Enterprise Technology Strategic Plan

2009 - 2012

Department of Technology Services (DTS)
Montgomery County, Maryland

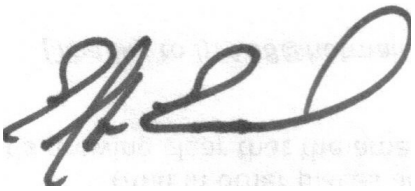
Message from the Director

Montgomery County Government (MCG) has made significant advances through its embrace of technology solutions that improve business response to its customers as well as streamlining the internal business processes. To continue a positive contribution from our investment in Information Technology (IT) solutions and innovations, it is essential for Montgomery County Department of Technology Services (DTS) to articulate the interpretation of Executive guidance as well as business mission objectives to confirm its understanding and prepare for future technology choices.

The purpose of this Enterprise Technology Strategic Plan (ETSP) is to describe and document DTS's interpretation of the direction of technical issues and to set the baseline for how information technology solutions are approached. While the ETSP is a point-in-time assessment of current processes and methods, it illustrates both the significant achievements and streamlining from previous efforts as well as sets a definitive road map for new objectives and methods.

This is a "living" document that can and will be reviewed on a periodic basis both internally as well as through the MCG Executive Leadership to ensure that it continues to support the Enterprise Business mission and strategies. The use of the ETSP to guide our Information Technology investments and activities will maintain a sustainable alignment between our corporate mission and technology improvement expectations.

E. Steven Emanuel
Director
Department of Technology Services



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1 Introduction

The Department of Technology Services (DTS) of Montgomery County is a fully integrated Information Technology Business Unit in which all County government departments and offices have access to information within a secure environment to perform government services. Due to de-centralization of the County government, however, each department or business unit was given the option to have an individual Information Technology Services (ITS) work unit with dedicated staff to address their independent and respective IT needs.

The most recent version of the Montgomery County Information Technology Strategic Plan (ITSP), (2006 – 2007) provides an overview of the current status of information technology services provided by DTS. This new Enterprise Technology Strategic Plan (ETSP), (2009 – 2012), will be an enterprise wide ITS initiative. The goal of this strategic plan is to drive Montgomery County's technology service solutions and business needs for departments through an enterprise process and create collaborative efforts through a centralized process, facilitated by the DTS.

Due to the of rapid advancements of information technology capabilities, the impact that information technology is having on today's business environment and the need for the business to strategize on technology choices, Montgomery County has recognized the need to assess its use of information technology. The assessment will allow MCG to better

manage its information technology inventory, technology costs, and to manage its business with a definitive IT direction and long-term strategy.

As of September 2006, the Information Technology Strategic Plan (ITSP) set the direction for DTS by looking at the business demand, selecting and documenting the strategic direction, and determining how limited resources (primarily funding and personnel) can achieve the plan. This current plan ETSP will outline a future oriented technology program that directly supports Montgomery County's missions, goals and objectives. Additionally, the ETSP will tactically and strategically guide Montgomery County Government (MCG) to a more proactive "enterprise" approach to implement and manage IT solutions that will provide a more global benefit to Montgomery County as a whole.

This Strategic Plan is a "living document" meaning as we progress and reach our goals the plan will be updated accordingly. It represents MCG's current statement of direction on technology issues and should be used as a starting point for all new IT acquisitions or development projects. As the standard for IT services is established through a governance process, the approach enables the DTS to define, develop and maintain a portfolio of technology solutions that can be effectively supported to meet business expectations, given the availability of human and fiscal resources.

Through continuous input from the business units, ongoing data collection, and regular "report card" updates, this Enterprise Technology Strategic Plan will remain current. MCG will continue to use this document as a motivating factor to strategically move forward.

Why an Enterprise Technology Strategic Plan?

From inception, MCG has transformed the way it serves its citizens. This ETSP transitions our current methods to a comprehensive "themed" business approach. This is intended to demonstrate the partnership between all of Montgomery County's Business Units and DTS, with the ultimate goal being to improve customer service delivery through overall strategic forward thinking.

2 Mission

2.1 County Business Mission Objectives

The Department of Technology Services (DTS) must direct its efforts toward the satisfaction of Montgomery County Government (MCG) County Executive's Mission Statement. The purpose of the Enterprise Technology Strategic Plan is to provide a means of responding to both business and technical direction by focusing on the internal efforts of DTS, and by aligning both DTS and departmental IT resources and long term implementation initiatives with the Mission of the County Executive. With this mission in mind, ETSP goals will be declared to ensure that Countywide Technology Support is aligned with the County Executive's Mission.

County Executive's Mission Statement

> WE pursue the common good by working for and with Montgomery County's diverse community members to provide:
>
> - ***A Responsive and Accountable County Government***
> - ***Affordable Housing in an Inclusive Community***
> - ***An Effective and Efficient Transportation Network***
> - ***Children Prepared to Live and Learn***

- ***Healthy and Sustainable Communities***
- ***Safe Streets and Secure Neighborhoods***
- ***A Strong and Vibrant Economy***
- ***Vital Living for All of Our Residents***

AS dedicated public servants, the employees of the Montgomery County Government strive to embody in our work these essential values:

• Collaboration	**• Competence**	**• Fiscal Prudence**
• Inclusiveness	**• Innovation**	**• Integrity**
• Knowledge	**• Respect for the Individual**	**• Transparency**

2.2 Technology Mission

Montgomery County will utilize IT to:

- Enable our employees to provide quality services to our citizens and businesses
- Deliver information and services to community residents
- Increase the productivity of government and citizens

Background

An Information Technology Strategic Plan is a road map. It represents MCG's current statement of direction on information technology issues and is used as a starting point for all IT acquisitions and IT development projects.

The Enterprise Technology Strategic Plan (ETSP) is intended to present the collective enterprise's statement of policy toward IT, the IT organizations' vision, directional statements and broad decision guidelines. It provides the guidelines through which IT projects are selected, planned, executed, and measured. MCG's technology and business leadership must further develop a plan for the adoption of enterprise technology architecture. DTS must continuously review and revise business and technology details in order to implement the strategic initiatives outlined in this ETSP.

The ETSP is a "living document," which will be reviewed at least once per year and updated in conjunction with the MCG's Mission and Business Strategy. Each version of the Technology Strategic Plan will be distributed widely so that it may be effectively used as a planning and communication tool.

Some specific uses for this Enterprise Technology Strategic Plan include the following:

- Describe the opportunities and benefits for leveraging common technology investment
- Describe support operation services implications for technology
- Provide a framework for cost containment and cost reduction activities
- Provide support for tactical (0–2 years) decisions
- Build a direction for strategic (2–5 years) decisions

3 Vision

This Enterprise Technology Strategic Plan(ETSP) was developed through a global partnership, commencing with concurrence from the IT Policy Advisory Committee (IPAC) with key internal Department of Technology Services (DTS)staff and external support services, following an industry standard strategic planning model. The DTS team was responsible for shaping the enterprise theming model and identifying/validating the departmental and common IT direction, principles, goals and objectives as a part of the countywide partnership.

DTS began by assessing the current state of IT within Montgomery County Government (MCG). This assessment will continue to be validated through an ongoing, established methodology that includes data collection, analysis and discussions with key MCG and DTS stakeholders. These steps are an important part of the development, planning and validation process to facilitate the assessment of the current state of IT requirements, perceptions, applications and provider organizations.

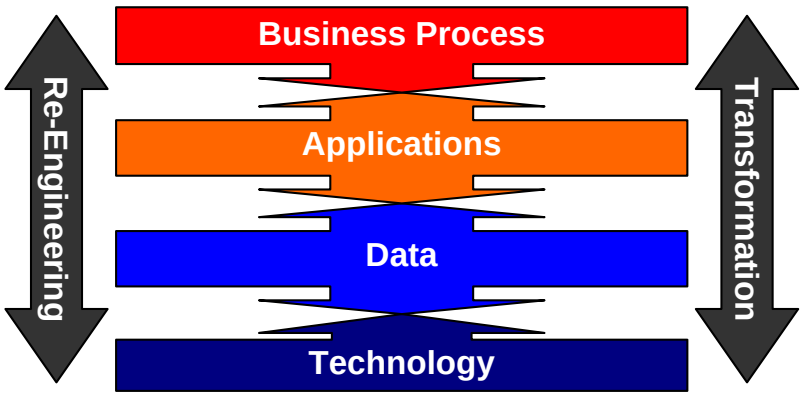
Key input to the plan includes the following:

- Presentation and feedback from IPAC on the concept of the Enterprise Technology Strategy plan
- Initial interviews with County Department Directors and Leaders
- Group interviews with Directors and DTS staff as a part of the theming construct
- Workshops with DTS management and program management staff

- Montgomery County Council Objectives
- FY 2006–2008 Montgomery County DTS Technology Strategic Plan
- DTS-specific documentation

The following figure depicts a nationally recognized strategic planning approach, which places an emphasis on business-driven planning for technology decision making at an enterprise level.

Figure 1 - DTS ETSP Approach



This plan builds upon the successes and strengths of MCG in deploying and utilizing technology in support of its operations. The ETSP also builds on the accomplishments and current strategies MCG has made in exploiting IT to further the objectives of providing services to its local businesses and citizens, notably:

- **Alignment of business objectives and direction for DTS**
  There is an emerging governance structure that includes participation from business leaders and managers in the early phases of the IT investment life cycle. There is high-level sponsorship and involvement from the business for transformational technology initiatives (e.g., Enterprise Systems, project and program processes, organization alignment supporting technology partnership).

- **Execution of various initiatives aimed at improving the overall planning and management of technology**
  DTS established a major initiative steering committee inclusive of technology leadership input, in concurrence with the development of an ETSP that articulates a unified and clear mission, vision and objectives. The ETSP also bonds the options for attaining those objectives, and sets the road map for attaining them. DTS established an enterprise Project Management Office (PMO) as an enabler to address business needs and provide necessary tools and processes to manage projects efficiently and effectively. As well DTS leveraged outsourcing.

- **Dedicated departmental technology staff**
  Many of the larger departments within the County have staff that support existing technology solutions. Most departmental teams have alliances with DTS and

support standards, processes and rules that support a consistent approach to technology selection, delivery and support.

- **Dedicated DTS staff**
  Many DTS personnel have long tenure and have comprehensive understanding of the business, mission and processes of MCG.

- **Use of technologies to transform the business**
  The plan for the implementation of an Enterprise Resource Planning (ERP) solution as well as a consolidated call center Constituent Relationship Management (CRM) have illustrated a willingness to change existing business processes and adopt best practices. MCG has consistently shown its desire to be a leader in proactive approaches as a government.

- **Effective establishment of a information security program**
  Re-organizing and alignment of information security, emergency operations and Disaster Recovery/Continuity of Operations Plan (DR/COOP) to be inclusive of DTS; conducting ongoing self-evaluations of security status through internal and third-party audits, resulting in highly secure IT services .

- Enhancing business performance on more sophisticated technology service offerings.

- Initial efforts at standardizing on current platforms and applications.

- Consolidation of systems and servers to support green initiatives, reduce support costs and maximize enterprise benefits.

The ETSP also highlights MCG and DTS' specific IT capabilities, including areas that present opportunities for improvement. During the assessment, DTS staff observed these areas for enhancement or escalation:

- **IT Governance**
  Montgomery County needs to adopt a formal IT governance process. With the exception of IT projects that are selected through the Annual IT Review process, many smaller efforts are selected and implemented on an informal basis, such as expensed or non-capitalized projects. There is the IT CIO Approval request and prioritization process, a component of the overall DTS support process which requires departments through a project evaluation, but only if there are dependencies on the core IT support or infrastructure. In this process, IT initiatives are vetted based on strategic value, technical risk and return on investment (ROI). This, in concert with future plans for consolidated enterprise project management and tracking, should facilitate better management and delivery of IT project benefits.

- **Knowledge Management**
  Montgomery County needs to adopt a formal IT knowledge management program to ensure that institutional and technical knowledge exists in a central repository that is accessible to all who require access to it and limits loss of institutional knowledge.

While DTS has implemented the Self Help Information Portal (SHIP) its base for knowledge collection is currently limited to IT user based help information. A more robust Knowledge Management initiative will comprise business/technology recordation and further support the historical roadmap for technology innovation and current state.

- **Business Intelligence**
  MCG has performance reports generated by multiple systems and methodologies; however, it lacks a formal County-wide data warehouse with business intelligence derived from multiple business units. This effort is anticipated following the development of the ERP solution.

- **Enterprise Architecture**
  MCG has made significant progress in architecture development in individual areas (i.e., application architecture and infrastructure, security, network, data center operations); however, there is a growing need for a comprehensive business Automation Framework (or Enterprise Architecture -EA) that integrates business, information and technology. DTS has defined technology standards through internal architecture governance. Improvements would include the establishment of an enterprise Architectural Governance Council (AGC). The AGC, which would include business functional members, would be responsible for developing standards. The architects (business and technology) attend sessions to present topics or to escalate issues that cannot be resolved within a specific project. This is the process for approving standards and for approving exceptions.

- **Adoption of an Integrated Information Technology Strategy**
  MCG, as enterprise solutions are implemented, will need to have an integrated enterprise information strategy, including:
  - Information standards and principles
  - Access to MCG-wide information assets (i.e., MCG-wide search)
  - Distribution mechanisms
  - Operational Governance (i.e. expansion of “policy” to operational support guidance)

- **Application Environment**
  MCG’s current application environment is a diverse assortment of platforms and applications due to the complexity and historical legacy of running a governmental operation. However, DTS has performed an application portfolio analysis to evaluate the applications based on technology, mission alignment and business value to identify targets for migration or integration or replacement based on current and future requirements. This effort will continue to receive emphasis as near term enterprise solutions through the Tech Mod programs will have a significant impact on the incorporation, management and retirement of this significant assortment of systems.

- **Information Security**
  MCG has re-organized information security under the Office of the Chief Information Officer to allow for direct and independent focus on security issues. The County’s

information security policies are continually in refreshed to identify and classify information (i.e., PCI, HIPAA, sensitive but unclassified, and public) based on security levels in order to design rules for systems and allocate resources accordingly.

- **DTS Staffing Plan**
  DTS must formalize a long-term staffing plan which identifies required staff skill "competencies" and defines roles and responsibilities required to deliver defined IT products and services. The results will use these competencies to drive the hiring process and source selection processes (which will include strategic thinking on internal hiring as well as outsourced provisions). This staffing plan should also be used to support imperatives and priorities for technology knowledge base development as well as roadmaps for employee positional succession planning.

- **Communications Strategy**
  DTS provides communication and outreach to its stakeholders through various mechanisms and in multiple formats. DTS, however, does not have dedicated staff to perform this function, with the exception of Outreach services in the Cable Office. A defined communication strategy is key to the ongoing education of DTS technology staff as well as County leaders, departmental partners and senior leadership on technical innovations, risks and consequences of actions for implementations or delays in addressing technology viability.

- **IT Infrastructure Environment**
  DTS currently maintains a focus on technology consolidation and optimization. In an effort to validate flexibility, adaptability and position in the marketplace, DTS should conduct an independent benchmarking study on its distributed computing, server infrastructure, datacenter, Local Area Network/Wide Area Network (LAN/WAN) and Help Desk to assess requirements, current technologies being used, and the processes serving the user base. This information should be compared against industry best practices to identify opportunities for consolidation and harmonization.

- **DTS Disaster Recovery/Continuity of Operations**
  DTS follows a disaster recovery plan that provides for recovery at an off-site location. However, funding has been approved for the planning and development of a comprehensive Continuity of Operations (COOP) plan that will provide a more accurate focus on disaster recovery objectives and expectations. Disaster recovery and COOP training needs to be provided to all business and IT staff to validate expectations in the support and identification of mission critical systems.

In addition to these strategic operational initiatives, MCG recognizes that there are IT improvement opportunities in the following areas:

- Public Safety Communications / Interoperability
- Health and Human Services Technology Modernization
- Integrated Financial Management
- Resident Customer Services/Satisfaction

- Records Management
- Fixed and Movable Asset Management
- Human Capital Management

In short, MCG will, as part of the enterprise investment opportunities, invest in these initiatives in order to improve the technology environment, especially where technology can reduce cost and/or directly improve services. This effort will have several benefits.

- Better positioning for the strategic direction of the County Executive
- A better-managed IT environment that is stable, standardized and easier to support
- A lower total cost of ownership for the IT environment
- Better utilization of IT investment dollars through standards and infrastructure improvements
- Better access to information and proven technologies that allow end users to be more productive in their current assignments, which frees up resources for other priorities
- Increased end-user satisfaction
- Provide a path for technology innovation that limits the risks for such efforts and investments.

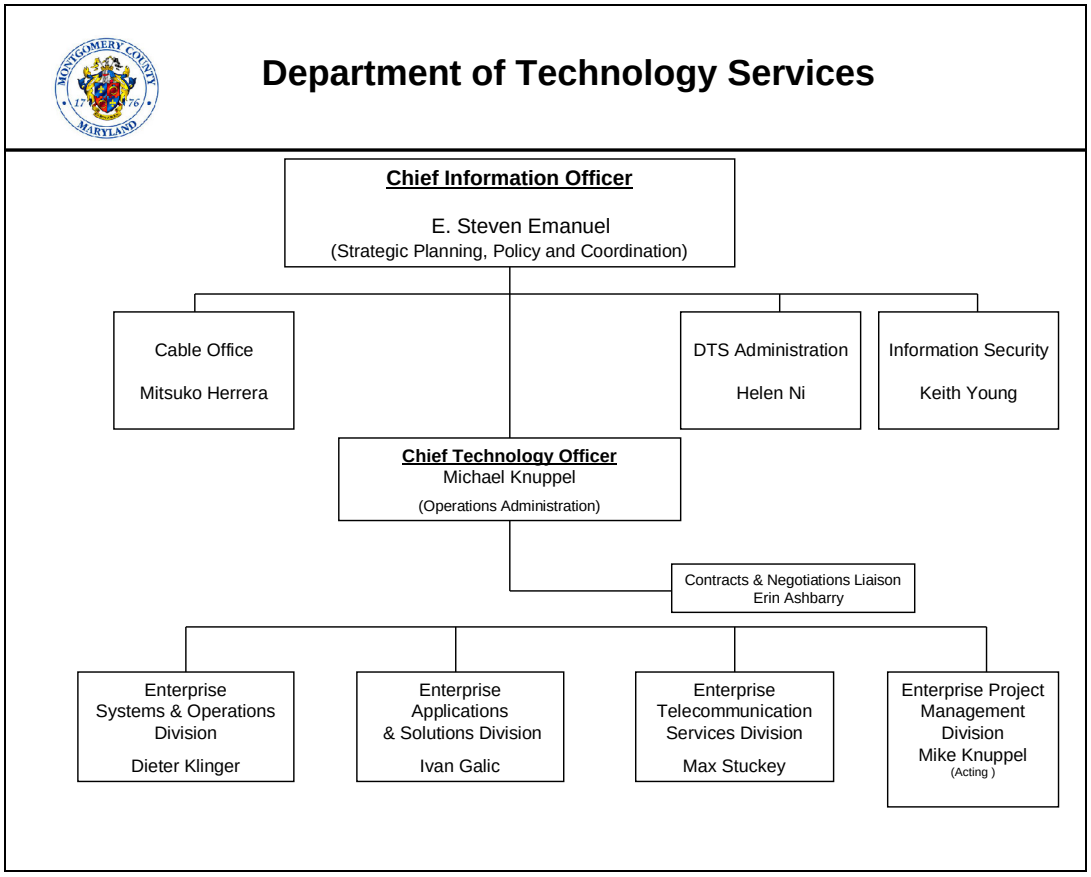
For MCG to realize these benefits, it is imperative that the County embrace change and enact a more structured and highly collaborative approach to managing its technology resources. Once the prioritization of the recommended initiatives has been made, the County will be positioned to ascertain quantitative benefits.

DTS has taken the most important step in managing its IT investment by recognizing the importance of a continued focus on technology at the enterprise level. This step, the creation of the Enterprise Technology Strategic Plan, was an effort that required cooperation from County leadership and the end-user community. The results of this cooperation will continue to be positive and establish recognition for DTS as the “center of excellence” for technology standards, delivery and management. To sustain the positive momentum from this initiative, the County must now continue its push for change and begin to embrace the momentum of the plan.

Clearly, all the recommendations of a strategic plan of this magnitude cannot and should not be executed at once. Fully approved projects with a short-term implementation schedules should continue to be funded and results posted for County leadership.

A full adoption and implementation of this plan will create an environment wherein technology investments and services will enable the enterprise to better achieve its mission. It also provides a consistent direction for DTS to achieve its IT services and support mission as stated at the beginning of the plan.

Figure 2 - Technology Support Organization



4 Focus on Enterprise

MCG leadership has been strategic and forward thinking with regards to the investment in technology. A challenge that has come to the forefront of key leadership has been the decentralized nature of IT. This renewed emphasis on the overall enterprise is not an attempt to validate or justify the decisions that lead to the current state of the organization, but focus more on how Technology Services can support a reasonable transition to enterprise technologies and drive this methodology to manage future expectations for both technology and support.

Prior technology strategic plans focused primarily on the work activities and accomplishments within the DTS organization. While successes are clear through the numerous awards and accomplishments that have been recognized in national venues, there was a limited focus on the outreach of DTS in support of larger, multi-departmental efforts. The primary focus was on technology operations and internal improvements.

The early efforts in the development of this plan were centered on a comprehensive assessment of the business units to gain a different perspective on support. The assessment would validate the energies on technology improvement by substantiating the direction through the communicated desires and needs of the business departments. While decentralization of IT functionality was a potential obstacle, through the IT Policy Advisory Committee (IPAC), there was a countywide agreement that there were benefits to the departments as well as DTS to ensure that the strategic vision for technology innovation

required a joint approach. However, a comprehensive approach is a time consuming and very detailed effort that is normally supported by auxiliary resources. Given the fiscal constraints and a need to expedite a plan, a hybrid approach has been developed and is embodied in this plan.

The hybrid approach will outline the significant technological successes that are an outcome of DTS process improvements as well as those that have evolved from DTS' support of departmental challenges. In addition to exemplifying the current direction, this strategic plan will be fully validated by continuing the detailed departmental assessments as part of the next update of this plan. While it is not anticipated that any single discovery will significantly alter the direction of technology implementations, the plan will be tested through the major enterprise initiatives like the Enterprise Resource Planning (ERP), the Constituent Relationship Management (MC311) as well as agency specific or service efforts like the Health and Human Services modernization, the Integrated Justice Information Systems (IJIS) implementation and Public Safety Systems upgrades (PSCS).

DTS has embarked on this hybrid view through the exemplification of the strides made in supporting County needs with technology, streamlining services, streamlining cost components to service and delivery and improved information collection by working with the organization to begin the "Enterprise Think" model. This has been achieved through our assessment as well as the fast paced efforts of our enterprise programs. Enterprise Think is the process of looking at solutions, both business and technology, at a holistic level which guides decision making to the multi-departmental level. This methodology introduces the dynamic of making decisions that benefit multiple venues, which is the core expectation of enterprise applications and accumulated benefits.

4.1 Developing the Business Strategy

As the various departments within MCG grow and expand so do their technology needs. In concert with the County's efforts to improve and modernize through an enterprise approach, there is a definitive need to develop a business methodology that will build "Enterprise" views and visions by and for the departments. The goal of this approach will be to transition the individual department direction model within the organization through the adoption of a "theme" approach to assist with technology alignments and provide results that support economies of scale. Like many other organizations who have adopted a "theme" approach to develop excellence synergies within their organizations, MCG will also include this strategy as a foundation to the technology strategic planning process.

