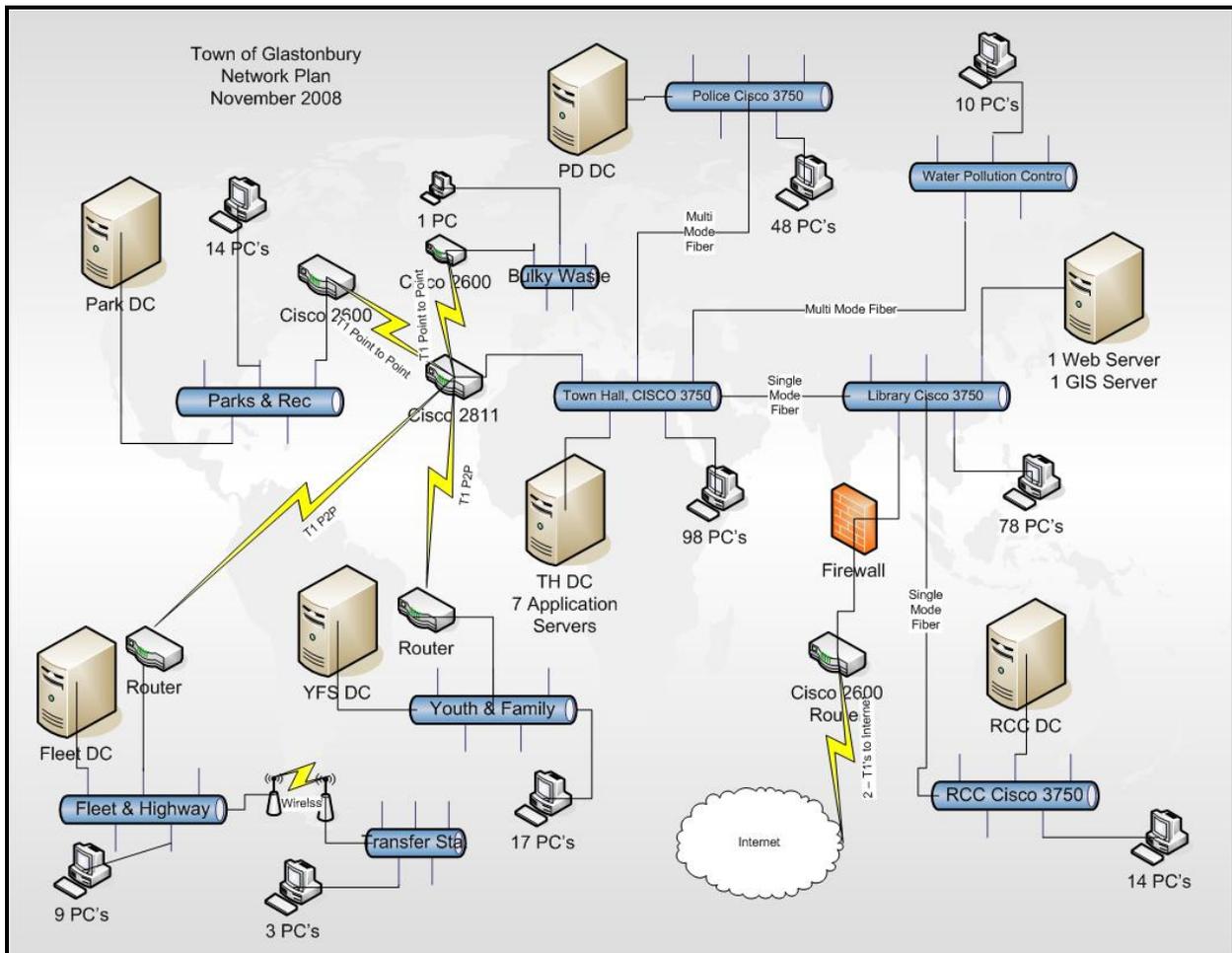


Annual Technology Costs

	2006	2007	2008
Hardware & Software	\$ 587,000	\$ 586,000	\$567,000
Wages & Consultants	\$219,133	\$233,120	\$248,000

Note: Costs for CIP Projects are estimated to be depreciated over 10 Years or more. Technology Costs are incorporated within each department's budget. Above information is compilation of costs based on review of key departmental cost codes.