The purpose of "business theming" in building technology strategies is that there are typical commonalities between the different business groups. ***The goal of this model is to ensure that technology's solutions benefits are maximized, systems and enhancements are sized, reviewed, and presented to support an enterprise deployment, whenever feasible.***

Research of other similar organizations that have successfully created "business theme" models use a minimum of three (3) to a maximum of eight (8) business themes. We have reviewed the various departments within MCG, and have recommended groupings

according to their business missions. Consequently, we have identified five business themes and they are as follows:

- Public Safety
- Administration (Back/Office Support)
- Retailing/Direct Consumer Services
- Program Services
- Legislative/Outreach

As with other components of the enterprise strategic planning process, changes to the organization, redefinition of the business mission and other factors may likely warrant reviews of the business theme model and result in appropriate recommendations for changes as required.

Taking this first step at a department synergistic level, the views and recommendations begin to take shape toward the enterprise model and it begins to create a stronger model for technology review, business process similarities, and technology dependencies between the theme participants and provides for the culture change that presents the most impact in "Enterprise Think".

Coupled to the theming process, a new structure of the governance model is created. While programs and larger projects may have cross departmental participation by senior leadership for direction, planning and outcomes of a specific effort, the thematic oversight from this new approach continues the relationship. It provides insights on project efforts, daily operations as well as business challenges that can potentially be resolved and serve multiple entities. These "Theme Teams" can have multiple positive outcomes, including avoiding multiple solutions for problems that have fiscal and human support elements.

Collaboration Imperative

For an IT organization to have any success in an enterprise approach to any aspect of technology with respect to innovation and common successes, collaboration is a key element of the overarching strategy. In Montgomery County, where large, decentralized components of IT exist in parallel with centralized IT functions and responsibilities, the challenge of organized strategy, management of customer expectation and definitive measures of success requires proactive focus. This focus is essential at all levels of IT to affect the support of vision, change and prudence in innovation adoption.

Montgomery County's leadership has welcomed and embraced the collaboration process. This is clearly evident by senior leaderships embrace and actions relative to numerous enterprise wide initiatives. Without this single, supported vision within the mission of leadership, adoption of modernization principles and enterprise direction, efforts of these magnitudes are doomed to failure.

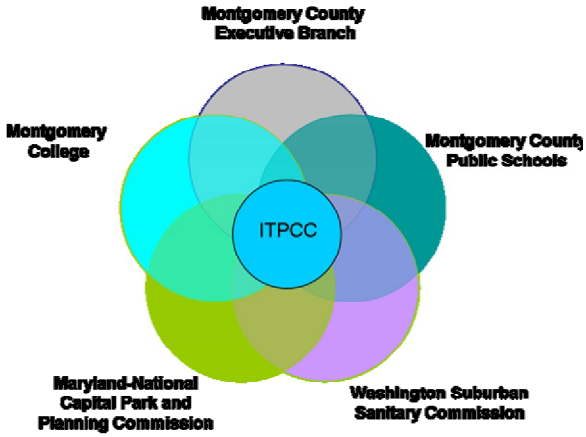
Collaborative energies are a focus of more than the business leadership. Elected officials in the County are champions of information, common practice and enterprise solution recommendations. In this combined venue, the recommendations of common modernization efforts have fewer challenges from a governance perspective and are most

common at the business production level. It is in this area that Montgomery County has begun a significant emphasis on Enterprise Change Management, with a proactive focus on the human element of change to encourage, promote and achieve a more accepting pace for business as well as technology change.

Internal Collaboration

Montgomery County has an established tradition between agencies for idea and solutions exchange. The formation of the County's Interagency Technology Policy and Coordination Committee (ITPCC), described in more detail in this plan, is the method by which elected governance ensure that common technology strategies are vetted for cross agency benefit and standardization.

Figure 3 - ITPCC



With the advent of a separate funding, the Inter-Agency Technology Fund (ITF), solely for the facilitation of cross agency initiatives, each County agency has an opportunity to contribute to the development, assessment and evaluation of common technology programs. These initiatives provide the basis for escalation to individual agency leadership, with the proven benefits and expectations outlined through the inter-agency trials.

Additionally, the ITPCC has an obligation to annually review the overall investment, across agency lines, to assess the overall state of technology and the risks and consequences of technology lifecycle. This is an important aspect of monitoring the highest view of technology investment and is a mandate from the elected County officials.

In addition to inter-agency information exchanges, collaborative mechanisms have been created within the Executive Branch to facilitate inter-departmental exchanges of information, validation of departmental technology recommendations during annual technology investment considerations as well as routine exchange of management principles, standards and processes.

At the senior level, this element of collaboration is evidenced by the IT Policy Advisory Committee (IPAC) and Executive Steering Committees for key projects and programs.

The IPAC is a legislatively created committee, required to meet bi-annually to discuss business drivers for technology policies and make recommendations to the Chief Information Officer (IPAC Chairperson) for formal review, development and adoption. While the recommendation for this committee is bi-annual, an established pattern of quarterly association has been managed and interim issues have been discussed and adopted at a more appropriate pace for more urgent issues. This committee has been instrumental in

the cross departmental communication of technology challenges and has instigated policy changes to keep pace with technology industry challenges.

External Collaboration

Montgomery County is an avid partner in the development of inter-jurisdictional activities in support of its residents and businesses. The technology leadership of the County is equally participatory in these exchanges.

As a member of the Metropolitan Washington Council of Governments (MWCOG) for the National Capital Region (NCR), Montgomery County actively participates with strategic technology developments that serve the 21 jurisdictional members. These efforts clearly demonstrate the cooperation between governmental agencies that link technology solutions, best practices and programs that serve constituents. In addition to general technology solutions, the cooperative has a significantly high focus on public safety initiatives which mandates a complex governance process that ensures robust and quality services as a part of joint technological efforts.

Over the past 5 years, the programs have developed innovations in support of the many focus group disciplines that are participants in the NCR, including:

- Institutional Network (I-Net) Interconnects
- Data Exchange Architecture and Standards
- Regional Broadband Wireless Development
- Shared Data Technology Policy and Governance
- Current Trend Technology Assessments

The benefits of this collaborative effort are enormous for all agencies. In addition to providing valuable lessons learned for technology programs, the information exchange on leveraging public contracts (through bridging), knowledge sharing and technology investment strategies demonstrate the effective use of funds that are demanded by taxpayers.

In addition to local jurisdiction cooperatives, the County has utilized collaborative mechanisms to States, Federal and other National Governmental organizations. These efforts and exchanges are most typically demonstrated by Montgomery County's continued presence in multi-level recognitions for innovative technical solutions and best practice implementations.

Summary

Collaboration and information exchange will be a key component to the ability of the Technology Services organization to effectively promote an Enterprise Technology Strategic Plan. The benefits, demonstrated by prior successes and current modernization efforts can easily be measured as the County embraces and readies for a combined business / technology transformation over the next five years.

Goal:
Identify and document collaboration opportunities including the anticipated outcomes, actual outcomes as well as long term benefits through return on investment and business improvement

4.2 Application Strategy

The embrace and proliferation of technology to solve business challenges requires a strategy to manage the many solutions that can be accumulated. This management process is an application strategy that organizes the myriad of programs that for many organizations grew from a haphazard and often disorganized fashion over many years.

Successful organizations have become savvier in the management of business solutions to ensure that older, obsolete applications are retired, similar applications are merged and newer applications truly solve business information needs, provide for organized delivery and are long-term cost effective solutions.

A mature application strategy is in proper alignment with enterprise business strategies. The overall strategy follows strategic sourcing, the direction of the architecture, business governance and proactive management of adoption and migration through business and human change management.

Montgomery County has embraced best practices in the management of its application inventory, techniques and the delivery of key enterprise applications. DTS has a committed focus on improving delivery and effectiveness through proactive portfolio management, managing applications following lifecycle practices and the delivery and management of an enterprise solution, Graphic Information Systems (GIS).

Application Portfolio

A long-term application strategy is essential to rise above the endless cycle of performing reactive stop-gap measures to support existing technology solutions as they inevitably age. The first step is to take inventory of all existing technology applications supporting the business. The Application Portfolio Management process identifies, measures and justifies the benefits of each existing application in comparison to the costs of the application's maintenance and operations.

DTS began the effort to identify all applications currently in use supporting the business functions of the MCG. By creating an enterprise application portfolio, Montgomery County is better able to:

- Establish a consistent view of applications and their attributes across the enterprise
- Prioritize and align technology assets within the County's mission statement
- Balance technology investments across the organization
- Identify multiple systems that support the same function across different organizations
- Use rational decision-making processes for large initiatives like the ERP implementation
- Reassess and rebalance priorities in an ever-changing environment
- Adhere to mandated compliance and regulatory requirements

The critical component in establishing an enterprise application portfolio is the definition of an application. MCG has defined an application as a business system having all of the following characteristics:

1. It enables the manipulation of data to serve a specific business need of Montgomery County
2. It automates a business process or a part of a business process
3. It is used to make business decisions
4. It is accessed by multiple users
5. It is shared across the network

The Application Portfolio will be the primary repository of business system information for the MCG. For each application, the following major categories of information must be collected and maintained in order to realize the benefits of the portfolio:

1. General Application Information
2. Platform Characteristics
3. Operational Characteristics
4. Business Characteristics
5. Cost Information
6. Interface Characteristics
7. Data Conversion Information (for the ERP Implementation)

Goal:
With the assistance of the business leadership, continue the evaluation and detailed documentation of the Enterprise Portfolio and determine the current and future value of business solutions and potential Integration and retirement objectives.

Systems Development Life Cycle (SDLC)

MCG's System Development Life Cycle (SDLC) process establishes the foundation for making the development and operations of technology applications a consistent and repeatable process. By following the established SDLC, the County can expect application development projects will result high quality systems that will meet or exceed customer expectations, reach completion within time and budget projections, provide value to the organization and can be operated and maintained in a predictable, efficient manner.

As technology systems have become more complex, a number of popular SDLC models have evolved in the industry: waterfall, spiral, rapid application development (RAD), iterative, etc. Each of these approaches has strengths and weaknesses relative to the size and functions of the proposed applications as well as the specific technologies and interfaces required during systems development.

MCG has developed a Project Life Cycle consistent enough to provide a solid, repeatable framework for developing applications, yet flexible enough to allow for varying SDLC approaches. This Project Life Cycle is based on the Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK) guide.

Goal:
Develop, communicate and support the innovation path for business solutions lifecycle in concert with the County's capability to adopt innovation and system change

Build vs. Buy

One of the most critical decisions at the beginning of any new technology project is performing a "build vs. buy" analysis. Which path will most efficiently address the business problem at hand: building a custom application from scratch or purchasing something off the shelf? The answer differs depending on the details of the specific business need and the "maturity" and "fitness" of the industry offerings available for purchase.

New application requests must be analyzed from the business need perspective. In finding a technology solution to solve these business needs, the following questions should be asked:

- Is the business need unique to the County?
- Do any off-the-shelf applications exist to meet the business need?
- Are required interfaces so complex that the work involved to integrate a packaged solution will exceed the effort to build from scratch?
- Will an off-the-shelf solution add structure to a poor business process?
- Will an off-the-shelf solution be implemented more quickly?
- Is the business willing (or able) to change business processes to avoid expensive customizations to an off-the-shelf package?
- What are the future costs for operations and maintenance?

The key strategic element in performing "build vs. buy" analysis is to separate the business need from technology requests for specific technology solutions. Ensuring that this analysis is performed with careful consideration will increase the probability that the County's future investments in technology solutions will the most efficient.

Goal:
Formalize the "build vs. buy" analysis as part of the new application project lifecycle.

Geographic Information Systems

The overall goals of the enterprise GIS programs for Montgomery County are:

1. Setting GIS technology standards for the County by constantly reviewing and adopting the best solutions for the County as a whole. Facilitate the using departments in obtaining the technology and related services.
2. Constructing and maintaining central (common) GIS databases for the open access of all County employees. The central repository is composed of data from the collaborating agencies, state and federal sources, in-house created and maintained datasets, and those obtained through contracted professional services. The whole County is using the same set of core GIS data.

3. Providing GIS services to departments and offices needing and requesting such services.
4. Developing and deploying Web based GIS services for County employees as well as citizens.
5. Participating and promoting collaboration among County agencies and with regional, state, federal and private entities.

Geographic Information System (GIS) technology is ingrained in County business processes. DTS partners with numerous County departments and offices to provide a comprehensive set of GIS services, including, but not limited to, data management, mapping, analysis, and database and web development.

This section describes the various Geographic Information System (GIS) initiatives needed to further expand the GIS program in support of the County's desire to leverage GIS as an anchoring element of business applications.

Migrating ArcInfo Workstation to ArcGIS Desktop/Server

The existing ArcInfo Workstation software has been in use since the late 1980s. It is a single user editing and visualization environment. The 'coverage' data format utilizes the 'INFO' database management system with limited functions. This must be migrated to the ArcGIS desktop/server environment supporting multiple user editing. The backend database management system makes use of an industry standard relational database management system.

To facilitate the migration, DTS must design an ArcGIS data model that would support the maintenance of both the street centerlines and the various DISTRICTS that were built using (mostly) the centerlines. Districts such as Election Precincts and Districts, Elementary School Service Areas, High School Clusters, Police Reporting Areas, Beats, and Districts, Fireboxes and Responding Areas, etc. must be maintained along with the centerlines. In addition, the data extraction applications for supporting Elections, Schools, and State Highway Administration need must also be migrated to the new environment.

Due to limited in-house expertise and experience with the new ArcGIS platform, DTS may require vendor assistance to support the migration initiative. Vendor training for the staff working on Centerline and Districts maintenance must be provided as well. DTS intends to request additional funding during the FY11 budget process to begin the migration and training efforts.

Adding Extensions to the *ArcGIS Server* Suite

Once County GIS users become familiar with the ArcGIS Server technology, DTS expects in increase in interest / demand for additional functionalities. These additional functionalities are not present in the ArcGIS Server package, but in a series of extensions. The following is a list of the currently available extensions: 3D, Image, Network, Spatial, Data Interoperability, Geostatistical, Job Tracking, and Schematics. These extensions are described below.

3D Extension
This extension provides advanced three-dimensional modeling capabilities such as cut-fill, line-of-sight, and terrain modeling.

Data Interoperability Extension
This extension provides direct access to hundreds of data formats via data translation tools for spatial extraction, transformation, and loading (ETL) capabilities.

Geostatistical Extension
This extension permits users to take geostatistical layers created in ArcGIS Desktop and publish them as Web services, giving Web application users powerful tools for data and surface exploration (e.g., interpolating the possible flow and direction of radiation, air pollution, or biohazard release or predicting optimal conditions for reliable crop production).

Image Extension
This extension makes it possible to take raw or preprocessed imagery and immediately deliver it as a Web service. Data access and processing is highly optimized, making the time from request to image display nearly instantaneous. These capabilities dramatically shorten the time between image capture and making imagery available to end users in an effective image management system.

Network Extension
This extension provides network-based analysis capabilities for routing, travel directions, closest facility, and service area analysis.

Schematics Extension
This extension allows the consolidation of numerous diagrams of varying styles and extents into a single Web service, eliminating the need to publish each diagram as a separate service. End users can filter the service for specific diagrams, as well as generate and update diagrams.

Spatial Extension
This extension delivers spatial modeling and analysis by analyzing raster data, performing integrated vector-raster analysis, and deriving new information.

As demand for these extensions arises, DTS will request additional funding to acquire the needed software licenses and any associated training services.

Developing new ArcGIS Server Based Applications

Web based ArcGIS Server applications relieve the need for users to learn GIS software. Instead, knowledge of familiar browser operations are all that are needed to take advantage of the GIS applications.

To date, DTS has developed several applications on behalf of County departments and offices. Among these are:

> Snow Operations Map Viewer – The application queries the relational database at prescribed intervals, retrieves snow clearing status codes (cleared, in progress, not yet worked on) associated with the snow routes and neighborhood streets, and displays the roadways in color codes corresponding to the status codes. With this map service, County citizens get frequent updates of the snow clearing progress.

Police Response Event Map Viewer – With this map service, Police event type and spatial distribution can be clearly communicated to the officers for more effective crime fighting and personnel deployment.

Council District Map Viewer – This is the 'live map' variation of the recently deployed Council District Multi-layer PDF Map Viewer. The selected map layers displayed always reflect the latest in the relational spatial database server. DTS recognizes the need to improve cartographic quality before the application can be deployed to the public.

DTS plans to expand the number of map viewers available in response to Customer demands.

Leveraging 'Free' Web Map Viewer Technologies

DTS has deployed several new online map services leveraging industry standards and leading technologies that are now ubiquitous on the Web. Web users have become familiar with the look and feel of online map viewers through the use of travel directions and location maps. Recently, DTS developed online map viewers for the Montgomery County Public Libraries (MCPL), Department of Transportation (DOT) roadway improvement projects map viewer and water main break map viewer, and the MyMontgomery map viewer.

DTS will develop additional map viewers leveraging these same or other emerging technologies as user departments request their development and deployment.

Developing Mobile GIS Applications and Services

GIS for handheld units is gaining popularity. The typical mode of operation is downloading a portion of a geographic database, working (collecting attributes and/or adding/editing spatial locations) in the field and uploading the database back to the relational database.
DTS anticipates increasing interest in mobile GIS applications, and must gear up to support users that intend to adopt this new GIS technology. As demand increases, DTS will request additional funding to acquire the needed software, hardware and any associated training and implementation support services.

4.3 Operations and Infrastructure Management Strategies

Technical Operations Strategic Principles

In an effort to fulfill the goals created to support Montgomery County's business missions and objectives, DTS recognized that "best practice" operational principles would be required to meet and maintain technology solutions. As a result, DTS has developed strategic operational principles to support solution development, administrative actions and has identified key components that will allow for the transition from theory and design to robust production solutions with best practices for support, including resource management,

The following table depicts the identified strategic operational initiatives to support both short-term and long-term strategies. In short, these are key objectives on how technology is

delivered and maintained. They are leading indicators for the development of new programs and include required considerations before moving into production status.

DTS Operational Strategic Principles

Figure 4 - DTS Operation Strategic Initiatives

Department of Technology Services Operational Strategic Initiatives
■ Define and implement an Enterprise Architecture across the MCG
■ Implement Enterprise Information Management
■ Implement IT Investment Management, including Enterprise Project Management Office capabilities
■ Implement an IT Communications Strategy
■ Enhance Application Portfolio Management
■ Improve Disaster Recovery/Business Continuity for Critical IT Systems
■ Develop and Implement Staffing Plan
■ Plan and Implement Infrastructure Consolidation/Optimization/Modernization
■ Establish an Effective Service-Based IT Operations Architecture
■ Establish MCG Data Warehouse and Business Intelligence
■ Enhance and Progress Information Security

Business Automation Framework (Enterprise Architecture-EA)

The purpose of the Business Automation Framework (BAF) is the process for developing a set of strategic definitions and models that depict the business model, the information to operate the business model, the technologies to support the identified business outcomes, their interrelationships, and the standards, principles and guidelines governing their design and evolution over time.

DTS has for the past few years supported a strong architectural methodology as described in our Enterprise focus within this strategic plan. The challenge for any IT organization is ensuring that the efforts from the development of this important program are continually reviewed and adopted by agencies participating in the enterprise schema.

While there are definitive benefits, risks that need to be considered include the need for strong change management (human) and change control (system) as well as mechanisms that can monitor compliance. Without attention in these areas, the framework is at risk for providing inaccurate expectations for new or modified business solutions.

Goal:
Establish a process to develop, monitor and communicate the County's framework and assess effectiveness through business review and effectiveness in supporting new business deliverables.

Enterprise Information Management (EIM)

Implementation of an Enterprise Information Management (EIM) solution provides an architecture with the management processes and governance to support:

- information use across Montgomery County
- structure of the information to be managed
- the distribution of information across applications
- the movement information across systems
- the methods by which information is accessed by users and other systems.

The result of building an EIM methodology is a documented definition of the structure of information to be managed and the roadmap for the distribution of information across applications.

Currently Montgomery County does not have a formal discipline in this area. The information is redundant in many systems and information access is complex, inconsistent, lacking enterprise wide data standards, well defined information distribution and providing limited knowledge management. A key component to changing this dynamic in the County will be the design and implementation of both the ERP and the MC311 solutions. Due to the data sharing dependencies for both of these enterprise solutions, EIM will have a new foundation to build upon with future assets.

Goal:
Develop a process for the documentation and tracking of business data to correlate and map information to serve as the basis for an enterprise data warehouse roadmap.

IT Communications Strategy

An IT Communications Strategy outlines the activities required to ensure stakeholders are informed and educated about IT strategies, plans and the value they bring when aligned with the business. Effective communication strategies and plans help build relationships of trust, manage expectations, encourage commitment, and minimize resistance to change.

With the emergence of a formal Change Management program for current enterprise efforts, the County is beginning to implement a well established outreach program. Through this outreach program, DTS can develop a standard mechanism to communicate operating procedures and processes. While there is no dedicated resource in DTS to support consistent, timely technology communications with business departments or other County agencies, as a part of a business assessment, DTS will be looking for existing opportunities and venues to promote enterprise and evolving strategies.

The benefits of an effective IT Communications Strategy are clear. It ensures that there is a repeatable, consistent communication process and methodology. It also provides for proactive communications with employees, leadership, executive management, external County agencies, internal customers and County residents.

Goal:
Develop a communications strategy that provides periodic, emerging technologies, and support services updates to the County's business departments.

Perform Application Portfolio Management

Application Portfolio Assessment strategies enable determination of proper application investments and improve overall solution efficiency. A targeted and comprehensive assessment of current business systems has been performed in order to track current investment benefits, assess solutions that provide organizational effectiveness as well as those solutions for potential retirement with the new enterprise programs underway.

The benefits are obtained when an organization establishes a formalized Application Portfolio Assessment that incorporates the following:

- The study identifies the current IT applications and identifies each application's user base, infrastructure and investments
- Identify assets for decommission in both the short-term and long-term
- Conduct a risk assessment of the current key systems
- Includes a study on collaboration tools to optimize enterprise-wide solution investment and facilitate communications

Goal:
Consolidate and maintain the County's application portfolio to allow for tracking and monitoring of County applications and the development of a predictable application life cycle

Plan and Implement Disaster Recovery/Business Continuity for Critical IT Systems

It is essential to keep a consistent focus on the County's Disaster Recovery Plan and implement solution for the re-establishment of IT services in the event of a disaster. Any new or proposed solutions will need to have a continuity plan as part of the development and ensure finalization prior to a production implementation.

The Disaster Recovery Plan must:

- Identify and categorize critical systems, personnel, system interrelationships and minimum operating environment.
- Plan and implement redundancy at the various technology levels (sub component, component and application level),
- Establish a remote facility with space, network support, storage and a server infrastructure sufficient to support the restoration of IT services, and identify staffing matrix to maintain operations during the disaster event.

- Implement the plan / Test the Plan

Montgomery County systems need to be fully prepared for a systems disaster event and maintain compliance to government regulations for disaster recovery and COOP requirements. As a government agency, as a goal set by our Executive, must be functional in a time of disaster.

> ***Goal:***
> ***Perform an assessment of current and proposed business systems that includes a business information analysis that identifies recovery needs to assist in the establishment of the systems recovery plan.***

Develop and Implement a Staffing Plan

A comprehensive staffing plan is essential for the entire DTS organization as well as departmental IT staff. A staffing capabilities evaluation needs to be planned and implemented to ensure that current support needs can be met and future skills be predictable.

DTS currently has a limited staffing plan to accurately predict the demand vs. supply of staff functions and needs for long-term staffing. As an example, there are functions such as Business Automation Framework, database management; CRM etc. that need to be proactively staffed. Montgomery County also has other departments doing IT systems development and implementation, which further complicates cross skills complexity and long term competency needs.