Current Network Diagram



2008 Strategic Objectives

1. Maintain and improve overall systems reliability and uptime
2. Reduce energy and paper consumption in technology related functions

3. Provide 24 hour customer support to Glastonbury Citizens
4. Improve return on investment
5. Set the right level of IT service
6. Keep software cost effective and legal

Strategic Objective One – Maintaining and Improving the reliability of the Technology Infrastructure

As stated earlier the majority of town staff are very dependent on the Town's technology systems . It is the priority of Glastonbury IT to keep these systems running properly. There are four major areas of concern that are monitored for potential downtime:

1. Hardware failures of workstations, servers, networking hardware, and WAN connections
2. Power failures and natural disasters
3. Operating system and application updates
4. Viruses & other forms of Malware

Each potential area has safeguards in place to reduce the likelihood or duration of such an event. These safeguards are reviewed on an annual basis and adjusted accordingly. Evaluations are routinely made to balance the potential costs of the event to the costs of solutions.

Hardware Failures & WAN Links

The goal for hardware is to use the hardware as long as it is functional without significant levels of failure. Glastonbury IT has established defined refresh policies for most types of equipment. The policy intervals are set based on historical data regarding failure rates compared to age and functional value of the system compared to age. The refresh policies are reviewed annually for any necessary changes based on changes in equipment failure rates. The overall goal is to have less than 5% failure rate on various hardware systems in the last year of functionality. There is more information on the current refresh policy in addendum one at the back of the Technology Plan.

Servers generally support multiple users, and as such, a failure on a server has more of an impact. To mitigate this risk, hard drive systems will employ RAID technology to minimize the risk of drive failures; Dual Power supplies will be configured in servers, and dual power feeds will be provided to the server. New servers will utilize Virtualization technologies where possible so that servers can be quickly migrated to different hardware.

Glastonbury IT utilizes and monitors T1 circuits, Cable VPN circuits, and DSL circuits to provide the network backbone. These circuits are monitored on a 24 hour basis with alerting technologies employed to quickly notify staff via email and paging technologies of potential outages.

Power Failures and Natural Disasters

Power failures and natural disasters cannot be avoided, but the effects can be mitigated or at least minimized. Technology systems are now purchased with UPS (Uninterruptable Power Supplies) systems to negate the effects of brief power losses. The town is fortunate that 60% or more of the staff operates in buildings that have backup generators that will mitigate longer power outages. For hardware that is not located in such facilities, software is configured to ensure that technology is properly shutdown to avoid data loss and software corruption.

To protect against natural disasters two issues needed to be addressed. First, the protection of data in the event workstations, servers, routers, and switches are damaged or destroyed. All staff are instructed to save data on servers and to avoid keeping any data on local workstations. Server data is backed up at least nightly and is saved off-site at least weekly. Backups are tested on a semi-annual basis. In addition, Shadow copy is configured on most servers to provide additional backups during the day in the event that data was accidentally overwritten or deleted. For more information regarding backup see Appendix B for the Glastonbury IT data backup policy.

The second issue for natural disasters is the ability to create temporary workspaces and utilize alternate hardware if spaces or systems are damaged. New servers are being configured with Virtualization so that servers and software can be moved between normally incompatible hardware based systems using common virtualized device drivers. These deployments are in year two of a five year rollout and will be accomplished as existing servers are replaced.

Wide area network hardware is located in facilities that include backup generation so that WAN links will not be disabled for a large group of staff in the event that a specific location was to lose power.

Operating System and Application Updates

Glastonbury IT supports over 90 operating systems and software applications. Many of these applications require periodic updates. In addition, many of the updates require current patches to other components, i.e. an update to a web application might require an update to the Java Virtual machine on all the workstations that would utilize the web application. To support the updates to the operating system Glastonbury IT has installed and configured Microsoft's WSUS (Windows Systems Update Service) to provide updates to operating systems and MS office applications. Patches are configured to deploy automatically to reduce the potential for an un-patched system. To validate updates and patches Glastonbury IT receives all the patches on their workstations and servers five days prior to the updates being deployed to the town staff.

Updates, upgrades, and patches of custom application software is scheduled between Glastonbury IT and the specific user departments to minimize the costs of user outages and the potential effects of update failures.

Projects are underway to automate the deployment of updates and patches using Group Policy as a central deployment technology. Once in operation updates can be done during off hours to minimize downtime.