> ***Goal:***
> ***Develop a strategy for the evaluation of current staff capabilities, depth of resources for current and immediate support efforts to create a roadmap for skills development, near and future training needs and succession planning.***

Plan and Implement Infrastructure Consolidation / Optimization

Montgomery County has recently developed a focus on technology consolidation and optimization. However, DTS should conduct an independent benchmarking study on its distributed computing, server infrastructure, datacenter, LAN/WAN, centralized services (e.g. DCM) and Help Desk to assess requirements, current technologies being used, and the processes serving the user base. This information should be compared against industry best practices to identify opportunities for consolidation and harmonization.

DTS has already demonstrated a significant vision on infrastructure optimization. With the use of condensed hardware solutions as well as its leadership in the area of virtualization, DTS has considerably moved forward in this area.

> ***Goal:***
> ***Begin a benchmarking planning effort that will provide a baseline for the current level of optimization and identify strategic opportunities for inter-Departmental Consolidation/Optimization.***

Technology Investment Management

As a part of DTS's implementation strategy, it is clear that investments in projects demonstrate clear ROI expectations and determine enablers to track their health on a regular basis.

Technology investments need to be prioritized based on the business goals and needs and budgeted accordingly. IT benchmarking should be done on a regular basis to compare costs with similar organizations.

At Montgomery County, there is an IT project request intake, qualification, validation process. Montgomery County has begun to develop a score carding process to aid in enterprise prioritization by establishing metrics for new project recommendations. However, it is not clear how the ROI is tracked for all technology across the enterprise regularly and what in-process validation actions are taken as project development details are assembled.

> ***Goal:***
> ***Establish, with the Assistance of Financial Leadership, a Documented Process for the Fiscal Evaluation of Technology Investments that will Demonstrate Return on Investment that is in Alignment with Industry Best Practices.***

Establish an Effective Service-Based IT Operations Architecture

Enterprises that systematically manage the life cycle of their IT assets can reduce the cost per asset by as much as 30 percent in the first year, and between 3 percent and 8 percent annually during the initial four to five years (Source: Gartner Study of SDLC, 2007).

Introduction or use of tactical outsourcing will cause significant degradation of productivity, impede staff retention and will typically have a higher than anticipated fiscal impact. The agile organizations of the future will skill up to the challenge of strategic IT sourcing. By leveraging the central IT buying power, Montgomery County can improve its IT costs by negotiating deeper discounts from its vendors.

Montgomery County does not have an enterprise wide asset management system to track and manage resources for planning, forecasting and acquisition purposes. Montgomery County does have an enterprise wide technology professional services procurement solution to manage strategic resourcing. Formalizing the solution for ad-hoc needs, tracking, documentation of departmental needs and long-term usage will generate necessary improvements for future fiscal outcomes, controlled management and assist in the creation of an automated approval process.

Goal:
Establish a direction for the implementation of an asset management solution to support the control, reporting and overall management of physical and resource assets that support County technology investments.

Enterprise Data Warehouse and Business Intelligence

The Data Warehouse (DW) is a central component of an organization's business intelligence program and is becoming the mission-critical heart of decision-making. Business Intelligence (BI) is the use of skills, knowledge, technologies, applications, quality, risks in the manipulation of a consolidated Data Warehouse that allows for a business to have a better understanding of business opportunities and enhance decision making. As a result, an organization's data warehousing initiative requires deep and broad skills across technologies and subject areas, sufficient funding and continuous quality assurance from experienced practitioners to avoid the numerous pitfalls.

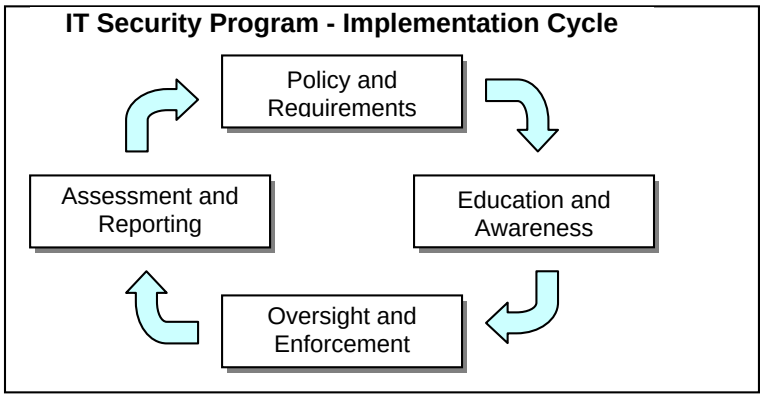
The County's ERP and CRM initiatives will mandate the development of the first consolidated DW as a direct result of the architecture of the two, enterprise initiatives. All future Technology Modernization initiatives will be required to leverage the single, enterprise DW and BI models.

Goal:
Identify existing information stores as well as planned, new solution information repositories that will need to be structured or modified and merged into an enterprise information/data portfolio

Enterprise Security Management

Development of an IT Security Program is an ongoing venture that follows a cyclical process. The implementation phases (see below) are not cleanly separated processes, but instead represent a flow of activities that yield an ever maturing Program. The implementation cycle involves establishing information security requirements, educating people about their responsibilities under those requirements, building governance structures to ensure Program compliance, and monitoring and reporting of progress.

Figure 5 - IT Security Program Implementation Cycle



The statement above makes a crucial point about information security. Information security is an ongoing effort that is the shared responsibility of the entire organization. It is a continuous opportunity to advance executive awareness regarding what it means for an organization to manage information security effectively. It is also a key component of most technology business solutions to ensure that information management and access controls are routinely reviewed as a part of a solution implementation.

Montgomery County includes security considerations in all aspects of technical advances. It will become significantly more visible as the County undertakes enterprise based solutions that will share information resources, dynamically link applications and data and further blend the ability for interdepartmental exchanges as well as information delivery to citizens.

Goal:
Establish a process for regular technical solutions assessment and progress on operational tactics, gap analysis through testing and deployment as well as validation through the integration and support of business objective deliverables.

Voice Communications

MCG maintains a modern voice communications platform (Private Branch Exchange - PBX) that leverages the Network domain to provide the following capabilities and services:

- Legacy Voice Services
- VOIP Services
- Voicemail Services
- Interactive Voice Response Services (IVR)
- 311 contact center Services
- Enhanced 911
- Unified Communications
- Mobility Solutions

- Conferencing and Collaboration Solutions

The PBX is a highly reliable and scalable system that supports a Flatten Consolidate and Extend (FCE) approach characteristic of Enterprise Architectures found in large organizations. The platform provides access between voice and data endpoints as well as many enterprise services required by the County to perform its mission.

At a time when local governments everywhere, but especially within the Washington, DC Metro area are focused on their ability to provide Continuity of Government when a disaster strikes, maximizing the survivability, availability and uniformity of communications infrastructure is critical. The PBX platform provides the County with significant business continuity and survivability capabilities, which provides highly flexible, scalable, and standards based building blocks that can be mixed and matched to create customized solutions. The PBX server provides a robust application platform based on industry standard operating systems to support distributed IP networking and centralized call processing across multi-protocol networks. The platform includes the following key features:

- Interoperable with standards based data networks to provided maximum flexibility and reduced cost of ownership.

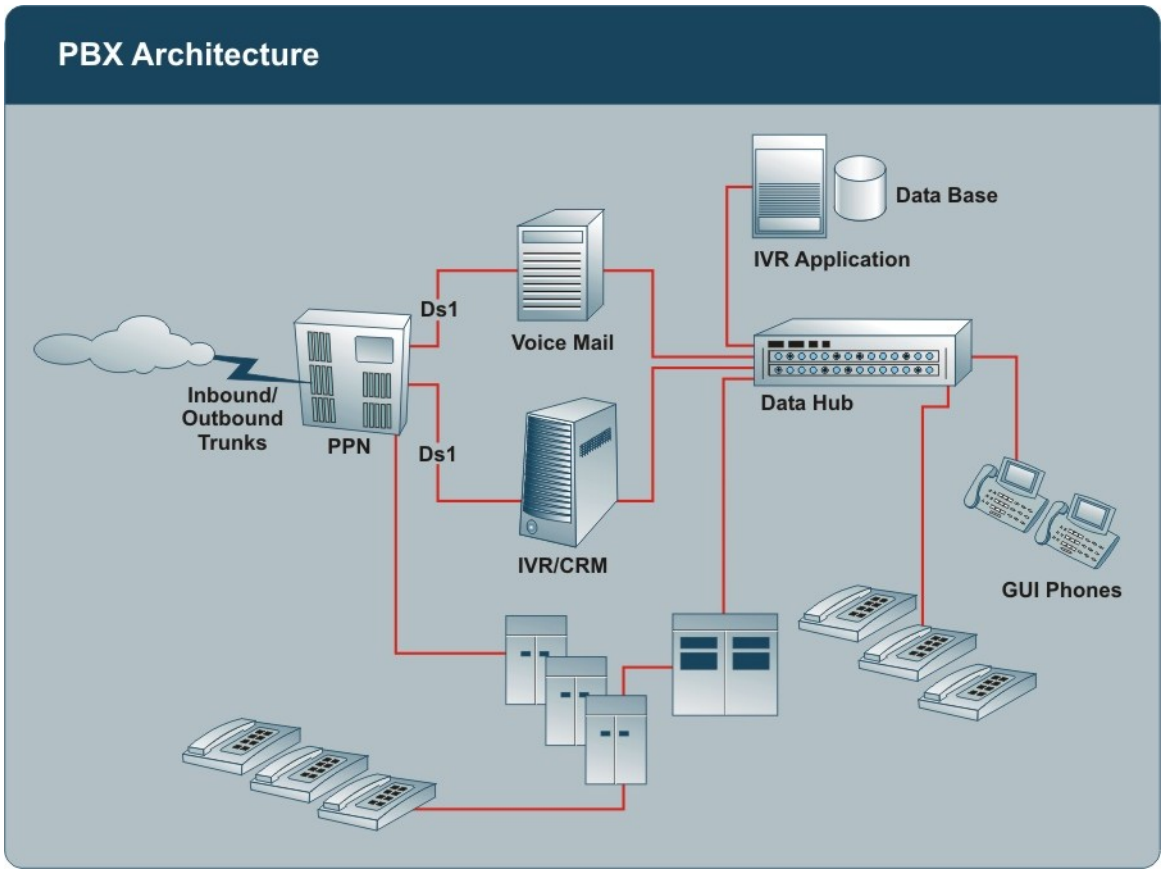
- Survivable features and options that allow endpoints to continue operating even if the primary PBX server fails or in the event a Wide Area Network (WAN) failure affects communications between the gateway and the server.

- Support multi-protocol environments, maximizing investment protection for enterprises that require concurrent support of Time Data Multiplexing (TDM) and Internet Protocol (IP) based telephony

- Redundant system and network options that support high availability configuration for both TDM and IP based solutions.

- Connectivity across any public or private network using a variety of interface options over TDM, Asynchronous Transfer Mode (ATM), Ethernet, Frame Relay or Point-to-Point Protocol (PPP).

Figure 6 - PBX Architecture



The current PBX telecommunications infrastructure is critical to the day-to-day operation of the County. County employees depend on the ability to quickly and efficiently communicate to obtain information that is essential to the performance of their jobs. Similarly, County citizens depend on the same infrastructure and telephony applications to access County employees and/or systems for information necessary to meet their needs. Therefore, ensuring that the telecommunications infrastructure is reliable and available to all County employees and citizens is vital. The PBX system is designed to be a “Five-Nine” reliable system which means that it is available, 99.999% of the time.

Additionally, traffic congestion, high fuel cost, and Business Continuity of Operations (COOP) requirements have driven the need to explore new capabilities to support effective means of Telecommuting. The PBX platform provides the ability for workers to have the same capabilities as work, at home, or on the road. For example, workers are able to use PC’s, laptops, or even PDA’s over the internet to take their phone and all their capabilities with them wherever they go.

Importantly, this communication capability is also available to the County’s Emergency Operations Center staff creating the ability to provide critical coordination and communications efforts.

Goal:
Continue to pursue innovative ways to enhance the PBX platform in a healthy evolutionary mode, which will prevent the need for an expensive replacement in the future.

FiberNet Strategic Plan

Montgomery County Government (MCG) is its own telecommunications carrier. In serving a community of over 950,000 residents, the County Government consumes voice/video/data services in extremely large quantities. In 1995 the County determined that cost savings could be realized and a future-proof network could be created by building its own facilities based fiber optic network. Leveraging work that the Department of Transportation (DoT) had already begun in building a fiber optic network for the Advanced Traffic Management System, The Department of Technology Services (DTS) was given the mission of building an electro-optical network on top of the fiber plant that DoT had already placed. FiberNet was born.

Today, FiberNet is the electro-optical backbone for MCG. FiberNet provides communications services for all County agencies including the Government (MCG), Public Schools (MCPS), Montgomery College, Maryland National Park and Planning Commission (MNCPPC), Washington Suburban Sanitary Commission (WSSC) and the Housing Opportunities Commission (HOC). FiberNet has become a big success and every agency wants to participate to the fullest extent possible. Governance is vested in the Information Technology Policy Coordinating Committee (ITPCC) with technical approval delegated to its CIO Subcommittee. DTS provides technical leadership and is operationally responsible for FiberNet.

The alternative to FiberNet would have been and continued to be the purchasing of telecommunications services from the local commercial market. Many state, county and municipal governments operate in this mode. These other agencies are discovering that as applications become more information rich, initiatives to improve services may be frustrated easily by the high cost of carrier leased lines or other tariffed offerings including special pricing agreements. Montgomery County Public Schools (MCPS) is currently seeing the bandwidth requirements for applications growing and the inability of sites, not on FiberNet, to deliver services.

In several cases the carriers are not maintaining their physical plants (underground and overhead wiring, old copper capabilities, etc.) making even simple connections unreliable and data services, problematic. MCPS has this problem with many elementary schools as does the County Government with several small offices. In a recent conversation with representatives from a commercial service provider, prices were quoted several thousand of dollars per month for a 10 MegaBit/second link. MCPS has over one hundred sites still to be added to FiberNet. Although a long term contract would bring this price down, it is possible to see the order of magnitude associated with providing such services through a local exchange carrier still costing hundreds of thousand dollars per month. MCPS and the

FiberNet Team are looking for alternatives and near term solutions have already been identified.

FiberNet is an integral component of the County's Public Safety Communications Network. Given these systems critical importance to the County's residents, having the County own and operate the underlying transport infrastructure ensures a higher level of service availability and control than would be achievable in a leased carrier system. Additionally, in the time of a real emergency the County is in a position to regulate network access to make sure that calls go through and applications operate. On an open public or commercial network, there is no pre-emption or prioritization for emergencies.

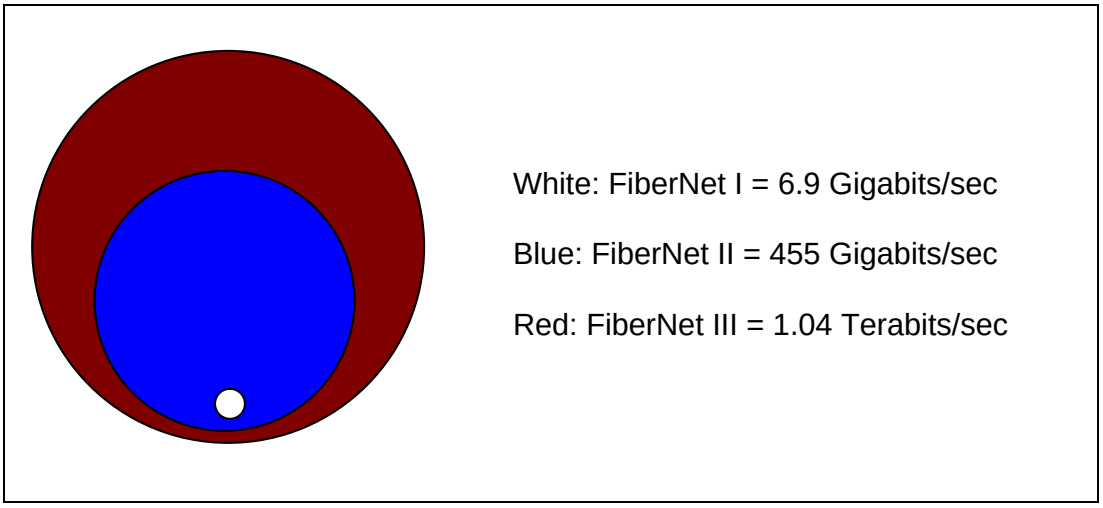
Strategically, FiberNet is working to leverage its resources, increase its footprint, improve security and provide voice/video/data services at lower cost. Tactical successes include:

- Leveraging the County's telephony platform by delivering dial tone to Housing Opportunities Commission (HOC);
- Becoming the Internet Service Provider for Maryland National Capital Park and Planning Commission (M-NCPPC) and HOC, providing Internet Service Provider (ISP) carrier services for the City of Gaithersburg and the American Film Institute;
- Replacing the County's legacy ATM network (FiberNet I) with a state-of-the-art Metro-Ethernet network (FiberNet II);
- Re-architecting the FiberNet core so that no or minimal equipment needs to be purchased to add a new site. Only the cost of fiber or other transport media needs to be considered when adding the location;
- Creating MCG WiFi Hotspots in Silver Spring, Bethesda, recreation centers and County cafeterias;
- Connecting to State of Maryland networks directly;
- Connecting to local government networks directly without going via the Internet;
- Adding a backup Internet Service Provider for the County.

Current initiatives include migrating all County departments onto FiberNet II; other participating agencies are already on the next generation solution. A major effort continues to be increasing FiberNet's footprint by adding MCPS elementary schools and County Government sites including the Smart Growth initiative. DTS is always looking for economically justifiable alternatives to the high cost of fiber. FiberNet has engaged the Washington Metropolitan Area Transit Authority (WMATA) to consider sharing assets and facility access to improve network reliability and availability for the County's Public Safety Radio System (PSRS). It is expected that this effort will produce positive results and increase the availability of this extremely important system.

FiberNet will be an integral part of the next generation Public Safety Radio System (PSRS). FiberNet has started a proof of concept trial to determine the feasibility of using cable modems to create a virtual private network to replace services leased from Verizon by MCPS and MCG. This is a recent initiative. If successful, it will permit high speed connections to elementary schools and leased County facilities at a fraction of the cost available from commercial carriers. MCPS is excited at the prospect and so is the FiberNet team.

Figure 7 - Raw Aggregate Backbone Bandwidth



FiberNet is built for the future. Raw bandwidth coupled with an intelligent network infrastructure is the hallmark of FiberNet II and the keys to future proofing the County's IT information transport requirements. A simple graphic captures the past, present and future of FiberNet. The figure above captures the raw aggregate bandwidth across all the FiberNet I backbone links. A second image encapsulates FiberNet I and is a proportionate analog for FiberNet II's aggregate backbone bandwidth today when compared to FiberNet I. Finally, the larger image is a graphical analog for FiberNet III's backbone capacity after a nominal capital improvement to FiberNet II.

FiberNet II is an ***intelligent network*** capable of making routing decisions in the network core. The Internet is designed based on this principle; FiberNet I model, is not. FiberNet II exists, is in use and is based on technologies that are being used by large service commercial providers. Funds are currently being accumulated in a capital reserve to move to FiberNet III when the time arrives.

FiberNet is an integrative system that makes inter and intra governmental IT services and communications easier to implement and most of all easier to secure. Ultimately, FiberNet's strategic goal is to deliver mission critical applications over a reliable and robust communications infrastructure at lower prices than those achievable in the open market. The current configuration of FiberNet II is designed to sustain the County's bandwidth requirements for the next ten years.

Goal:
Continue to migrate to the next generation of FiberNet, Communicate and integrate FiberNet advantages within all new and enhanced programs requiring inter-department, inter-agency and inter-jurisdictional voice and data transmission needs

4.4 Enterprise Architecture

In 2000, DTS initiated an Enterprise Architecture program that began with the creation of an Enterprise Architect position. The Enterprise Architect sponsored a project which resulted in the official publishing of the Montgomery County Technical Architecture document in 2003. The publication has undergone a number of updates since that time with updates published in 2004, 2005, 2007, and 2008.

The County's Enterprise Architecture effort is based on defining the following:

- Business Architecture – defining the business strategy, processes, business domains, and governance
- Technical Architecture – defining the IT infrastructure and standards
- Data Architecture – defining the business physical and logical data structure and its data management policies and governance
- Application Architecture – Application architecture and standards

The purpose of the Enterprise Architecture is to communicate:

- the results of County business decisions (related to IT);
- the County IT Architecture and infrastructure;
- how the County manages its data; and
- how the County builds or acquires applications.

In general, it communicates how the organization has invested in its IT infrastructure (including hardware, software, processes and people). The County continues to make significant investments in IT and must communicate to many parties, how future investments align or impact the architecture and infrastructure.

The Enterprise Architecture is targeted to the following audiences:

- General public
- County employees, including the following subsets of County employees:
    - Technical Operational Management Group (TOMG) members
    - Information Technology Policy Advisory Committee (IPAC) members
    - County Departmental IT Staff
    - County Council Administration
    - County Executive Staff
    - DTS Employees
- Vendors responding to RFPs and Contracts
- Auditors

A reduced version of the document is published on the County Internet portal. The full version is published on the County Intranet portal and is attached to large IT projects RFPs and contracts.

Background

Montgomery County takes advantage of mature technologies in areas of data, voice and

radio networking, datacenter operations and monitoring, hardware and software systems deployment, and application development. The Enterprise Architecture document, prepared by the DTS, is used as a comprehensive reference to the County's information technology architecture.

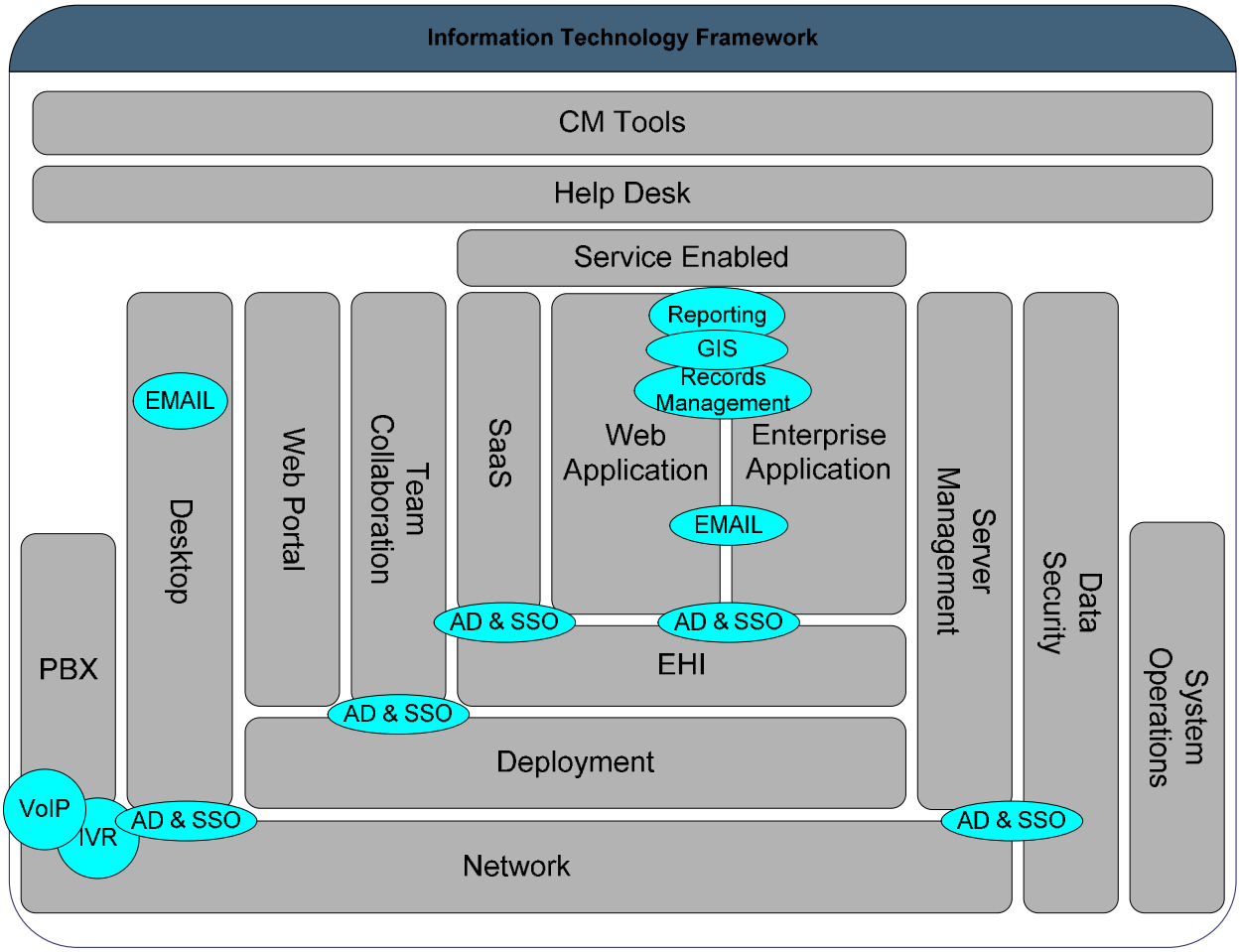
The Enterprise Architecture Document is DTS' framework for program execution. It is prepared in concert with the Enterprise Technology Strategic Plan and is designed to support the initiatives outlined in the plan.

The County has three essential organizational resources, people, process and technology. People are the County's greatest resource, process binds them together into a coherent workforce, and technology is the tool. This document is a blueprint as to how DTS is aligned and is used with business support to make business, technical, application, and data decisions.

Purpose

The purpose of the Enterprise Architecture is to present well-defined, strategic standards adopted for the development and delivery of the County's information systems. It provides a cohesive blueprint to optimally design, purchase, develop, deploy and manage information systems for the County. The components of the overall infrastructure are shown in Figure 8 – Information Technology Framework.

Figure 8 - Information Technology Framework



This integrated approach to developing complimentary technologies yields a rapid return on investments for new and upcoming programs. In certain areas, the County benefits from consolidating technology, increasing depth of knowledge and skill-set, and lowering the total cost of ownership.

The architecture is designed to achieve efficiencies based on economies of scale. Standardization of technologies encourages the development and purchase of reusable infrastructure and business components. This enhances in-house employee skills in a predictable set of hardware, systems software, COTS packages, and communication and networking platforms. Tiered architecture permits horizontal scaling of solutions by rapid allocation of skills and resources.

The document identifies a framework for the County's IT initiatives with a great degree of specificity. It also offers a certain amount of flexibility, providing Program Managers a list of options for the development of their enterprise software solutions.

Domains

As the Figure 8 suggests, Montgomery County Technical Architecture may be defined as a collection of component architectures or domains. Each architectural domain identified above introduces the following topics:

Principles – explaining the purpose of the component, along with some implementation details.

Owners – identifies both the technical and business owners for the component.

Components – expanding on the operational aspects of the component by identifying preferred implementation products and staff skill-sets.

Standards and Guidelines – identifying standards and guidelines which the County follows so that it can provide quality services.

The components are all interrelated with the result that the sum of the whole is greater than the parts. As one example, the Active Directory domain is the County technical directory service. It is leveraged by other services to improve their functionality. It is used to:

- Improve the Web Applications and Enterprise Applications Domains by having a single identity source for applications
- Improve the usability of the Web Applications and Enterprise Applications Domains through a single sign on
- Improve the Security Domain by providing a single identity source for network and wireless login

Benefits of a Defined Architecture

The Architecture communicates how the resources of DTS in particular and the County in general are aligned with regards to Enterprise Services. It serves to publish the availability of Enterprise Services that departments can take advantage of in their projects.

The Enterprise Architecture document is included in many MCG IT RFPs and contracts and serves to inform vendors about the County Infrastructure and how they can best take advantage of current County processes within their proposals. Additionally, the Enterprise Architecture document is attached to many contracts to hold vendors accountable to aligning to it.

Goal:
The goal for the MCG Enterprise Architecture is to marry the business and technical fields into one discipline.

4.5 Project Management

Enterprise Project Management (EPM) is a business strategy using technologies and tactical processes that enables organizations to assess, deploy and manage what might otherwise be unstructured efforts. EPM can be the key to strategic investments for organizations to compete and survive in an uncertain economy. EPM can also drive process efficiencies and compliance efforts, as well as collaborative information management needs.

Montgomery County has developed a comprehensive strategy that includes best practices for program level governance, reporting and metrics. As DTS deploys its strategy with the department, adoption by other business areas can also enable the larger organization's ability to optimize costs, remove redundancies from overlapping efforts and save on ongoing maintenance costs, storage and infrastructure costs, and operational support for systems.

Figure 9 - Main Deliverables of the Project Management Process

The Project Life Cycle contains 4 major phases: Initiate, Plan, Execute & Control, Deploy & Transition. Each phase contains multiple steps. Each step defines one or more outputs designed to support the primary goals in each phase.

The Initiation Phase establishes the business case for the project request. The enterprise evaluates the costs, benefits and risks of proceeding with the project. If the project is approved, resources will be assigned for the Plan Phase of the project.

The Plan Phase establishes the framework for which the project will be evaluated and governed. On medium or large sized projects, a project will be assigned to coordinate the various activities in this phase. A Project Management Plan will be developed to define project governance, communications, scope management, quality management,

configuration management, schedule, budget and spending plans, risk and issues management. Requirements Analysis and Systems Design will also commence during this phase.

The Execute & Control Phase defines the period of time where the project team executes the plans developed during the Plan phase. The systems developers may be building the system using any of the selected SDLC methods during this phase. The project manager will be monitoring and reporting progress, risks and issues to the project stakeholders. This phase is usually concluded with the successful completion of systems acceptance testing activities.

The Deploy & Transition Phase defines the activities required to transition a high quality system from acceptance testing to a working system that fulfills its intended mission. Systems documentation and training are delivered during this phase. Knowledge is transferred from the project development team to the team responsible for application operations. Lessons learned sessions are conducted to identify areas of improvement that can be applied to future projects.

Enterprise Project Management

MCG's Enterprise Project Management model is based on the recognition that the IT value proposition is an enterprise business concern, not just a technology concern. Each single project co-exists with many other projects in the enterprise or may be part of a larger program. In order to use the County's technology resources most efficiently, the business must establish an enterprise view of how projects are evaluated and prioritized within the context of existing project requests and existing applications.

It has become essential to be able to manage, monitor and assess the status of all projects in the enterprise through a set of uniform project management processes. DTS' Project Management Office (PMO) facilitates the effective implementation of strategic County objectives by identifying and focusing on a portfolio of projects with the highest value and maintaining standard processes and practices that lead to improved project and program outcomes.

Figure 10 - Enterprise IT Value Proposition

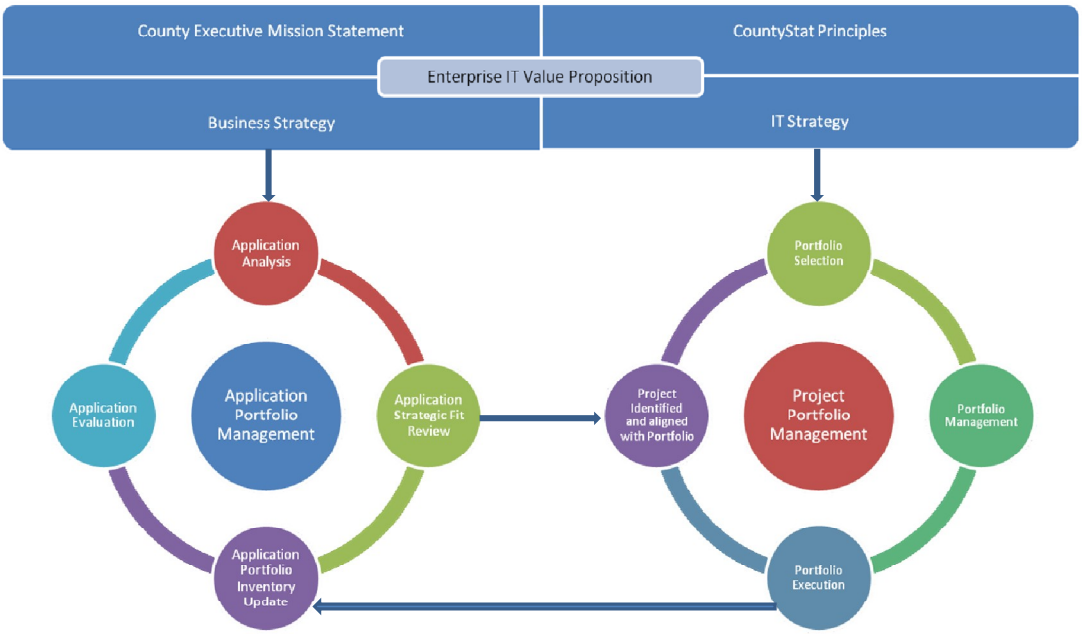


Figure 11 - Application Portfolio Management

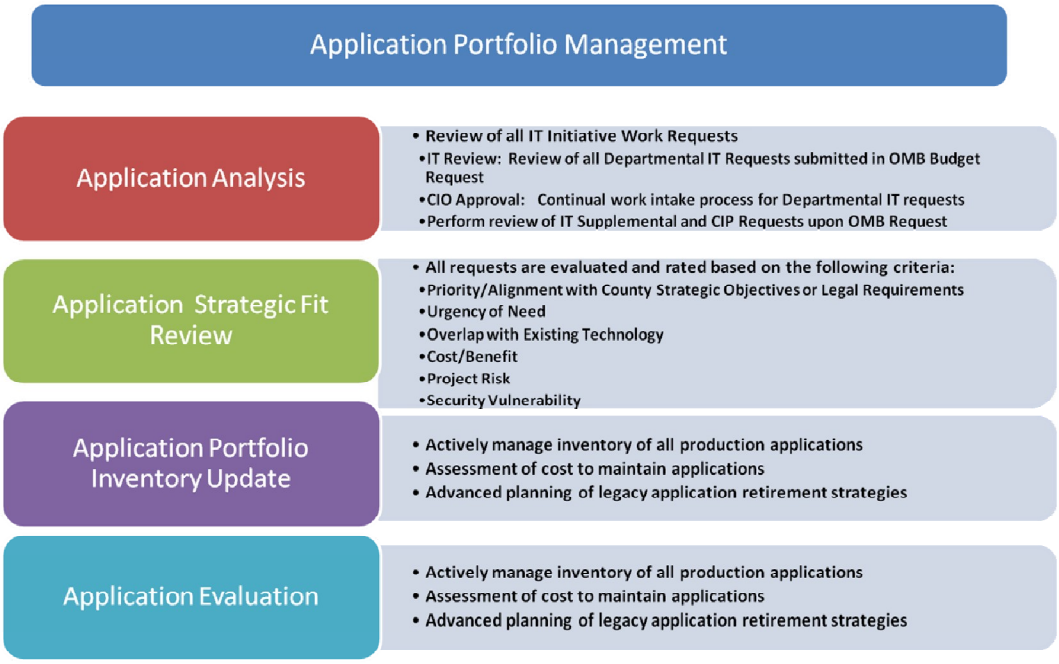
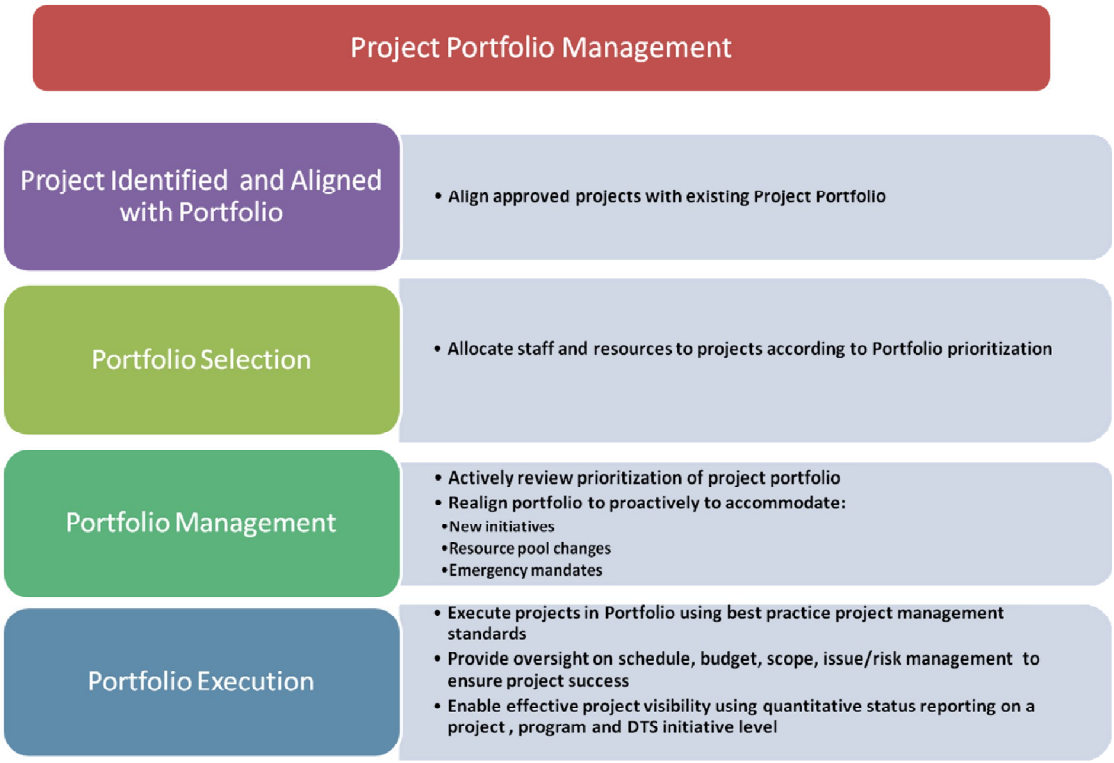


Figure 12 - Project Portfolio Management



MCG's Enterprise Project Management approach is focused on monitoring the application and project portfolios to maintain the "right mix" of projects in an ever changing environment with finite resources. New project requests must demonstrate the value to the enterprise as well as support the enterprise architecture and security constraints.

Goal:
Continue the enhancement of the current enterprise project management strategy, including the communication and implementation in other business areas while identifying measures that demonstrate the successes for an optimized PM process.

4.6 Information Security

In 2002, DTS created the Data Security team with a team of two full-time employees and very limited resources. The ever changing information security landscape proliferated by viruses, identify thefts, sensitive data leakages denial of service attacks, and other cyber

threats resulted in the need to allocate more resources to securing County information assets.

Since 2006, the 5-member Security Team has provided technical expertise and services to ensure the confidentiality, integrity and availability of County information assets by establishing and implementing enforceable rules regarding access to and acceptable use of County information resources; conducting risk assessment and analysis; establishing reasonable security guidelines and controls to protect County data; monitoring and management of systems security vulnerabilities; coordinating information security audits to achieve regulatory compliance; and assisting with forensic investigations and resolution of problems and/or alleged violations of County information security policies.

Business/Administrative Services

The team has recommended a comprehensive security program that will provide services for both the Information Technology staff and County end-users to ensure the preserving of County information assets. The services include:

- Risk Assessment/Management

  All computer systems have inherent risks that can not be completely eliminated. The goal of the risk-based security program focuses on identifying risks, communicating them to the proper level of management, and maintaining identified risks at an acceptable level. Risk is managed by using the management structure to accept, decline, or transfer identified risk(s). A risk-based approach enables senior management to understand the risks associated with specific business operations and make informed decisions as to how to mitigate and manage such risks. Most importantly, risk assessments and cost-benefit analysis allows a manager to effectively plan and implement a budget that works for the overall County business goals and objectives.
- Compliance: County compliance efforts performed/coordinated by the Security Team have included:
    - HIPAA (Health Insurance Portability and Accountability Act) Compliance

      In 2007, the security team coordinated with BAE Systems to perform an independent risk assessment of County HIPAA-covered systems. The assessments provided system owners with evidence documenting the capability of the system to operate with an acceptable level of risk to their information technology resources; data processed, stored, and transmitted within specific applications, and their connections to other information systems. These systems included four shared services systems and 15 Major Applications (MA).

      Currently, the team is involved on a regular basis with the Executive-led HIPAA Committee to build compliance strategies and monitor progress.

    - PCI (Payment Card Industry) Compliance

      Montgomery County contracted an industry security assessment organization to perform a Payment Card Industry (PCI) – Self Assessment Questionnaire, in accordance with the requirements of the PCI Data Security Standard (PCI-DSS).

The assessment was performed from a project management approach. Information was collected through batteries of qualitative interviews to identify the various locations and processes that touch cardholder data in the various business units. This project was initiated in January, 2007.

There has been an ongoing effort throughout FY08 and FY09 with 19 departments and the Department of Finance to move towards compliance and remain compliant. This effort will continue as the regulations are updated and new credit card services are brought online.

- Security Awareness and Training Program

  In recognition that people are in most cases the first line of defense against security threats, such as malicious viruses, disgruntled employees, and other ill-intended third parties, the County deployed it's first ever computer-based Security Awareness and Training Program (ISATP) in June 2007. The ISATP training objective is to heighten County employees' information security consciousness by providing relevant information that will help protect the confidentiality, integrity and availability of County information system resources. Employee training on this important topic is critical and is mandated by several different laws and regulations that require the County compliance. Within the first three months, an unprecedented number of County employees (4,500 plus) enrolled and successfully completed the training.

Figure 13 - Staff Completion of Security Awareness Training

Technical Services

The Security Team utilizes a myriad of high-tech tools to provide secure remote access to County employees, perform network scanning for vulnerabilities, Internet content filtering, intrusion detection and prevention, security logging, analysis and reporting. The Security Team also provides technical expertise on email SPAM, spyware, virus and other research associated with vulnerabilities. Other technical services include:

- Incident Response
- Computer Forensics
- Log Correlation and Management
- Remote access

These high-tech tools enable the team to produce ad-hoc or periodic reports using real-time data. See sample reports below:

Figure 14 - Sample Web Filtering Report

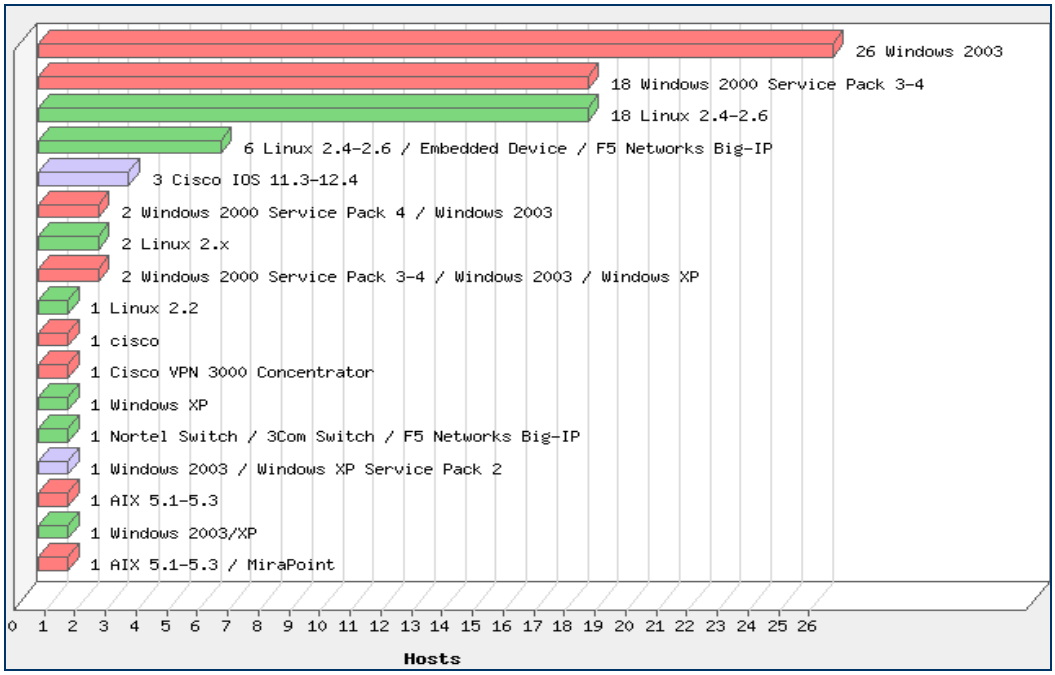
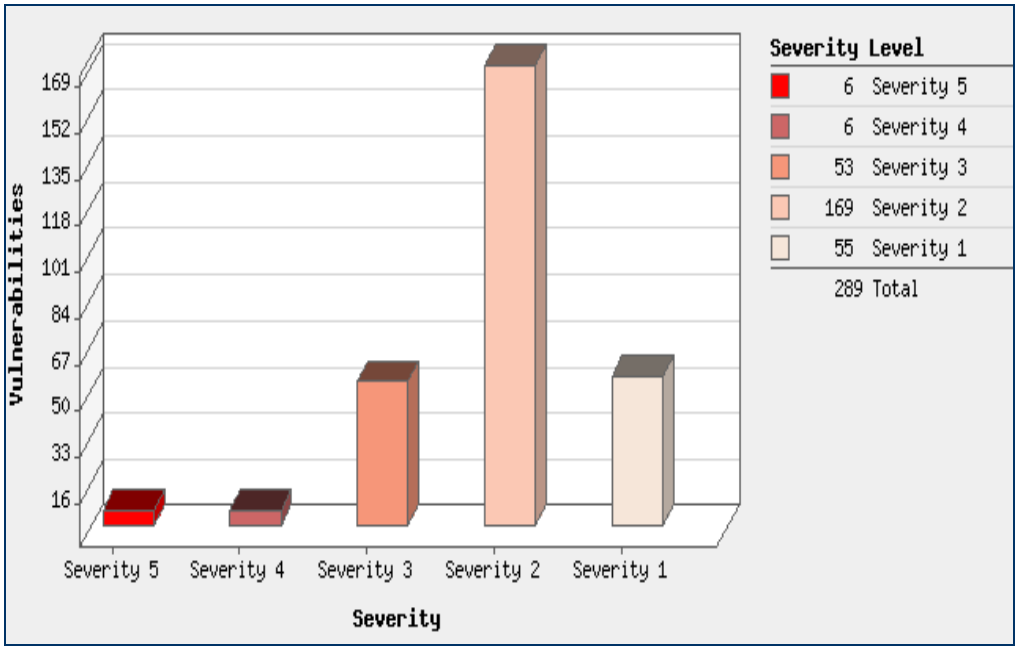


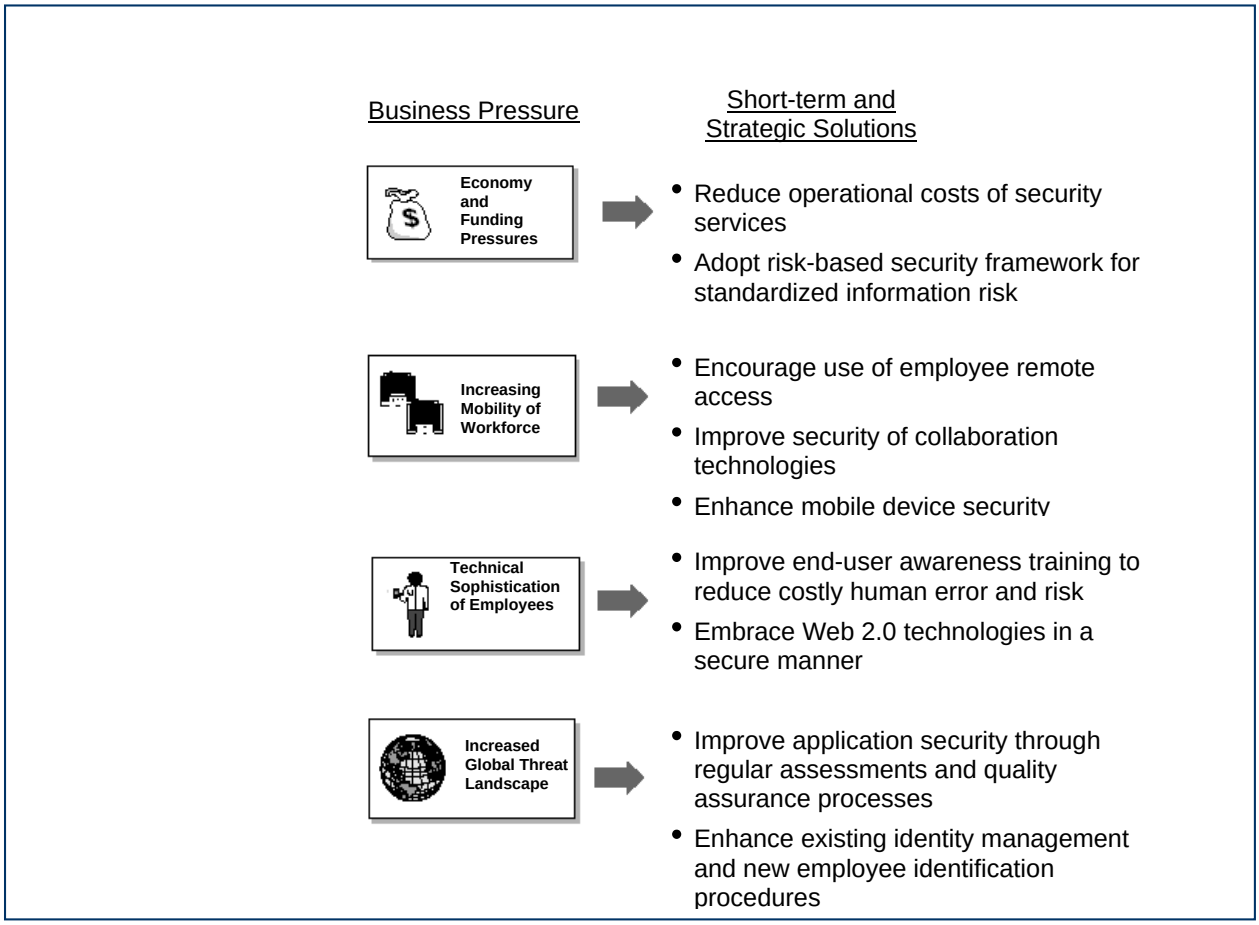
Figure 15 - Sample Vulnerability Scan Report



Security Strategies

As threats and challenges continue to evolve, both tactical and strategic mitigation plans must be adapted to handle these transformations.