Viruses & Other Forms of Malware

Viruses and malware are a fact of life in the world of technology. It is always challenging to provide a balance between protecting the systems from harm and providing the user with sufficient capabilities to perform their tasks. Microsoft has provided a number of tools to assist with this endeavor and the town utilizes these tools as much as possible. First, and most important, is the standards Microsoft sets for all developers of software for the Microsoft operating system environments. The requirements are that user applications must be able to run in a Standard or limited user environment. Glastonbury IT adheres to this policy and requires vendors to adhere to it as well. Glastonbury IT works with vendors to identify specific folder locations and registry locations where permissions might need to be modified paying careful attention to sensitive areas of the operating system where viruses and malware could be used. This approach has been very successful and Help Desk Requests for Viruses and Malware are less than 2% per year.

All workstations and servers are configured with Anti-Virus protection and all email entering and exiting the domain are scanned for potential threats and quarantined as necessary. Content filtering is employed to block potentially harmful websites that frequently can be the source of malware. All systems on the town network are routed through the Content Filter system and all email accounts are routed through the spam and malware filter.

Strategic Objective Two - Reduce Energy and Paper Consumption in Technology Related Functions

Strategic Objective Two has been an ongoing since 2003 when the IT started configuring desktop computers with Flat Panel monitors that used 35% less energy. In 2008 we have five major initiative aimed at achieving Strategic Objective Two.

1. Continued Replacement of CRT Monitors with Flat Panel Monitors

Glastonbury IT is in the final year of replacing CRT monitors. The Town has been replacing CRT monitors for the last five years and will complete the process this year in conjunction with its standard six year refresh policy.

2. Deployment of Sleep and Low Energy Mode Software Policies

Microsoft based workstations come with capabilities to enable Low Energy, Sleep, and Hibernation modes for inactive machines to save energy. These modes have generally been difficult to implement due to conflicts with software application compatibility. Glastonbury IT has been working for the last two years on a department by department basis to find acceptable settings to achieve a balance of

stable operation and energy savings. Approximately 70% of machines are now configured for some form of sleep or low energy mode with another 20% slated for completion in the current year.

Additional plans are underway to develop or procure more advanced software to allow more machines to achieve a higher state of energy savings. i.e. enabling sleep mode instead of low energy by acquiring software capable of monitoring compatible application states.

3. Utilize Extended Refresh Standards

Glastonbury IT utilizes an extended Refresh standard compared to most other entities in an effort to reduce the recycling and disposal of older equipment. The present refresh cycle for the Town of Glastonbury is six years for workstations and five years for servers. Compared to many other agencies and business this is one to three years longer. Several procedures are utilized to make this possible.

- New Workstation standards are higher than standard deployment workstations. Glastonbury IT sets and reviews the standard workstation configuration to use a stepped up processor, front side buss, and increased memory to allow the unit to perform its functions adequately for a longer period of time. Although the cost of this increase is from 10% to 15%, the savings in increased lifespan and decreased staffing for deployment more than offsets the cost. The gain is less hardware being recycled on an annual basis.
- Two Rotation Cycles are utilized. A primary rotation cycle is utilized for the majority of Town Staff users that utilize standard applications and perform normal workstation functions. The primary rotation positions are refreshed on a six year basis. The secondary rotation cycle is comprised of high computing users and limited computing users. High computing users depend heavily on the computer for their job function and utilize a large number of applications, many simultaneously. The limited computing users generally serve only one primary function, such as a web browser function for library catalog searching. Workstations in the secondary rotation cycle are utilized for either four or five years by the High Computing User and then re-imaged for use by the limited computing user for the balance of the six year life-cycle.
- A spare workstation is maintained by Glastonbury IT, preconfigured with most needed applications in the event that a workstation fails minimizing interruption to staff.
- Since most of the equipment failures occur in the final year of a workstation's life-cycle, a spare new workstation is kept ready for deployment in the event a scheduled workstation for replacement fails so that staff interruption is minimized.

4. Reduce Print Output Devices

In early 2008, Glastonbury IT performed a comprehensive analysis of print output technologies and devices utilized by the town. The goals were threefold:

1. Reduce the number of output devices being utilized. Printers and copiers utilize significant amounts of energy, even when not performing print functions.