Figure 16 - Information Risk Solutions of Current Montgomery County Pressures



- New Enterprise Security Implementation

  The Security Team completed a draft of a National Institutes of Standards and Technology (NIST) risk-based Enterprise Security Policy Implementation Program. This risk-based policy when approved will replace the existing rule-based security program. This policy will permit differing levels of security depending on business need and appropriate risk-level acceptance. It is currently undergoing the review and approval process for implementation.

- Enhanced Security Awareness and Training Program

  Recently, the County participated in a multi-departmental research effort to improve our information security end-user awareness and general employee communication

channels. Based on the survey results, an area noted for improvement included the area of communicating and raising user awareness on policy and compliance requirements. As a consequence, the Compliance & Policy Resource Central (CPR-Central) on the Employee Communications intranet page was created to heighten employee awareness of critical policies and compliance requirements, as they relate to job functions. The CPR-Central will serve as a centralized repository for easy access to Countywide Administrative Policies (APs), County Codes, Federal, State and Local laws, standards, and industry best practices pertinent to information security, privacy and other regulatory compliance requirements. Efforts are underway to create a more interactive and visually-enhanced refresher awareness training and implementation of a Security Message Bulletin Board for alerts, tips, and security notifications.

Goal:
Continue to evolve, both tactical and strategic mitigation plans to adapt to information threat and vulnerability transformations.

5 Innovation

5.1 Existing Technology Strategies

Montgomery County has demonstrated leadership in the use of technology. Innovation opportunities have been pursued as a result of the development of maturing technology that have clearly shown benefits to business operations, implemented new solutions that streamline technology or business operations as well as those that create efficiencies in management as well as cost.

Innovation in technology, to ensure business success, needs to have defined controls that assist with the decision processes to take automation to new levels. Many organizations have found that best innovation improvements are not necessarily from the strong pursuit, but creation of an environment that sustains opportunity for innovative thought and solution to flourish.

Innovation success factors that promote successful innovative strategies include:

- Ensuring that business improvements and IT developments are aligned early to obtain new outcomes
- Innovation decisions are part of life cycle processes and leadership governance
- Managing creativity and aggressive pursuit of business improvements with metrics and anticipated outcomes

- Continually incorporating ideas and needs with the ability to question investment timing, transparency and impact to the organization.

Montgomery County IT has developed numerous innovative solutions which have been integrated into the County's technology operations support strategies. These forward thinking solutions are continually critiqued to ensure that innovation is not taken too far to the "bleeding edge" which requires the ability to take risks and may yield stranded costs. This plan outlines key areas where this innovation approach has demonstrated proven results while reducing risks and providing measurable results that can be applied to current and future enterprise technology opportunities.

5.1.1 Virtualization

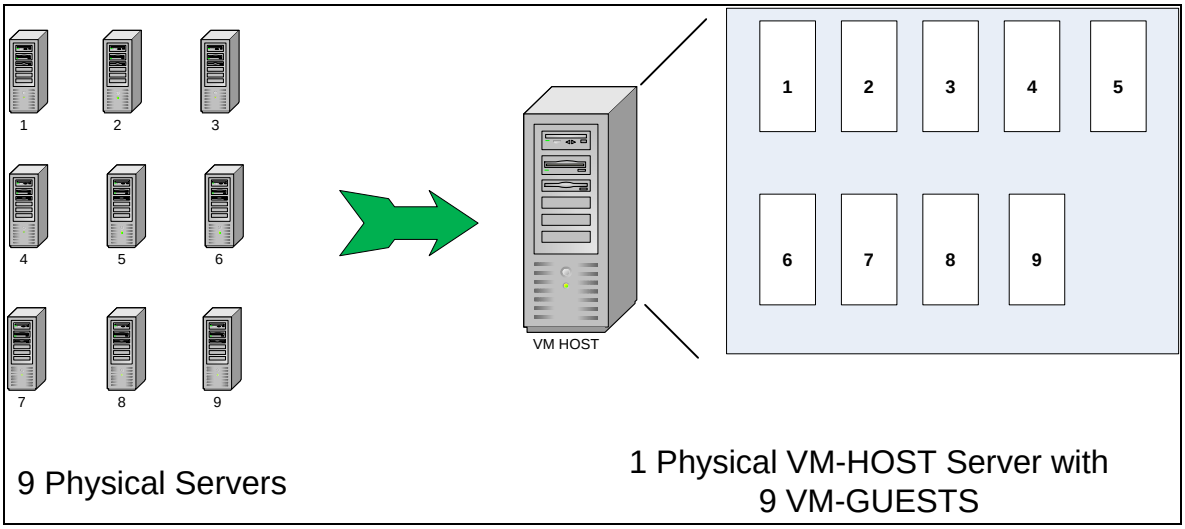
Computer virtualization involves abstraction of Operating System, Hardware and Peripherals with origins in 1960s mainframes. In late 2002 VMware, a x86/x64 server virtualization pioneer, shipped stable commodity OS virtualization products in late 2002. Today there are many vendors marketing products in the arena and this is considered a mainstream technology for servers.

Montgomery County was an early adopter of virtualization, and has been recognized by commercial vendors and government peers as a leader in application of server virtualization. DTS experimented with the technology initially to meet needs for testing and system evaluation. But we soon saw many more opportunities that this technology could provide benefits, and soon the DTS was pushing the envelope with the types of deployments.

The areas that promised improved services, processes and savings and have proven successful are listed below.

Server Consolidation
Virtualization allows multiple servers to run on the same hardware. DTS saw this as a way to reduce number of physical servers and optimize the resources of the hardware. Previously, separate servers were needed because most applications require their own server. With virtualization each application has its own operating system environment but can share the physical server hardware. Most application servers were only using a fraction of the server processing capacity, with virtualization the County is able to load balance and optimize the hardware utilization.

Figure 17 - Server Virtualization



Server Cloning

Since instances of virtual servers are files they can be copied (cloned). DTS quickly realized numerous ways to take advantage of this capability to change how servers are provisioned, how servers are patched and upgraded, and how disaster recovery is approached.

DTS reduced the time for server provisioning from weeks to minutes. DTS maintains master copies of the server standard operating systems it supports and can respond to project and department requests for servers in near real-time.

In conjunction with the adoption of virtualization, the DTS also updated it server hardware specifications to optimize the advantages virtualization offered, including matching the storage configuration to allow for making and storing “snap shots” of the virtual servers at any point in time. This had a dramatic effect on server patching and upgrades and server recovery. Server failures from patching and upgrades has been eliminated, reversion from a failed upgrade can be done easily by going back to the “snap shot.” The technology reduced the testing cycle not only by having additional server resources, it also allowed the segmentation of long many step upgrade processes, so that when a problem was identified staff did not have to start the process from the beginning, they could start from the last “snap shot.” This has saved countless hours of staff time. DTS also took advantage of the “snap shot” technology to reduce the complexity process of and reduced the time of restoring failed servers.

Server Farm Environment Duplication

DTS not only saw the ability to clone individual servers, it used the technology to create complete server farms for specific applications that could be duplicated for different version

testing thereby eliminating resource constraints and conflicts, as well as enabling the Architectural Proof Of Concept process.

Server Maintenance

The County simplified its server inventory by moving to a virtual server environment. The County adopted a single server type that resulted in economies of scale by leveraging acquisitions, simplifying maintenance and eliminating most hardware maintenance contracts. Since the virtual servers can be moved quickly and easily, if a hardware failure occurs on a business critical system it is moved to another physical server while the hardware failure is addressed.

The County's adoption of and exploitation of server virtualization has resulted in significant cost savings and increased the stability and functionality of the County's IT server infrastructure that would not have been possible with physical servers. DTS is continuing searching for new uses for virtualization, with one area being desktop virtualization, as discussed in a later section.

Figure 18 - Server Virtualization Rate

Virtual VM Guest Servers	350
Physical VM Host Server	70
Physical Servers Traditional	98
Total Servers	**518**
Server Virtualization Rate	**78%**

5.1.2 Open source (infrastructure)

DTS was an early adopter of Open Source software and continues look for opportunities to not only reduce licensing costs, but also add or improve functionality and robustness to the IT infrastructure. The adoption of Open Source operating systems, middleware and infrastructure tools have been accelerated because of the use of virtualization, describe above, for experimentation, proof of concepts and hands-on learning.

DTS has be selective in the application of open source targeting areas where open source is mature and where a high return of investment could be realized. A list of the current open source software employed is given below.

Figure 19 - Currently employed open source software

Infrastructure Function	Open Source Software
Virtual Server	VMware
Operating System	CENTOS Linux
J2EE Middleware	JBOSS
Enterprise Monitoring	ZENOSS
Enterprise Services Bus	MULE
Webserver	Apache

Version Control	SVN (subversion)
Tracking (bug, issues)	Trac
Requirements	OSRMT (ALM)
Testing – Web	SAHI
Testing – Performance	Grinder

DTS' open source adoption started with VMware and Linux, which fueled the transformation of the enterprise server architecture.

The DTS Server team had a need to monitor the enterprise server infrastructure and selected Zenoss as its primary Enterprise Server Management tool. Zenoss is similar to high cost commercial products including OpenView ™, Tivoli™, and Unicenter™, and has proven to be even more advanced than the commercial products in some areas. The cost of a commercial product would have been in the millions of dollars.

DTS uses Zenoss for monitoring and alert functionality through the use of the Zenoss console, the ITIL CMDB standard inventory capability for rich modeling of the servers and their patch management and update process, the performance monitoring capabilities for proactive alerts and capacity planning exercises, the email notification capability to alert DTS Server Team Members performing off hours support of critical alert errors such as "System Down" for reactive attention. The system is even more valuable as it sends alerts for excessive CPU, memory or disk usage enabling preventative maintenance before users experience problems.

DTS will continue to investigate opportunistically and adopt open source when it is found to meet the needs of business and fit into the County IT architecture.

5.1.3 Open Source Software Solutions

DTS has had and continues to have pragmatic approach to the use and implementation of Open Source software. The focus is always on the long term stability and supportability of the applications. The Open Source operating systems, middleware and tools have been leveraged extensively and proven highly effective.

To date, DTS has deployed limited Open Source software on enterprise Desktop PC's. The standard desktop now includes CutePDF for the creation of PDF documents improving end user productivity, reducing storage needs, improving document quality, and reducing the need to purchase commercial software for most users.

As this segment of Open Source evolves and matures, DTS will continue to investigate, test and validate applications for use in the enterprise. The usability and supportability issues can be a significant barrier given the large number of users and training and interoperability needs. An example of an application suite that appears nearing maturity that DTS is planning to investigate is Open Office.

5.1.4 Open standards (i.e., LDAP, XML, J2EE, etc.)

The Service Enabled Domain promotes the development of robust, scalable and flexible services for business integration with the County infrastructure. The goal is to achieve a cooperative and secure service and data sharing environment, and to avoid data replication

The County recognizes the importance of developing Services capable of integration with internal and external systems. To maximize the interoperability of County systems, the platform adheres to open architecture, conforming to open standards. The following table lists the County's supported standards and protocols.

Figure 20 - County's supported standards and protocols

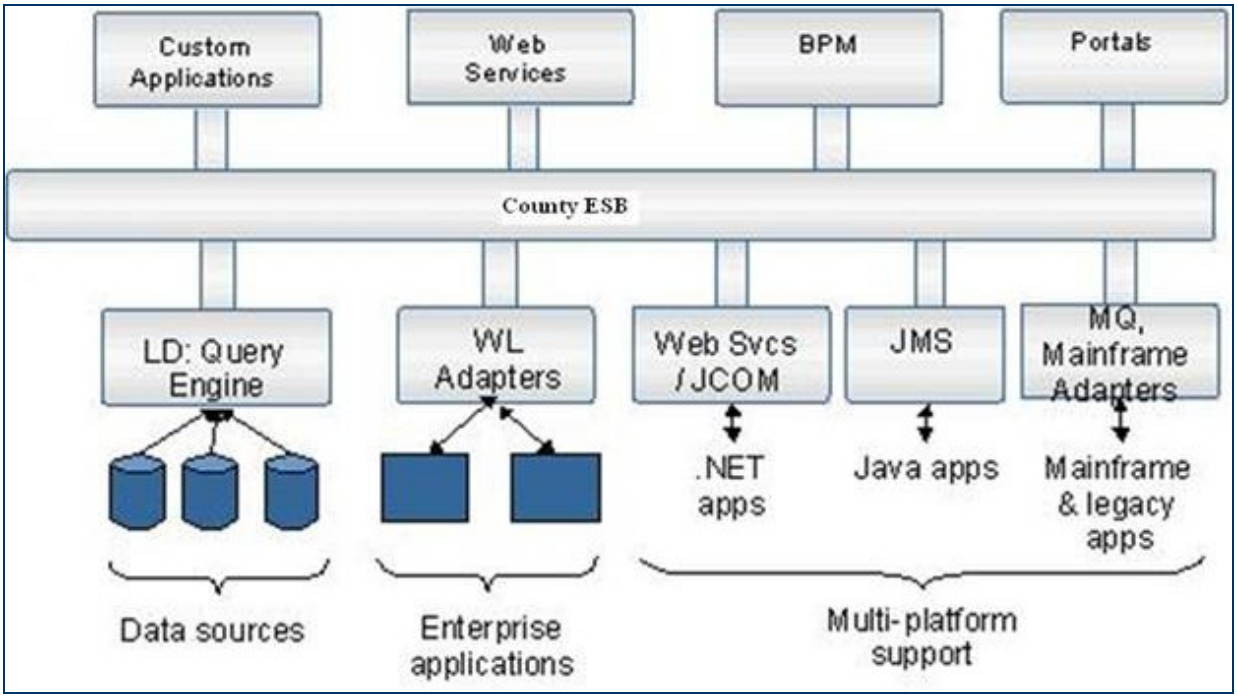
Open DataBase Connectivity (ODBC)
Lightweight Directory Access Protocol (LDAP)
Transmission Control Protocol (TCP/IP)
Extensible Markup Language (XML, XSLT)
HyperText Markup Language (HTML, XHTML)
Java, J2EE
Enterprise Java Bean (EJB)
Java Messaging Services (JMS)
Service Oriented Access Protocol (SOAP)
Secure Hypertext Transfer Protocol (HTTPS)
Web Services Description Language (WSDL)
Universal Description Discovery and Integration (UDDI)

An event-based, messaging model was adopted to help avoid stovepipes (rigid, self-contained functionally organized service solutions for each department, not acting as a single-entity). To do this, the County hosts a healthy mix of services. Some have been developed in-house, and some are COTS (Commercial Off- The-Shelf) solutions. Each application will document and publish well-defined interfaces to the protocols identified in this section.

An events-based messaging service will foster the maturation of service implementations based on Service Oriented Architecture (SOA). The County encourages the use of XML to define event messages, Web Services technologies for integrating .NET and J2EE services and Enterprise Java Bean (EJB) for integrating J2EE services.

The following illustration depicts the Enterprise Services Bus (ESB) developed by DTS as the basis for enterprise messaging services between applications.

Figure 21 - Enterprise Service Bus (ESB)



5.1.5 Environmental (green)

Green Desktops

The average desktop PC wastes nearly half of the energy it consumes as heat. This wasted electricity translates to higher electricity bills and increased greenhouse gas emissions. DCM uses power management features on County computers which can CO2 emissions and save an average of more than $60 a year in energy costs per PC. (Source: http://www.climatesaverscomputing.org/

Since the DCM program started back in 1999, the County has standardized on ENERGY STAR compliant PCs. ENERGY STAR 4.0 is expected to save consumers and businesses more than $1.8 billion in energy costs over the next 5 years and prevent greenhouse gas emissions equal to the annual emissions of 2.7 million vehicles.(Source: http://www.energystar.gov/index.cfm?c=home.index)

Today, the Energy Star compliant workstations, desktops and notebooks can reduce power consumption by as much as 78%. (Assuming an Annual Usage Profiles of 1 hour max performance, 7 hours office productivity, 1 hour idle and 15 hours sleep state for 264 days a year; 24 hours sleep state for 101 days.)

DCM strives to meet or exceed industry standards in energy efficiency, using the latest benchmarks such as Energy Star 4.0 and EPEAT Gold standards. Standardizing on energy efficient computer equipment allows DCM to select power-efficient components.

DCM continues to make informed decisions on all new desktop and laptop models using an Energy Calculator which can help on how changes in power management settings and more efficient hardware options can positively impact energy costs, and can help optimize County infrastructure for high efficiency.

Green Data Center Innovations

In the datacenter, the use of virtual servers has proven very advantageous in the County's efforts to reduce costs and greenhouse emissions and will continue to play a role in continuing the reduction of electrical needs moving forward.

DTS continues to follow best practices in the configuration and operations of the datacenter to reduce costs and greenhouse emissions. DTS has adopted the practice of a hot / cold isle configuration which have been proven to both improve cooling efficiencies, as well as server longevity. DTS is planning to implement further low cost solutions to further improve air flow in the datacenter and thereby reducing cooling costs and emissions.

Given numbers of (350) virtual and (70) physical servers we site in server virtualization section, and applying unit consumptions numbers from vendor websites (7,000 kWh and 4 tons per server annually) we are saving over 2 million kWh of electricity and 1,100 tons of carbon dioxide emissions per year.

5.1.6 Voice over IP

Montgomery County has been a demonstrated leader in the development and implement of new technologies in many areas. One such area, within the Telecommunications Operation, is the inclusion and rapid deployment of Voice over Internet Protocol (VoIP).

Voice over Internet Protocol (VoIP) is a general term for a family of transmission technologies for delivery of voice communications over IP networks such as the Internet or other packet-switched networks.

Montgomery County's Enterprise Telecommunications Team has numerous VoIP efforts included in the solution portfolio. As a direct result of the County's PBX platform upgrade in early, 2007, as business requirements demonstrate the need for enhanced voice services, these modern voice solutions can be integrated without complex changes to the infrastructure. An example of these service opportunities includes:

- IP Soft phone
- Mobility solutions
- Bluetooth headsets
- Wireless PBX phones
- Conferencing and Collaboration Solutions

- Distance Learning
- Desktop Video Telephony
- Wireless PDA
- Push Alerts and Messaged through VOIP display phone
- Unified Communications

All of the above solutions can be supported on the current platform. At the present time, only the IP Soft phone, which is used at the County's Emergency Operations Center, has been deployed for production use.

The Telecom Division is currently in the process of engaging various departments in developing strategies to leverage the systems capabilities in their business functions. Additionally, many of the above trends are being discussed for use in the planned MC311 contact center.

Goal:
Continually analyze and identify business communications opportunities that can be enhanced through the implementation of IP telephony solutions in an effort to automate communications functions and integrate business applications with advanced voice capabilities

5.1.7 Web 2.0 Strategies

DTS has embraced the use of the internet to lower costs, extend the reach of communications and provide online services to County constituents and employees. While the tools, techniques and innovation has accelerated to a significant extent, DTS has integrated and adopted new web technologies as business drivers support the changes with visible and defined objectives.

As a result, DTS's Web 2.0 efforts support the County Executive's (CE) goal of "A Responsive and Accountable County Government." The Web 2.0 strategy uses highly innovative technology to provide comprehensive and cohesive access to information and services. The Web 2.0 program is a component of the County's on-going efforts to enhance the look, feel, navigation and functionality of the County's web portal to provide wide-ranging service options to County residents. The County's web portal has been recognized with numerous awards and distinctions since its initial launch in 2002, and DTS will continue to work with County Departments and Offices to deploy creative, innovative and cost-effective technology solutions to improve the accessibility and utility of on-line services and information.

According to Wikipedia, the term "Web 2.0" describes the changing trends in the use of World Wide Web (WWW) technology and web design that aim to enhance creativity, communications, secure information sharing, collaboration and functionality of the web. Web 2.0 websites allow users to do more than just retrieve information. They can build on the interactive facilities of "Web 1.0" to provide "Network as platform" computing, allowing

users to run software-applications entirely through a browser. Users can own the data on a Web 2.0 site and exercise control over that data. These sites may have an "Architecture of participation" that encourages users to add value to the application as they use it. This stands in contrast to very old traditional websites, the sort which limited visitors to viewing and whose content only the site's owner could modify.

DTS began its Web 2.0 program in response to industry trends showing an increasing demand for on-line collaboration, social networking and social media technologies as well as the increasing availability of Web 2.0 tools and technologies. DTS has worked extensively with the County's Office of Public Information (OPI) and other County Departments and Offices to develop and enhance the County's Web 2.0 solution set. Current Web 2.0 solution components include, but are not limited to, the following elements:

1. Mash-ups
2. Really Simple Syndication (RSS)
3. Weblogs, or "Blogs"
4. Social networking
5. Podcasts

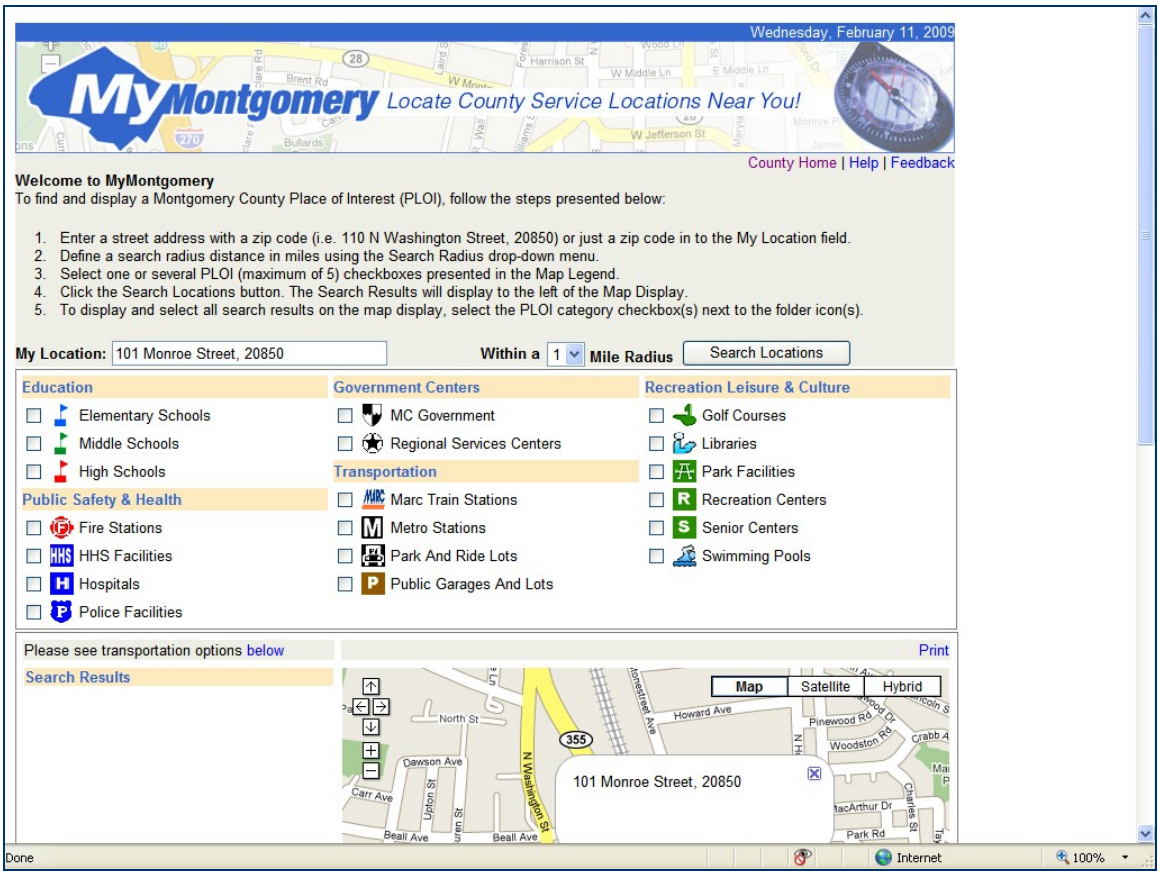
The County's implementation of these Web 2.0 solutions is described in greater detail in the following sections.

Mash-ups

A mash-up is a Web application that combines data from more than one source into a single integrated tool. A mash-up provides easy and fast integration, and is frequently accomplished by access to open software and/or data sources.

The County has deployed several mash-ups on its website. One recent example is the implementation of the "MyMontgomery" tool (Figure 22 – MyMontgomery Home Page), which can be used on-line at the following web address (URL): http://www2.montgomerycountymd.gov/mymontgomery/.

Figure 22 - MyMontgomery Home Page



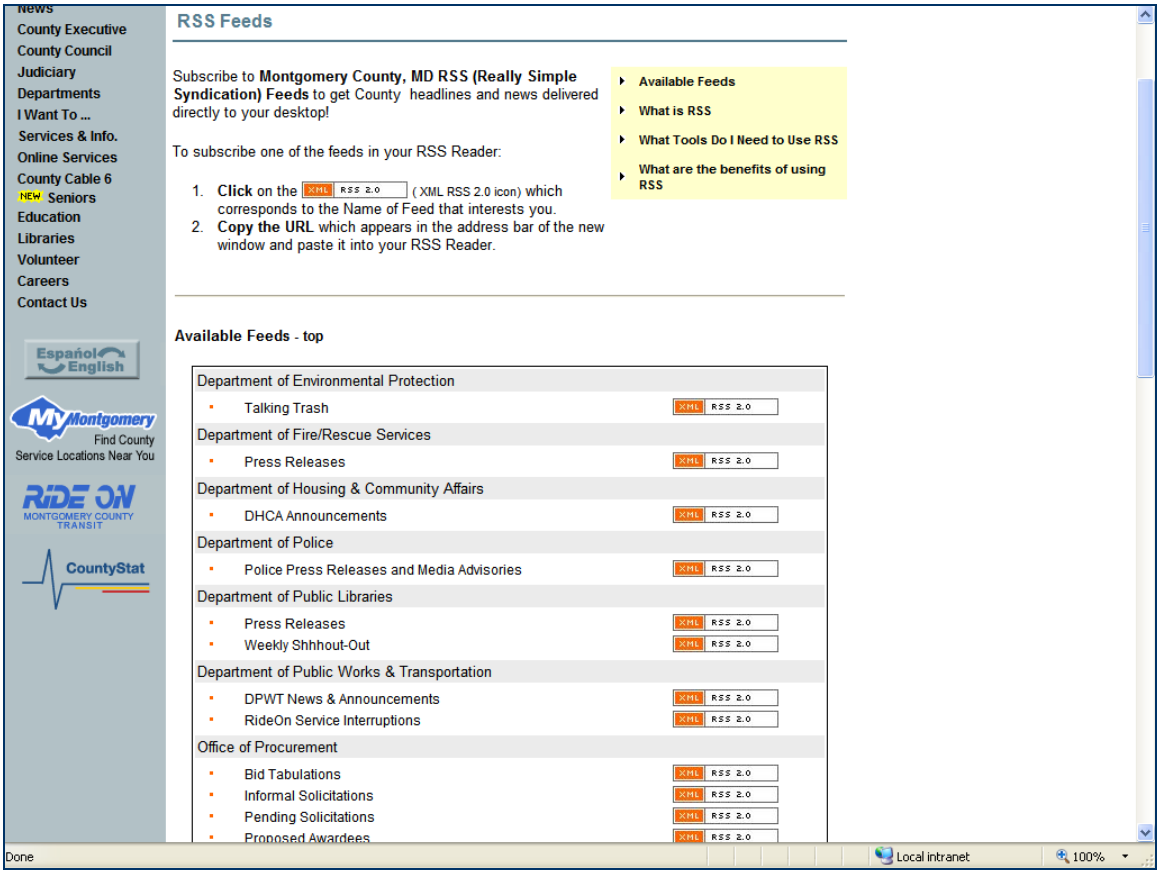
MyMontgomery combines nearly twenty (20) County Geographic Information System (GIS) data layers with Google mapping technology and provides a quick an easy way for County residents to locate County services. DTS incurred no additional or incremental hardware or software costs to develop the MyMontgomery solution because the Google mapping software is made available for free to application developers. Further, the GIS data used within the MyMontgomery application is maintained by DTS and checked regularly to ensure high quality and accuracy. DTS expects to expand the number and types of data layers available on MyMontgomery to further enhance the utility and usability of the solution.

Really Simple Syndication (RSS)

RSS techhnologies provide web users the ability to subscribe to timely updates from favored websites or to aggregate feeds from many sites into one place. RSS feeds can be read using software called an "RSS reader" which can be web-based, desktop-based, a mobile device or any computerized Internet-connected device. The RSS reader checks the user's subscribed feeds regularly for new work, downloads any updates that it finds, and provides a user interface to monitor and read the feeds.

The County has deployed several RSS feeds on its website (Figure 23 – County RSS Feeds). A centralized listing of available RSS feeds may be found at the following URL: http://www.montgomerycountymd.gov/apps/News/RSS/mcgRSS.asp.

Figure 23 – County RSS Feeds



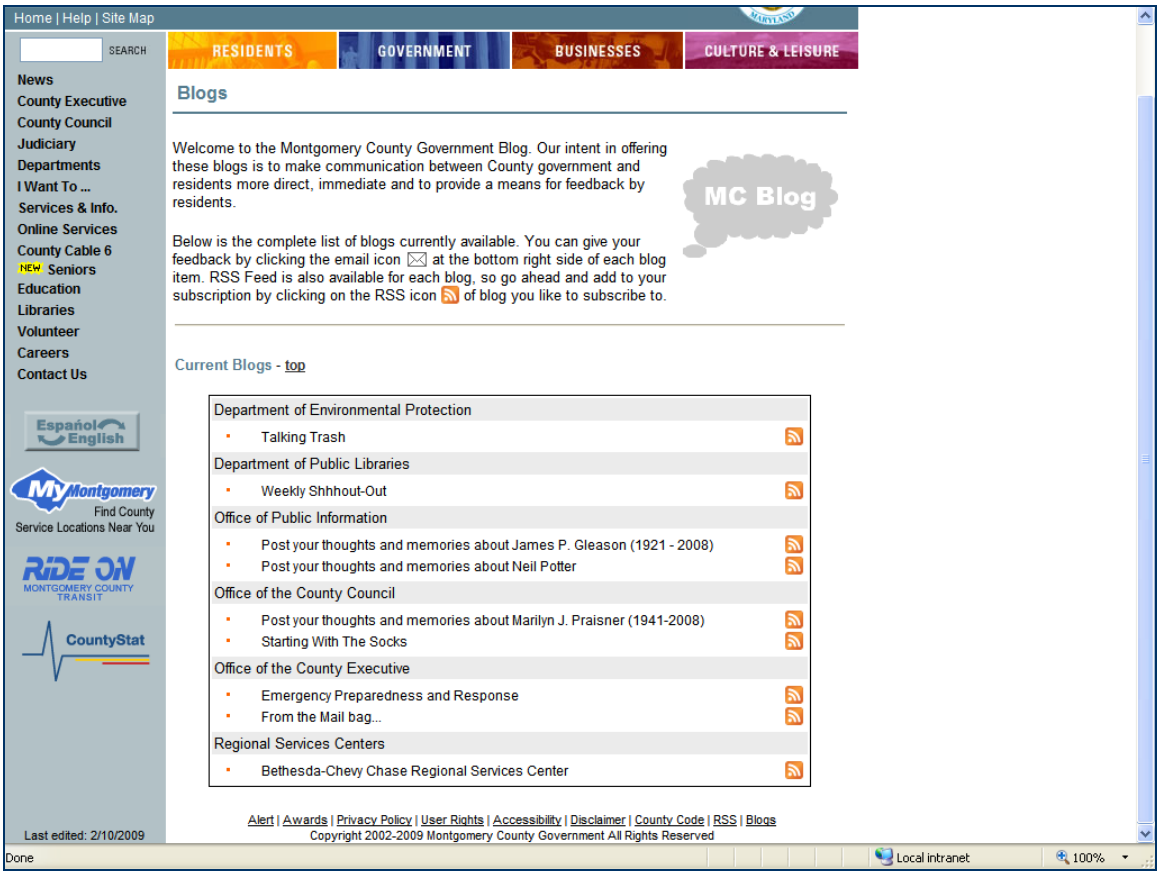
The County provides nearly twenty-five (25) RSS feeds categorized across eleven (11) County Departments and Offices. The web page also provides an overview of RSS technologies as well as links to web sites where users may download required RSS readers. DTS will continue to work with OPI and County Departments and Offices to expand the availability of RSS feeds.

Weblogs (Blogs)

A blog is a Web site, usually maintained by an individual with regular entries of commentary, descriptions of events, or other material.

The County has deployed several blogs on its website (Figure 24 – County Blogs). A centralized listing of available blogs may be found at the following URL: http://www.montgomerycountymd.gov/apps/News/Blog/mcgBlog.asp.

Figure 24 - County Blogs



The County provides access to nearly ten blogs categorized by six (6) County departments and offices. These blogs help to improve communication between County government and residents by making communications more direct, immediate and to provide a means for feedback by residents. DTS expects to work extensively with OPI and County departments and offices to expand the availability and interactivity of existing blogs and to develop and deploy new and interesting blogs.

Social Networking

Social networks focus on building online communities of people who share interests and/or activities, or who are interested in exploring the interests and activities of others. Most social network services are web based and provide a variety of ways for users to interact, such as e-mail and instant messaging services.

In early 2009, OPI encapsulated the County's social networking solution set into a branded offering known as "Montgomery On Demand" (Figure 25 – Montgonery On Demand). This can be accessed at the following URL: http://www.montgomerycountymd.gov/ . DTS contributed significantly to the implementation of the Montgomery On Demand solution set components and provides on-going application and infrastructure support.

Figure 25 - Montgomery On Demand

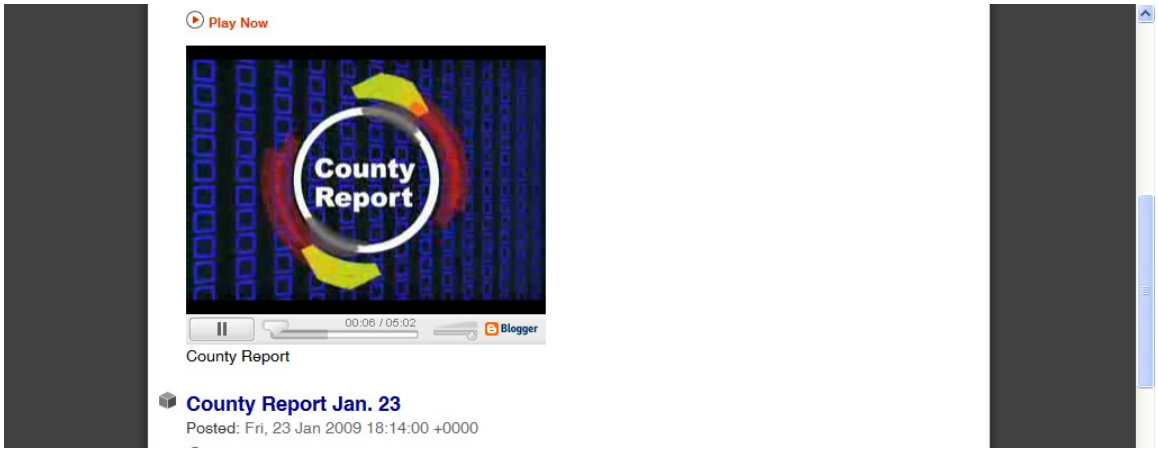
Included in the Montgomery On Demand solution set are links to County content on YouTube, Podcasts on iTunes, access to County's Facebook pages, County Twitter pages, and other critical information such as emergency alerts, newsletters and cable programming. DTS expects that interest in social networking solutions will expand and will collaborate with OPI and County Departments and Offices to continue to expand the County's social networking portfolio.

Podcasts

A podcast is a series of audio or video digital media files which are distributed over the Internet by syndicated download, through Web feeds, to portable media players and personal computers.

The County currently provides access to several Podcasts (Figure 26 – County Podcasts), which may be accessed on Apple itunes, or via the following URL directly: http://feeds.feedburner.com/blogspot/JZrg.

Figure 26 - County Podcasts



In addition to County Report, the Montgomery County Fire and Rescue Service (MCFRS) has a podcast available on the iTunes web site. DTS will work with OPI and other County Departments and Offices to provide infrastructure support for any additional Podcasts deployed in the future.

In summary, DTS, in collaboration with OPI and County Departments and Offices, has deployed several creative, innovative and cost-effective Web 2.0 solutions. Web 2.0 technologies may provide benefits including, but not limited to, enhanced constituent participation, improved on-line services and user interfaces, greater information accessibility, enhanced integration and collaboration, and reduced costs.

Wherever possible and practical, DTS will continue to provide support for the County's implementation of new and enhanced Web 2.0 technologies and business solutions. DTS will advocate Web 2.0 solutions for those County Departments and Offices seeking to deploy technology solutions to enhance creativity, communications, secure information sharing and collaboration. Departments must demonstrate viable business cases driving the need for Web 2.0 solutions, and must leverage existing DTS work intake processes (ex: IT Review, MITIRPS etc.) to initiate new Web 2.0 work programs.

5.1.8 Collaboration

The Team Collaboration Service provides an easy to use online meeting place for internal County teams. Team members can come to a team portal and collaborate on projects using their desktop browsers.

The collaboration service provides some of the following abilities to a team:

- Announcements
- Meeting Agendas
- Document Sharing
- Calendar
- Tasks

- Discussion Board
- Linking Ability

When a team requests a collaboration site DTS allocates an area on the Enterprise collaboration server. DTS maintains the overall server providing proactive server management and backup facilities. When a team requests a new site it is set up by the DTS Site Administrator. The team must designate their own Site Administrator, who will be responsible for the content and administrative duties for the site, including: adding and deleting site users (Users must be County Active Directory members), and management of the content.

DTS maintains a collaboration section on the DTS departmental homepage on the Intranet Portal. The collaboration section will contain information about the service as well as a directory of all the collaboration sites.

5.1.9 Heartbeat performance monitoring

Despite overall success of many web application rollouts, a number of operational challenges mounted to sustain a heterogeneous set of technologies, hundreds of servers and complex networks.

Therefore, in addition to the infrastructure monitoring conducted by DTS (described in an earlier section), DTS also adopted the approach to institute continuous end-user simulated availability / performance monitoring. The “heartbeat” monitoring enables DTS to realize the following:

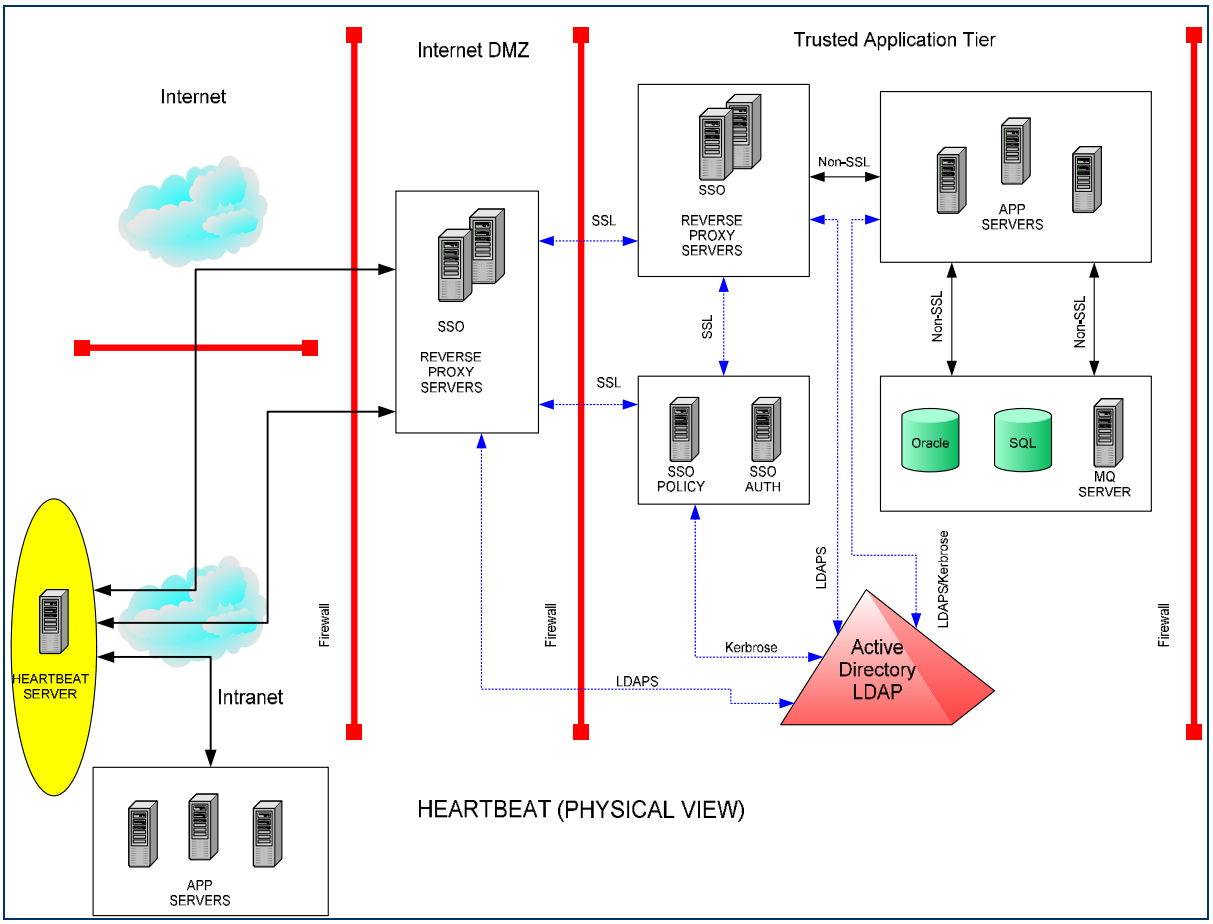
- Higher web application availability.
- 24x7 notification of issues to system engineers via email and/or pagers.
- Better root cause analysis of problems through leverage of historical logs from the monitor.

DTS currently has numerous active HEARTBEAT scripts which include.