2. Analyze current level of printed output for quantities and purposes to determine where reductions of overall output could be achieved, as well as, to set base standards for future comparisons of success or failures of reduction initiatives.
3. Gather data for development of electronic output replacement initiatives.

The analysis has provided the following results:

- A baseline is now established for annual comparison in an effort to reduce printed output. The baseline was set at 178,000 pages per month as of January 2008. Future analysis will be done on an annual basis to show net reductions/increases on a departmental basis.
- A reduction of seven output devices was included in the technology deployment plan for the FY2009 with additional reductions expected over the next two years..
- Several initiatives have been developed in conjunction with various departments to convert printed output to digital electronic output are in various stages of deployment.
- Reconfiguration of Output Device Settings has been initiated to utilize duplexing operations on outputted data to reduce quantity of paper consumed. At this point conversion to duplexing is configured as an option to staff members so that determinations can be made regarding how thoroughly it can be utilized.

5. Utilization of Virtualization Technologies

Virtualization technologies provide a capability to utilize existing hardware equipment to greater efficiencies in both the server room and the Technology Lab. The following steps have been implemented utilizing Virtualization Technology:

- Two physical servers have been deployed in 2007 and 2008 that each contain three or four virtual servers. This has reduced the physical server footprint by nearly 10%
- Workstations in the Glastonbury IT offices are being configured with Virtual desktops to allow development and deployment testing without the need for physical desktops being used for this purpose any longer, thus saving both space and energy.

A number of concepts are being evaluated now for increased use of Virtualization. It is quite possible that virtualization technologies will enable as much as an additional 20% reduction in physical servers in the next three years.

Strategic Objective Three – Provide 24 hour Customer Service to Glastonbury Citizens

The Town of Glastonbury has for several years been working to provide services to the public that would allow tasks to be performed on the Internet 24/7. A number of systems have been installed or upgraded to provide this capability. Improvements have been made to these system's capabilities in the current fiscal year and additional initiatives are being considered for the near future. A new website has been completed improving the user experience with significant improvements in navigation and search capabilities. A large quantity of information and forms has been added to provide easy access to information online.

New applications and major upgrades to existing applications now undergo a technical review for compliance with online access initiatives. Applications that do not provide abilities for online access and interaction are slated for eventual replacement.

Glastonbury IT performs periodic review of applications for potential provisioning to web capable interaction and during the budget process will review potential applications for funding.

Strategic Objective Four - Improve Return on Investment (ROI)

The Town of Glastonbury presently has approximately 30 specialized departmental software applications that are used by various departments. While it is very necessary for departments to obtain and utilize these applications for their departmental needs, a number of inefficiencies and cross-data compatibility limitations has been found that have an effect on overall return on investment for the town. To combat this, Glastonbury IT has been working with departments and the town purchasing department to reduce these issues.

Glastonbury IT has developed in conjunction with the Purchasing Department centralized review of technology initiatives. When any technology is considered for procurement and sometimes even for upgrade the following requirements are now being reviewed and considered:

- New and upgraded applications need to provide online interaction for citizen access. Applications that contain data and records that citizens would benefit from online access to need to have Web interface capability the Town website.
- Databases utilized by departmental applications need to have cross-connectivity capabilities to provide automated access or uploads between systems such that information need not be re-entered multiple times into disparate systems.
- Departmental applications will be procured wherever possible that will support multiple department needs where needs are similar in nature so that support and support costs for specific department applications can be reduced.

- Hardware procurements are reviewed for overall cost effectiveness, utilization of most effective contract pricing by comparison to multiple regional, state, and federal contracts, energy consumption requirements, and ability to recycle equipment at the end of the life cycle.

Many of these policies have been in place for more than two years and several applications have been purchased or upgraded to meet these requirements. For 2008 Glastonbury IT is working with several departments to develop automated data exchanges with newer and existing systems that will relieve town staff from duplicate manual entry of information thus bringing new efficiencies and improved ROI for those applications.

Strategic Objective Five – Setting the Right Level of IT Service

Glastonbury IT receives 400+ support requests per year. At any given time over 30 projects are in production or waiting for execution. To provide Town of Glastonbury staff an adequate level of service, the project and service requests require proper prioritization, procedures, and documentation to be successfully completed. In 2008 a new initiative was undertaken by Glastonbury IT to streamline its processes to Industry Standard Best Practices to better organize these demands. The first step in this initiative has been to purchase a new Help Desk software system. With the system installation nearly complete the following tasks will be implemented to accomplish the overall Strategic Objective.