- The primary County Internet portal, www.montgomerycountymd.gov
- Several Departmental / agency portals, such as Finance, Recreation, Parks.
- Enterprise Infrastructure: Single Sign-on, Crystal Reports Enterprise, Helpdesk, Imaging, Content Management System, Justice Systems, and MCTime

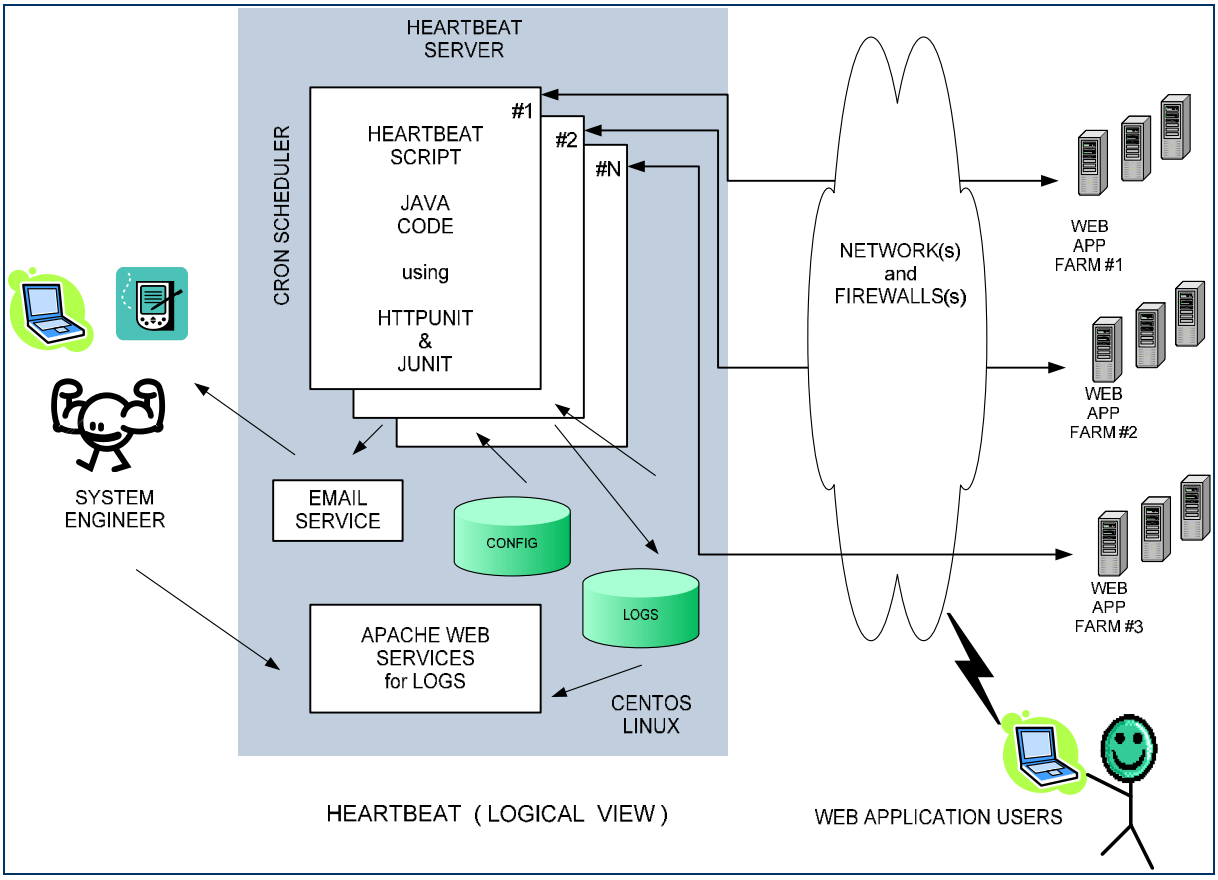
Below is the physical topology of the HEARTBEAT infrastructure. Worth noting, a single HEARTBEAT to one web application validates the health of tens of servers, many layers of middleware, databases and several networks.

Figure 27 - Physical topology of the HEARTBEAT infrastructure



As outlined in the logical view below, individual HEARTBEAT scripts, run in parallel / background monitoring access to web applications, in the event that unexpected behavior occurs, System Engineers are sent emails / text pages. Each HEARTBEAT script is independently configured for windows of operation, repeat intervals and which System Engineers are to be notified.

Figure 28 - Logical view of the Heartbeat Infrastructure



The combination of enterprise monitoring and heartbeats to discover emerging problems and perform preventive maintenance has dramatically reduced disruptive business system outages that impact end users.

5.1.10 Enterprise Architecture Quarterly Assessment

As an implemented, best practice methodology, the Enterprise Architect takes input from the various program, initiatives and systems projects and creates a Quarterly Enterprise Architecture assessment that is published to the CIO, CTO, and DTS Chiefs. The Quarterly assessment identifies potential:

- Enterprise Architecture Framework and processes changes
- New Services – New technical services that can be offered outside the department
- Service Upgrades – Upgrades to current technical services
- Sustaining Services – New processes or tools around sustaining services
- Security Services
- Compliance Services

The update concludes with a section that previews possible research topics looking at future trends that could affect the Enterprise Architecture.

5.2 Existing Business Strategies

The Department of Technology Services (DTS) has a defined focus that centers on outreach, customer support and collaborative innovation. As a direct result, many aspects of the services and support solutions are directed at customer needs from both a business as well as technological aspect.

5.2.1 Self Service

Self Help Information Portal (SHIP)

DCM was looking to enhance the productivity of County employees across all Departments and agencies, by having a single, easily accessible, simple to use portal for sharing and disseminating information. In response to this requirement, DCM developed a Self-Help Information Portal, or "SHIP." The SHIP application is a high level Knowledge Management tool that captures user based institutional knowledge that facilitates self service information and user training. SHIP contains information on topics as diverse as County procedures, information on the location and use of forms, animated training programs, and frequently asked questions (FAQ's) on a wide variety of subjects, processes and programs. With its intuitive and powerful search capabilities, SHIP has become the first place County staff members look for information

SHIP has brought a new degree of consistency to processes and information dissemination. The education programs that have been conducted around its use and the ease of use DCM designed into the system make the tool usable by even basic computer novices. County employees do use this system. Inquiries are growing at a compounded rate of 10% a month during the past six months, and Departments are routinely adding additional content that in turn enhances the usefulness and functionality of the portal.

The benefits this tool has brought to the County are significant. Thus, SHIP has achieved DCM's initial goal of enhancing productivity and morale by minimizing employees' frustration in obtaining information.

Password Reset

In the past, network password-reset issues have constituted the 2nd most frequently used subject in the County IT Support ticket system, with more than 5,000 password-related issues logged per year. (Source: Magic Service Desk tickets)

Employees in need of a password reset were required to contact the County IT Help Desk, who would then reset the password and leave the new password on the employee's voicemail. The process of contacting the help desk, while ordinarily quick, contributes to employee downtime associated with password reset. For those employees without voicemail, the process (and subsequent downtime) was much longer.

Additionally, the IT Help Desk had no viable means of validating a caller's identity prior to resetting a password. An individual who was able to observe or otherwise obtain an

employee's voicemail password (passwords that require no complexity and have no expiration policy) could possibly contact the help desk, request a password reset, and then obtain the new password from the voicemail system, thus gaining all rights and access to information granted to the compromised account.

To address these issues DTS implemented a Password Station and a Password Bouncer application. These secure, web-based products enforce identification proofing and password policies. They utilize a series of personalized challenge questions to assure that an employee's identity is securely confirmed before allowing the password to be changed. The Password Station and Password Bouncer integrate with all major operating systems and enterprise applications.

DCM implemented the system to provide self-service password reset capabilities to County employees within the County LAN as well as those who telecommute or are on travel.

The benefits of this tool have been:
1. Reduced employee downtime resulting from computer/application lockout
2. Increased information security
3. Increased productivity of County IT support staff responsible for system and application support
4. Increased employee satisfaction

5.2.2 Partnerships

Desktop Support

The DCM program established a partnership with a private company for the purpose of enhancing the quality of support to the County's users of personal computers and other mobile data devices. The results of the partnership have been outstanding. Through the innovative use of technology coupled with business process improvements, since early 2006, DCM has successfully resolved 96% of user problems over the phone, without needing to dispatch a service technician to the caller's location. The result has improved worker productivity due to a significant decrease in downtime. Furthermore, DCM and its partner have consistently negotiated deep discounts, in the range of 10-30%, in computer acquisition costs as compared to the State of Maryland and other local jurisdictions. The result: savings of hundreds of thousands of dollars and lower total cost of ownership to the County. Results such as these have garnered the DCM program recognition from organizations such as the Public Technology Institute and the National Association of Counties.

Recently, the International Standards Organization (ISO) established the ISO 20000 performance standard as the first formal international definition of quality best practices in Information Technology (IT) operations management. DCM and it's partner collaborated to make Montgomery County the first, and currently the only, public sector organization in North America to receive the prestigious ISO 20000 certification. This has given the County global recognition for the quality of its IT support programs.

This year, DCM and its partner teamed to create a self-help information portal (SHIP) for use by County employees. This innovative IT tool contains answers to common questions related to the use of the County's software programs, including hundreds of animated tutorials for self education. It also provides all agencies and organizations with the ability to post answers to procedural questions related to their IT operations for the benefit of all employees. SHIP reduces time consuming inquiries to department IT staff and assists in the training of County IT users.

5.2.3 Architectural Proof of Concept

Given a long history of major gaps between what vendor marketing promised and what vendor implementation deployed, DTS looked for a way to reduce County risk resulting in cost overruns, missed schedules and failed projects, due to the following gap areas.

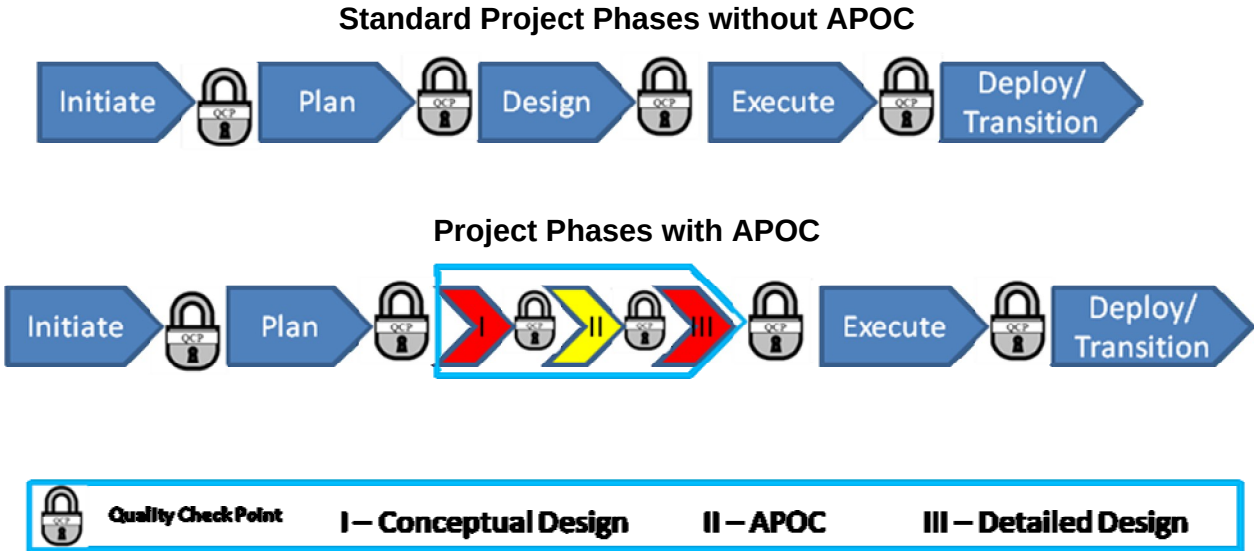
- Missing functionality
- Lack of Compliance
- Technological (Non-Functional) Issues
- Architecture misalignment
- Inattention to County DR, Backup/Archiving, Security, Platforms, Documentation
- Inattention to County Business Process, Data Integration, Administration

DTS's solution was the development of an Architectural Proof of Concept (APOC) approach.
The APOC starts with Risk Identification

- Technological
- Security
- Quality/Performance
- Functional (TBD)

The APOC then defines and executes "sub-project" prior to Execution phase of the overall Project. The APOC Sub-project has well-defined scope, schedule and resources; and begins with well-documented APOC Goals. The result of the APOC is a comprehensive Issue/Risk Log.

Figure 29 - APOC Phases



DTS employs the following specific approach to APOCs

- APOC is a distinct phase of the Project
  - After vendor(s) Identification AND before contract signing
- Scope of APOC is communicated to Vendor
  - Reviewing/Deploying/Testing of over TEN categories, including Security/Platform/Integration/Process/Network etc
- Contract/License details are finalized
- A Tiger-team Formed that deploys a Pilot instance
- Reviews/Deployments/Tests are conducted on the Pilot instance
- Issues/Risks are documented and Communicated
- Implementation solution(s) are identified and documented

DTS has found APOCs to be consistently very beneficial including the following results:

- Vendors on projects with APOCs were able better align their offering to meet County needs and architecture
- Projects with APOCs avoided contract and license challenges experienced elsewhere
- County able to verify vendor solution and identify GAP/Risk before contract execution
- County and vendors able to transform risks to issues; find solutions before project implementation and execution
- County and vendors able to build mutual understanding and trust
- Increasing knowledge of tasks, effort and cost and thereby enhancing project execution

The bottom line of APOCs has proven to be the ability of the DTS to use it a powerful leverage point to with vendors to ensure a successful project implementations.

6 Governance

Information Technology Governance is a subset discipline of County Governance focused on information technology (IT) systems and their performance and risk management. Attention to gGovernance is a direct outcome of historical acknowledgments that IT projects can easily get out of control and profoundly affect the performance of an organization.

A common theme of IT governance discussions is that the IT capability can no longer be a mystery to the business. Historically, involvement of executives in IT issues was to defer all key decisions to the company's IT leadership. IT governance implies a system in which all stakeholders, including leadership, internal customers, and particular departments, have the necessary input into the decision making process. The goal is the prevention of IT from independently making and later being held solely responsible for decisions that have a less than positive impact. A strong governance model also holds users accountable for decisions when a system does not behave or perform as expected.

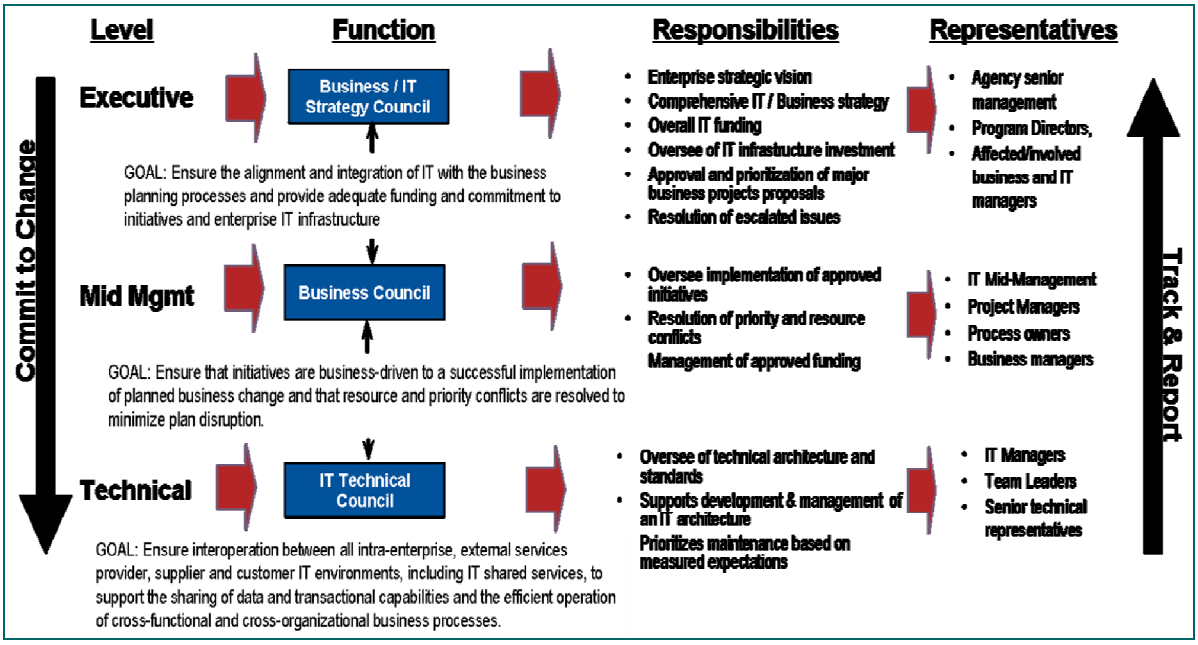
Enterprise Governance is about who is responsible for making major decisions, has input and is accountable for implementing those decisions. Governance objectives are:

- Enterprise Governance assigns decision rights and creates an accountability framework that encourages desirable behavior.
- Business Automation Framework (known in the Technology circles as Enterprise Architecture or EA) Governance is the subset of Business Governance that focuses on setting direction for the County – in terms of how to execute processes and how to use IT; both the business and IT organizations participate.

Once the organization adopts a robust Governance strategy, the model provides the organization with an effective mechanism for planning changes to meet business objectives and support desired outcomes. The governed programs are a proactive response by IT to avoid scars and expensive mistakes by anticipating business needs.

To be fully effective, Governance works better when business owns the business process of planning how to meet their needs, and utilizing technology as the tool for the results. The chart that follows, demonstrates how multiple levels of leadership and input are key to the input required for organized change and the subsequent parallel is the communication that takes place to ensure enterprise knowledge and change success.

Figure 30 - Governance Input



Montgomery County has embraced a variety of governance models that support the business drive to use technology and make effective decisions on technology investments.

6.1 Technical Operations Management Group (TOMG)

The TOMG will identify, develop and recommend enterprise policies and strategies required to guide the deployment of information technology solutions and products. TOMG will identify opportunities for improving service delivery throughout Montgomery County Government (MCG). TOMG recommendations will be made to the Chief Information Officer (CIO), the Chair of Information Technology Policy Advisory Committee (IPAC). The IPAC will have final decision authority on recommendations.

To fulfill the County's mission, the TOMG will consider the following:

- The County Executive's Mission Statement
- Customer needs and expectation, internal and external
- Work activities across lines-of-business (LOB) / departments
- The capabilities and limitations of emerging and maturing technologies

Responsibilities

In fulfilling its purpose, the TOMG will:

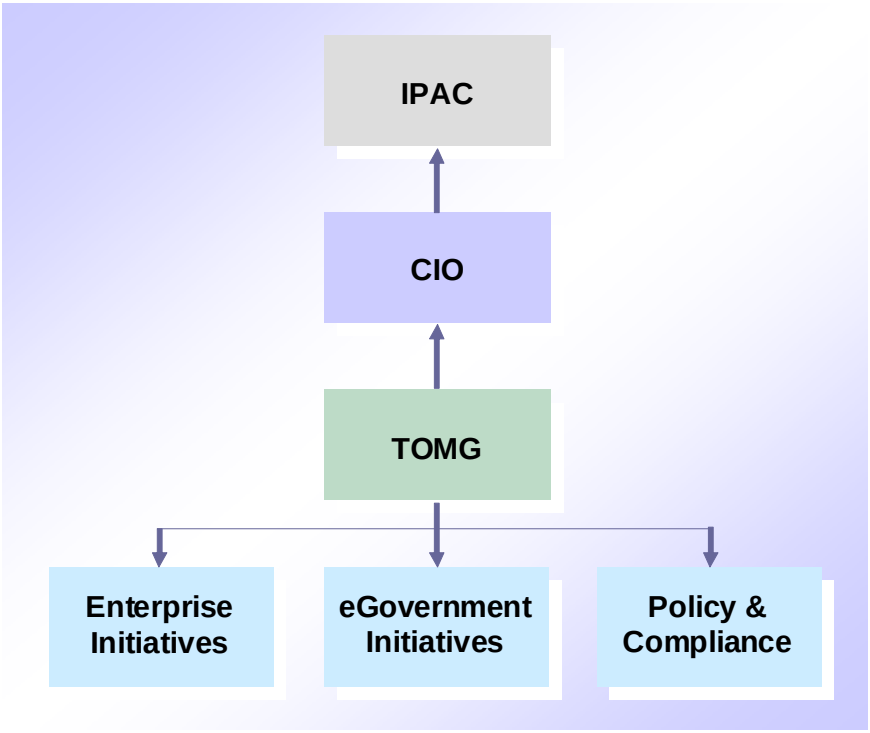
- Establish fundamental operating principles and business practices for, communications, transactions and the use of technology;
- Identify innovations and best practices to compare the effectiveness of MCG activities with government and private sector best practices;
- Strive to maximize the use of technology in MCG Departments, Offices and business lines to benefit customers and other key stakeholders;
- Endeavor to assure that all electronic content is secure, available and accurate;
- Identify key issues bearing upon the advantageous deployment, availability and use of Technology;
- Identify and standardize departmental level policies needed to ensure the security, availability and use of technology;
- Recommend policies and strategies as appropriate to ensure business needs are met;
- Consult with key user-communities and encourage these communities to communicate their technology needs;
- Recommend changes to the County Enterprise Architect; and
- Provide coordination and communication among the various Departmental groups currently working on technology projects in MCG.

Framework

In order to include all County organizations in Enterprise technology discussions and solutions, the TOMG will be based on a two-tier structure. Tier A will comprise all organizations with "in-house" technical staff. Tier B will comprise all other organizations.

Tier A organizations shall appoint a business and technical representative to the TOMG. Tier B organizations should appoint a business representative.

Figure 31 - TOMG Framework



The TOMG facilitator, designated by the CIO, will coordinate the meetings. All meetings will have an advance agenda and each meeting will be documented through minutes. Any TOMG representative can add an item to the agenda. Other DTS required representatives include architecture, security and others as required. The TOMG will determine sub-division(s) of work effort. The work products and recommendations of the TOMG will be submitted to the CIO for review and consideration, and then submitted to IPAC for final approval.

Issues or areas of concern will be resolved to the maximum extent possible through consensus. Those issues which cannot be resolved will be forwarded to the CIO for guidance and/or decision.

TOMG representatives may designate an alternate to attend meetings. However, all TOMG representatives must have the requisite knowledge and authority to speak on behalf of the business or technical organization.

6.2 Information Technology Policy Advisory Committee (IPAC)

Montgomery County implemented an IT governance structure and processes, based on recognized business best practices, in order to plan, manage, and build support for IT projects, programs and policies. The committee is designed to facilitate the cooperation and communication among various County departments and to establish an institution to promulgate and adopt IT operating standards, policies, and architecture decisions.

The IT governance initiative includes two levels of input and review. First, the Technical Operations Management Group (TOMG) is comprised of technical representatives from each County department. Second, the IT Policy Advisory Committee (IPAC) is comprised of 12 department heads representing a cross section of County departments. The Chief Information Officer (CIO) chairs both groups.

The new IT governance structure has been instrumental in the adoption and implementation of new policies and procedures for the enterprise directory and messaging systems and in developing an overarching IT architecture standard for the County government. The governance structure will allow the County government to steer a course to introduce and coordinate the best use of IT resources in order to improve the service provided citizens and County employees.

The Need for Governance

Montgomery County was experiencing challenges due to the decentralized budgeting, planning, and management of IT systems and services. The decentralized approach fostered duplication of systems and services, operational inefficiencies, stand-alone systems that were unable to share data, and hampered the County in implementing and maintaining enterprise-wide IT initiatives.

In many cases, departments would develop or purchase systems that were not compatible with enterprise systems and had difficulties communicating with other department applications. This resulted in a County IT infrastructure with many vulnerabilities and requiring a greater amount of resources to operate and maintain. Specific examples include over 30 Network domains, over 10 independent e-mail systems, and numerous single function stand-alone business applications. Another result of this environment includes limited or ineffective IT policies.

A symptom of the lack of coordination was that departments did not have a good understanding of the strategic IT plan for the County. The operating departments also did not see the central IT department, DTS, as providing the leadership to guide the County in IT initiatives.

Departments did not have an opportunity to contribute to enterprise initiatives these initiatives with few exceptions failed or achieved limited success. The lack of the governance also hindered securing funds for major IT projects. MCG needed an effective IT governance process that allowed all stakeholders to participate in a formalized process to adopt standards, policies and IT architecture for the County.

The IT governance initiative started with the County Government's CIO recognizing that IT leadership was ineffective. The CIO proposed a two tiered governance structure, comprised of a technical level and a policy level. The technical level was designated the Technical Operations Management Group (TOMG). The policy level was designated the IT Policy Advisory Committee (IPAC). A core group of 12 operating department heads were asked to participate on the committee. The proposal was accepted and endorsed by the Chief Administrative Officer.

TOMG meets on a regular basis and focuses on technical issues. They are also responsible for a first review of policies and how they would impact business operations.

IPAC meets quarterly and focuses on policy issues, but also has the added responsibility of reviewing the standards and technical designs recommended by the TOMG. Since its inception, IPAC has undertaken establishing County policies for Internet and cell phone use, as well as creating County Internet domain naming and portal design architectures.