- Town staff will be trained on procedures for entering support requests. The system will allow staff to individually enter requests so that loss of information due to second hand communications will be minimized.
- Requests will be organized based on request or problem severity and assigned accordingly to a Service Level Agreement (SLA).
- Solutions involving user training or education will be documented and be made available to staff as frequently asked questions where appropriate to diminish repeat requests.
- Automated escalation procedures will be configured to address support requests that fail to be resolved in required time periods for requests of a critical nature.
- Email communications will be configured to allow technical staff and support requesters to be kept apprised to status updates of the requests in process.
- Support Requests and Projects will be entered and monitored on the new system so that time management, departmental reporting, and managerial oversight can be integrated into combined status reports.

A second initiative related to providing the right level of Glastonbury IT support involves improving response time to requests for software patch deployments and desktop security modifications where entire departments or possibly the entire town staff is affected. In the past, many of these tasks

involved touching each desktop to configure or deploy the update of configuration fix. In 2007 Active Directory was installed and Group Policies were enabled that allowed mass changes and updates to be deployed from central servers. For 2008 this new capability is being extended by training Glastonbury IT support staff to create custom deployment packages, (MSI Packages), for updates to the 90+ software applications in use by the town departments. This capability will allow deployment of updates that once might have taken 80 man hours to deploy to be completed in as little as four or six hours.

Strategic Objective Six – Keeping Town of Glastonbury Software Cost Effective and Legal

The Town of Glastonbury budget includes significant costs for new software and for maintenance of existing software systems. Starting in 2006, Glastonbury IT began to review the practice of purchasing maintenance contracts yearly for software applications and operating systems. Based on the results of those reviews some software application purchases and operating system purchases were modified to purchase based on the lifespan of the hardware. These changes created an estimated cost savings of about \$20,000. over a five year period. Based on that success, many software based purchases are now evaluated for similar potential savings. In addition, application software is also evaluated for the most effective software bundle configuration. For example if 80% of town staff only used Word, Excel, and Outlook then Microsoft Office Basic can be deployed instead of Office Standard. For a town the size of Glastonbury, this cost saving can be more than \$ 4,000 per year.

Businesses and governments alike must maintain correct inventory counts on software to ensure legal compliance with software licensing. With as many computers that Glastonbury IT supports this can be a significant challenge. In 2003 a new database system was developed to track and maintain the information necessary to monitor compliance. For 2008 a significant improvement has been implemented to automate the tracking process for installed applications and monitor compliance. A new software and hardware auditing system was installed that automatically tracks installation of software applications and allows input of license purchases. The system is capable of “on the fly” reporting of licensing status of all installations. In addition, this system integrates with the Help Desk system to provide correlation between support requests and the associated software applications and hardware devices. This capability allows more accurate tracking of software licenses and reduces documentation time by support technicians.

Future Plans

Presently, the Town of Glastonbury has 24 physical production servers located in seven server rooms. As the fiber optic backbone is extended to more buildings consideration of server consolidation and

virtualization will be examined and expanded wherever possible. It is foreseeable that a 30% to 50% server conversion to a virtual server environment will be possible.

Glastonbury IT and Glastonbury Board of Education has been monitoring over the last few years the growing demands on the wide area traffic and the increased demands for technologies such as distance learning and video streaming. Under consideration is a joint initiative to expand our existing fiber optic backbone and wireless infrastructure to encompass the remaining schools and town buildings.

Glastonbury IT has identified to date 13 separate applications for potential development of online capability in addition to the eight applications being developed at this time. Every department is now focusing efforts on delivering to the town web site opportunities that enable citizens to avoid trips to town hall.

In connection with the introduction of the new town website, a number of training programs were instituted by Glastonbury IT this year. In many respects the success of the system has been largely due to the number of employees now involved with the daily updating of the site. The recognized need for training on some of the more advanced capabilities in the new system is causing Glastonbury IT to adapt the training strategies to continue the educational process to other applications in the hopes to further make effective use of the technology already in use.

Appendix A - TECHNOLOGY REPLACEMENT & REDUNDANCY POLICY

I. Workstations

It is important to replace computers on a schedule so that a minimum number of computers fail causing lost staff productivity and inefficient deployment of replacement workstations.

Workstations configured together in groups of four to eight machines can be done in as little as 1.5 hours technician time per station. When deploying workstations after a failure where it is done one at a time it can take four to six hours.

The life expectancy of PC workstations currently in use ranges between five and seven years. Historical records have indicated that at six years you can expect a 10% failure rate on the machines. Based on that information a six year replacement cycle is used for replacing workstations.

It should be noted that this rotation is based on workstations working adequately for six years with minimal percentages of failures. The failure rate is monitored yearly. As new workstations become available every year at lower costs the concern is that the materials used in production are decreasing in value as well, thus decreasing the life expectancy of the workstation.

There are only a few items on a workstation that can be simply swapped out with generic equipment. Most of these items can be purchased in advance and kept in inventory ready for deployment. Items to purchase and have on hand include hard drives, both IDE and Sata, USB mice, and keyboards. By tracking annual usage it should be easy to estimate quantities and purchase these items once or twice a year. Having these items on hand significantly decreases downtime of workstations.

Two rotation plans are used. Plan one is intended for standard users that use the computer for two to three normal applications at a time. This rotation places the workstation at the desktop and will be used for the life of the equipment. Plan two is intended for high demand users and applications where several applications requiring significant processing power and memory is required or where the user is significantly impacted by even a short work disruption requiring the workstation to be highly reliable. For rotation plan two the workstation is placed in service for approximately four to four and a half years and then it is replaced. The old workstation is then reimaged and re-tasked to operate as minimal workstation such as a library catalog browser or a web kiosk machine. The secondary rotation will operate for two to three years before being replaced by another plan two workstation.

II. Servers

Computer servers are high end computers used to house data and run applications on a centralized basis that are generally accessed by many users. Applications such as email, directory services, and database management are critical systems that operate on computer servers. A replacement plan for these servers has been established at **five years** based on industry standards and comparisons with other municipalities. In some instances, this schedule may be extended for special application devices that are appropriately designed for it.

Currently the best protection from server outages is through redundancy. When purchasing server hardware it is purchased with redundant power supplies and RAID 1 or RAID 5 drive configurations. Although it is not a foolproof solution it does protect the most common causes of failures. A new option is emerging with the advent of virtualization whereby servers are purchased and built with a virtual base operating system that will then host multiple virtual servers. This technology allows space to be left on a server to accommodate additional virtual servers in the event another virtualized server fails. The costs for this technology are becoming reasonable and continue to get better as time goes on.

III. Switches and Routers

Switches and Routers are evaluated at budget time once they reach 5 years of age. The reality is that the technology changes so fast that most switches and routers will need to be replaced in approximately five years due to obsolescence. Historical review of equipment failure shows that routers will start to fail after six to seven years, although little data has been available since few switches and routers have been in service that long. New developments in Voice over IP and quality of service will probably continue this trend.

Switches and routers continue to get more complex every day. Current technology switches are in fact routers themselves with complex layer-three configurations. In many cases there are switches and routers installed in a network, that if were to fail, would shutdown all technology operations. To prepare for such issues the purchase of modular layer-three switches using a standard device throughout the enterprise and then purchasing an additional unit as a backup device is utilized. In either case it is imperative that configurations of every switch and router be backed up on external media to allow for restoration onto a backup device. This is an area frequently overlooked and can cause some of the most expensive outages.

Hardware vendors prefer to sell next day business repair service and that is indeed one option. In today's technology environment it is probably reasonable to assume a 24 hours downtime period when using that kind of service; however, it frequently extends beyond one day. The

technology is so complex that frequently new parts are ordered and installed the next day only to find out that there is yet something else wrong. Using a modular approach to equipment purchases with a spare unit in many cases is the fastest method for restoring service. As a standard practice Glastonbury IT purchases similar switches for most environments and also purchases a spare in case of an outage.

IV. Printers

As a general rule printers are workhorses. It is not uncommon to find laser printers still in operation that are eight or nine years old. There are three factors that govern a replacement plan for printers.

- Availability of replacement parts. Gathering data with various printer service providers has helped to determine that about ten years is the outside limit where parts are available.
- Functionality. The policy is to recommend a replacement printer once the existing printer has reached ten years of age assuming that it has been performing adequately up to that time.
- Energy Utilization. Printers use a significant amount of electricity. Major steps by printer manufacturers in recent years to utilize less electricity and to set power saving modes during non use make it a compelling argument for replacing units with more efficient models possibly sooner than ten years. Specific research on the energy utilization of both the old and the new unit should be done to consider a replacement.

In most instances printer repair is outsourced to external vendors except for minor repairs such as feed roller replacements. A good policy for printers is to have a spare network printer on hand that can be deployed quickly. For municipalities that utilize multiple subnets and DHCP with reservations a spare printer can be preconfigured on each DHCP scope and a printer installed on a server so that it can be quickly installed on workstations. Having one or even two printers can save on vendor costs for printer maintenance by having a printer tech fix multiple printers on one service call. At the same time staff has not been significantly affected by a printer outage.

Standard replacement cycles for black and white printers are eight years. Replacement cycles for color printers are six years. These cycle durations are based on historical data collected regarding failure rates and cost of repairs.

Appendix B - DATA BACKUP POLICY

I. Overview

In general, a Data Backup Policy defines the requirements for backing up computer based data to protect against equipment failure, natural disasters, and human error. The requirements need to include both backup schedules to meet the various needs of users creating data based and on their use and update schedules of the files and the equipment necessary to restore the data in the event of a loss.

II. Schedules

To understand the necessary backup schedules to protect data it is necessary to understand the typical cycle of how files are created and updated. In general there are four cycles to be considered:

1. Office type documents that are created for a specific purpose. These files are generally worked on for a few days, up to about a week, and then left relatively untouched. Human error causing undesired update or deletion is most common type of problem that needs restoration or attention.
2. Office document or database document that is used on a bi-weekly basis. This type of document is generally used for activities such as Payroll, Human Resources, and/or Accounts Payable. The typical cycle for these files is updates occurring every 12 to 15 days.
3. Office or database files that are used on a monthly basis. These files are generally produced or updated on a monthly basis, usually right before or right after a month ends.
4. Office or database files that are used on a quarterly basis. These files are generally produced or updated on a quarterly basis, usually right before or right after a quarter ends.

III. Equipment

To properly protect the data network all four cycles need to be considered. Multiple technologies should be used to best accomplish this goal. To achieve these goals the following recommendations should be considered:

- Utilize technology built into most server based operating systems such as shadow copy to create backups of office type data files that will be updated frequently over a short period of time. Setting the interval to every three hours for backup should work in most cases. This recommendation helps in a situation where a file is created and edited multiple times in the same day. In the event the file is deleted or undesirably altered within that day it can be recovered, whereas a daily tape backup would not have backed it up.

- Implement daily backups using tape or a Network Attached Storage Device (NAS). These daily backups should be used in a three week rotation. This will protect data that is worked on for several days in a row against equipment failure.
- Implement a weekly backup using tape or NAS. These weekly backups should rotate every six weeks. This backup rotation is intended to protect data that is updated every month. The extra two weeks is to cover the potential delay after a month closes for delays in completing such monthly processes due to vacations or similar situations.
- Implement a monthly backup policy using tape. These monthly backups should be rotated on a semi-annual basis. This procedure should protect files that are updated or created quarterly. If possible it is recommended that these backups be kept on a more permanent basis. It is suggested that backup tapes that are used on daily basis or weekly basis be used for this purpose after a years' worth of use and then retired by being used for a permanent monthly backup. This helps to keep the backup tapes in good working order. It is not recommended that a Network Attached Storage device be used for permanent storage.

Tape based backup equipment needs to have some procedures implemented specific to such equipment:

- Head cleanings should be done according to recommended manufacturers procedures. Please note it is possible to clean the heads of the units too frequently.
- In situations where there are multiple tape units in various servers, all units should be the same unit type, use the same brand of software and be kept at the same version level to allow a server to be able to restore data from a failed server.
- If possible have access to a spare external tape unit that will work for any of the tape units in place. This recommendation is for Disaster Recovery purposes in situation where the original hardware is damaged and unusable.

The last recommendation would be to establish a relationship with another municipality that would agree to utilize compatible equipment for purposes of disaster recovery on a larger basis. It would be best for such entity to be located far enough away to be unaffected by the types of disaster that might occur in the immediate area, such a Hurricanes, Tornado's, or similar situations.