6.3 ITPCC Overview

The Interagency Technology Policy and Coordination Committee (ITPCC) was chartered by the Montgomery County Council on July 26, 1994 in Council Resolution No. 12-1758. The rapidly accelerating changes and opportunities presented by new information technologies presented unique challenges to both public and private sectors for efficient utilization of these capabilities. Council desired to provide a framework to encourage agencies of County government to coordinate where possible and leverage opportunities for interagency linkage and economies of scale. As stated by Councilmember Marilyn Praisner who initiated ITPCC, "the taxpayer sees one government" meaning that the differences between agency missions was not apparent to the typical citizen who has the continuing expectation that the agencies of government work together efficiently, not separately.

The mission of ITPCC is to: promote IT strategic planning and coordination among the agencies of MCG that include Montgomery County Public Schools (MCPS), Montgomery College (MC), Montgomery County Government (MCG), Maryland National Parks and Planning Commission (M-NCPPC), Washington Suburban Sanitary Commission (WSSC), and the Housing Opportunities Commission (HOC); provide a forum for coordinated implementation of technology policy and guidelines; facilitate Interagency communication including evaluation and sharing of new technologies, and advise policy makers on strategic uses of technology.

This is accomplished within a structure consisting of the ITPCC Principals, the CIO Staff Subcommittee, Project Teams, Special Interest Groups (SIGs), and Special Subcommittees. The Principals are the agency heads for the ITPCC agencies noted above. The ITPCC establishes policy, reviews work products, and establishes priorities. The ITPCC provides status reports to the Management and Fiscal Planning Committee (MFP) periodically. The CIO Staff Subcommittee reports to the ITPCC and is composed of representatives from each member agency who hold the title or role of a Chief Information Officer (CIO). The Staff Subcommittee meets periodically and proposes the yearly work plan, approves or defines the scope and tasks to be completed by the project work teams,

allocates resources to complete project tasks, reviews and approves project work products, and makes recommendations to the ITPCC based on the results of the work accomplished by the teams. Project Work Teams are designated by the CIO to perform the tasks required by the ITPCC work plan, or other special project assignments as required. Special Interest Groups (SIGs) are typically the offspring of the project work teams that have completed a project. SIGs meet to continue information sharing and dialog on issues of common interagency interest and benefit.

Examples of some of the major interagency project efforts include: development of an interagency GIS Strategic Plan in 1996 (presently being updated); establishing interagency guidelines for Internet policies; the Year 2000 project; establishment of the policy for standard replacement cycles for desktop computer systems (60k plus systems); completion of the FiberNet Strategic Plan; establishment of the Interagency FiberNet Governance Charter; establishment of the FiberNet Interagency Technical Advisory Committee; established the FiberNet Chargeback Policy; created of the FiberNet Designated Reserve Fund; developed of the IT Major Systems asset management models revealing the critical need for adequate resourcing for over $350 million of major systems replacements and upgrades; established the Interagency Technology Fund (ITF) that currently supports multiple projects including development of Continuity of Operations Plans (COOP) in all agencies, implementation of a Central Vendor Registration System, a strategic roadmap study for CAD systems, and a new GIS Strategic Plan. There are many additional examples of interagency coordination that have been facilitated by the existence of ITPCC.

The ITPCC framework is unique in local government in that it periodically brings together the most senior decision makers in government to discuss issues and coordinate actions on a true interagency basis. The ongoing dialog among the agencies facilitates information exchanges and enables government to be more nimble in adopting policies and technology solutions to effectively and efficiently deliver services to the residents of Montgomery County.

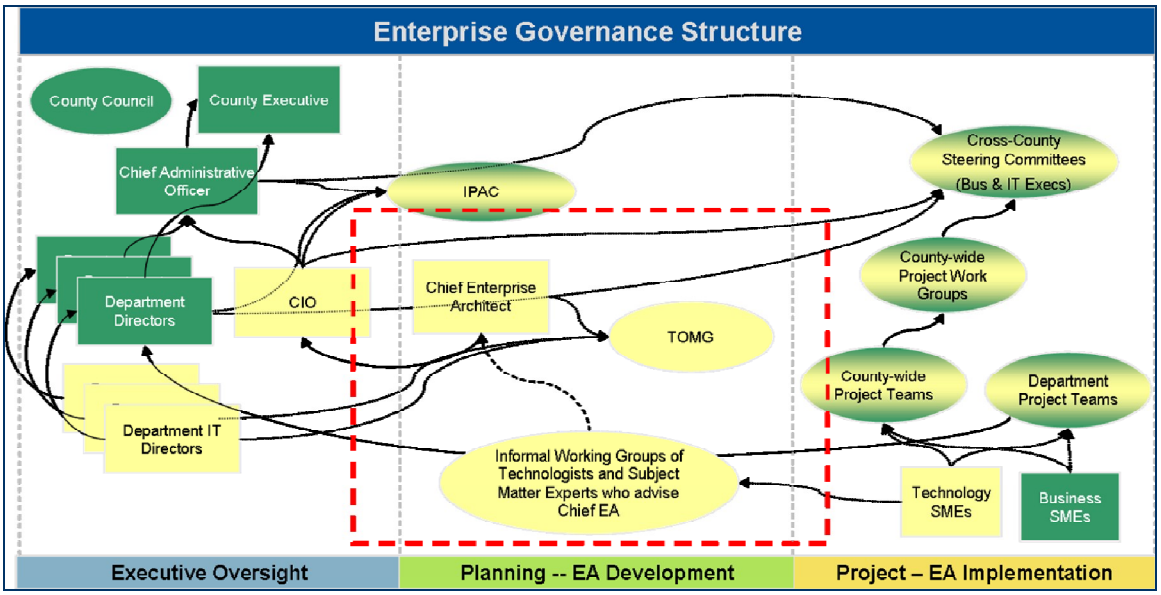
Governance Summary

While Montgomery County has a complex network for technology governance today, the introduction of our future enterprise solutions can add additional complexity to the governance process as well as offer opportunities to streamline the governance model.

In early 2008, as a part of the preparation for Enterprise Resource Planning effort, Gartner was utilized to provide an assessment of technology processes that included the governance model. The assessment outlined the current flow and also provided some recommendations on how the County might look at the future state.

The following image is Gartner's assessment of the current state of the governance model used.

Figure 32 - Enterprise Governance Structure



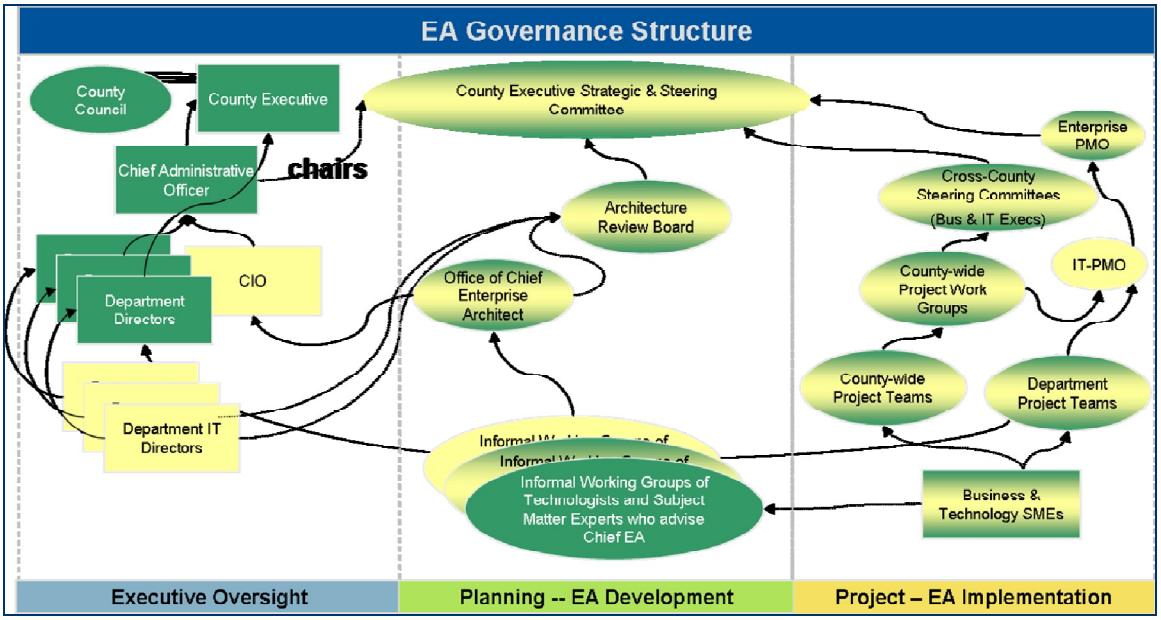
While the Gartner review did not identify any major issues with the as-is model, they did outline risks that needed to be considered. In summary, these were:

1. No formal coordination/reporting structure above Project Steering committees
2. The Project Management Office functionality is only provided for the IT dimension
3. Reliance on informal communications channels and relationships for coordinating issues with indirect stakeholders and other projects
4. Non-Enterprise activities provided limited visibility and coordination with other department initiatives
5. There was the absence of an Architecture Review Board function for providing stakeholder input into enterprise architecture transformation and lacking an enterprise approval process to support compliance.

Gartner clearly articulated that there is no single “right answer” to creating the most effective governance model. Each organization needs to evaluate the strengths and weaknesses of the IT processes to develop a model that has efficiencies, strong communications and promotes a collaborative environment in decision making that may affect the current infrastructure as well as the integration of new systems or solutions.

The following chart is one example of numerous models that were presented for consideration. This example is a direct result of the opportunities that the County will have as larger, enterprise processes begin to permeate the future technology transformations.

Figure 33 - EA Governance Structure



The example provided denotes a number of changes that will need to be considered as the County progresses with the impetus of new, broader technology solutions. The model also provides for the ability to integrate non-core technology efforts into the broader, enterprise model. This is extremely important given the vast number of technology initiatives that will be competing for visibility as their results are continually monitored to ensure the original goals are being met, objectives have not changed and that these programs are healthy to move forward.

Some of the changes that this model asks the County leadership to examine include a transformation of current governance groups. As an example, the TOMG group in the older model, given the tasks and accountabilities in the current state, transitions into the Architecture Review Board to take more of a technical role in change / modernization recommendations.

Many of the recommendations from the Gartner review have created momentum on the development of a future Enterprise Governance recommendation. While the final outcomes of the leadership have not been finalized, the change in direction and commitment to brining business views and input into technology transformation is considered a best practice for organizations that truly embrace technology as a tool for future success.

Goal:
Continue to develop leadership oversight mechanisms that provide for business inputs and impacts while managing and modernizing technology to support business outcomes.

7 Resources and People

MCG DTS workforce shares characteristics with other public sector agencies with the impending loss of its institutional and technical memory as well as the ever increasing private sector competition for qualified employees. The DTS strategic response is to develop a proactive approach so that it can meet Department and constituent needs more efficiently, effectively, and with significantly fewer increases employees. To help managers assess current and future workforce trends and plan realistically for the future operations, DTS is developing this Strategic Staffing Plan.

7.1 Retention / Attraction

Aging Workforce

In the U.S. there is a substantial pool of highly qualified workers who are on the verge of retirement. Bureau of Labor Services data shows that some 78 million Baby Boomers will begin retiring in 2010. This will impose a major drain on the existing labor pool. Within the next 10 years, 43 percent of the U.S. workforce will be eligible for retirement. By 2020, nearly 24 percent of the workforce will consist of employees age 55 or older. That is twice the number from 1990.

This reduction in the size of the labor market will impact businesses in two ways. Not only will they need to address the lack of employees in the terms of numbers, they must also consider the loss of vital skills and significant institutional knowledge.

Commonly known as the “brain drain effect,” when the Boomers leave the workforce, they take with them technical expertise that in many cases is not available elsewhere in today’s labor pool. Skills such as mainframe programming and maintenance are not commonly held by many of today’s young professionals and companies either can not or are not ready to give up on these technologies. Consequently there will be a pressing need for businesses to find adequate replacement personnel to support their legacy applications.

One step taken to address this issue was to determine DTS’ vulnerability to the impending labor shortage. To ascertain this, a skill assessment was conducted to identify potential vulnerabilities. An additional step is the continued participation in the MCG’s resource planning and Leadership Development Program (LDP).

Baby Boomer Departure

Although older Americans are willing to continue working, most companies today have no planned retention policies to encourage them to stay. Nor do they have replacement strategies to help their business cope with their exodus. A 2006 AARP survey of 1,000 executives conducted by BusinessWeek Research Services found that a majority of executives are aware of the impending retirement crisis, but few are doing anything about it.

Though 59% of executives said their companies need to be “more proactive in thinking about how to retain workers who are approaching retirement,” only 37% say that their organizations have formal processes to capture key business knowledge from employees who retire or leave. Fewer still have programs to encourage older employees to stay with the company longer (just 16%). When asked if their company is ‘very’ committed to retaining employees who are approaching retirement,” only 14% responded yes.

While DTS can continue to recruit future personnel with technical skills and expertise, an effective alternative would be the retraining of current employees with the required enhanced technical and analytical skills. Retraining will help DTS overcome the scarcity of those specialized skills in the labor market.

Due to the complexities of required technical skills, development may require longer periods of training, perhaps exposure to several months of on-the-job experience.

DTS strives to improve its documentation of strategic job descriptions, particularly with the management and senior IT positions. It is equally important to enhance critical job procedures. Specialized knowledge should be captured and translated into a singular procedural manual, or projected into a configuration management information database. This will leave an informational reference or knowledge base for future employees in the agency.

Additional financial resources for salaries will be needed to successfully attract and retain qualified personnel for these positions, especially as new openings arise.

Retaining Valuable Personnel

DTS has instituted a more comprehensive individual annual performance review process to provide feedback on the progress of employee development. DTS may also need to identify more formalized financial and non-financial rewards for employees accustomed to advancement and recognition within the constraints of the County's personnel regulations.

Workforce

This is the first time in history that 4 generations are working side by side in the workplace. They are (as of Oct 2007):

Figure 34 - Workforce Generation Mix

Workforce Generation Matrix		
Veterans	Born before 1944	Youngest is 63
Baby Boomers	Born between 1945-1962	Oldest is 62; Youngest is 45
Generation X	Born between 1963-1982	Oldest is 44; Youngest is 25
Millennials	Born between 1983-2000	Oldest is 24; Youngest is 7

Today's organization is a cross-generational workplace more so than anytime before. Each generation has its own values, views, ambitions, defining events that helped shape their lives. Different ways of talking, thinking and working naturally bring about conflict that needs to managed, which is a direct result of the considerable diversity of the organization. Management will continue to be challenged as the organization grows and recedes and there is an ongoing need to address the overlap that exists between the generations.

Goal:
Continue to invest in human resources solutions to attract and retain a quality workforce that can support current and future technology strategies while developing resources for new and progressive technology solutions support.

8 Next Steps

8.1 Business Assessment and Strategic Alignment

An Enterprise Technology strategy will be the most influential when it can support as well as differentiate the needs of the business. Driving success using IT requires both a view of current business technologies as well as an understanding of the business objectives dependant on technical innovation for success. IT organizations that ensure business strategies are included in setting technology direction will excel in supporting the mission of the business and drive highly successful business initiatives.

It is DTS's goal to create a winning Enterprise Technology strategy that easily demonstrates business value for Montgomery County departments. To complete a well rounded technology strategic plan, business process and objective research will be an ongoing component to a strong, long-term strategic plan.

In an effort to demonstrate a comprehensive approach and provide for positive technology objectives, this strategy champions the overarching intent of "theming" for technology strategies to identify commonalities between the business users. The goal for moving forward would be to ensure that technology solutions and needs be sized, reviewed and presented from the group delivery. The result is intended to clearly demonstrate Return on

Investment (ROI) and maximizing value are a routine part of the business/technology analysis.

DTS has, as a part of the continuing strategy, identified key questions that are designed to initiate business input discussions, help extract key issue information and provide both immediate and long-term opportunities to explore valued technology innovation:

- How does the business area define success?
- How does/can technology help your business succeed?
- How are strategic results measured to demonstrate contribution to business success?
- How are technology needs and objectives communicated to allow for timely innovations?

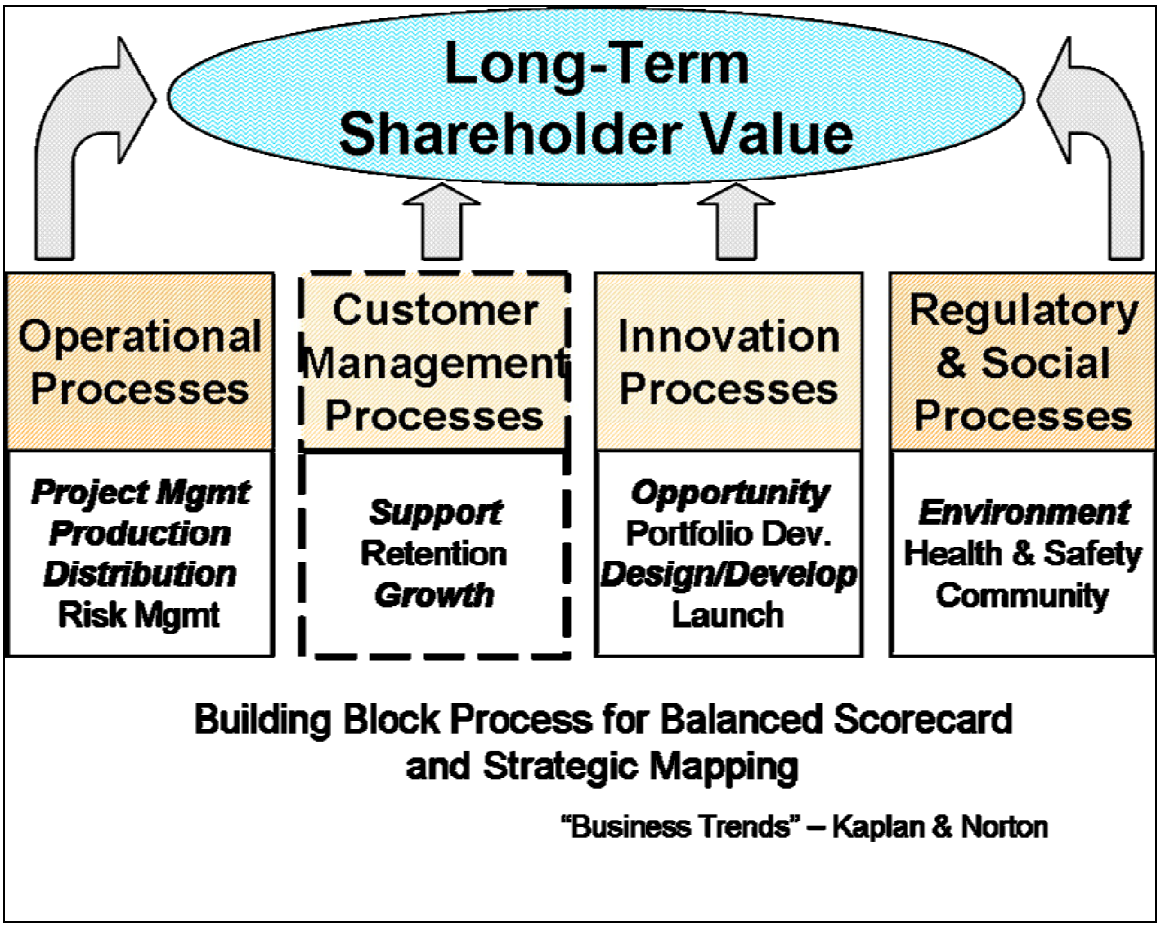
As part of the data-collection process, DTS teams have begun the interview process inclusive of department directors and key departmental Subject Matter Experts (SME). Additionally, information has been collected from the Montgomery County Public Web sites, key internal documents (including Executive Performance Plans and metrics) and surveys. Continuing on information gathering and discovery, an interview process has been designed to interact with any additional departmental resources that further define departmental objectives. The objective of this approach will be to assist departments in recognizing and concurring with collaborative and common technology approaches that will form a more robust, enterprise approach to new technologies.

Shareholder Strategy Mapping

The “Balanced Scorecard”, an industry recognized methodology for identifying value, includes a strategic overview of how four key components identify long-term value from the key shareholder perspective. Four components are identified as a part of this mapping:

- Operational Activities
- Customer Management
- Innovation
- Regulatory and Social Aspects

Figure 35 - Building Block Process for Balanced Scorecard and Strategic Mapping



Shareholder acceptance is clearly an outcome of the Customer Management component of the mapping process. The outputs of the process will assist DTS with the identification of gaps in the current strategy, outline areas of near term innovations for business objectives and solutions that may potentially be served through a joint or collaborative program.

Assessment Objectives

For a progressive technology support operation to be successful, there are business knowledge imperatives that must be considered as a primary component of offering services. To facilitate the understanding of the business function, the assessment will include confirmation of existing, documented business objectives as well as current business challenges. The interview process includes a series of questions that will ensure an accurate understanding of business services, anticipated outcomes and customer success criteria.

With a business objectives confirmation complete, the efforts of the assessment are to understand and document business strategies with a technical component for desired

improvements. It is in this area where the assessment is being developed to align other business processes, either within the framework of the emerging enterprise solutions or an associated business process with similar need. At a minimum, a collaborative and commons solution will create opportunities for technology implementation efficiencies, avoidance of replicate solutions with divergent support models and seizing cost efficiencies through economies of scale.

In addition to technology for business processes and growth, an added component to the assessment includes satisfaction levels and opportunities for immediate support improvements from the current, centralized DTS infrastructure. With a hybrid support model that includes core IT support for some agencies versus ancillary IT support for fully developed departmental IT groups, it is essential that service gaps be included in the analysis.

The outcomes of this comprehensive assessment will assist both the departments and DTS in decisions about foundational technology investments that provide long haul benefit. It will validate the client application portfolio through a next step analysis of existing information by confirming the urgency and priority of business expectations for the life cycle of current, individual and departmental systems with the ability to document dependencies as part of continuity planning and formal Business Impact Analysis (BIA). Finally, it will provide for a more definitive alignment of DTS objectives for departmental technology needs and expectations.

Goal:
Complete the detailed business assessment of all County departments with a validation of existing solution needs and expectations as well as potential technology collaborations

8.2 Long Term Programs

Enterprise Resource Planning (ERP) Implementation Support

Program	Support and enable an ERP solution plan to provide new technology services and enterprise solutions
Vision/Purpose/Business Reason	■ The organization should continue to define and implement an ERP system as a business management solution that integrates all facets of the business, including financial management, human resource management, business process planning, procurement, and implement ERP in business activities such as inventory and asset control, work order tracking, budget preparation, tax functions and citizen information delivery. ■ An effective ERP solution can enable new business strategies and lead to cost reductions, work cycle time improvements, productivity, quality and citizen services ■ Montgomery County currently is implementing an ERP system for back-office automation. Montgomery County has many legacy systems that can be migrated into the new ERP system with a risk mitigated approach. ■ The County's vision for this project is "*Transforming the way Montgomery County serves its residents and customers by setting new standards for how government operates.*" This statement is a direct extension of the County Executive's goal to become a more responsive government that provides superior service to County Residents and County leaders view ERP as one of the means to meet these goals. ■ The County is attempting to address difficult policy and fiscal challenges with inefficient business processes and incomplete information generated by outdated systems. ERP systems use technology to technology to improve decision making and operational efficiency through information integration and process improvement. ■ ERP will transform the internal, business processes of the County by providing an integrated business system infrastructure. ERP will replace most aging core business systems in the County and re-engineer and streamline current business processes and reporting.
Alignment to IT Goals/Objectives	Consolidate (in terms of eliminating redundancy) and improve the technology services to provide effective means to achieve business results and improve operational efficiency ■ Drive business systems to enterprise solutions ■ Manage effective systems development and investment planning and control processes

	■ Increase the usage of current technologies to quickly deliver the functionality ■ Remove paths for the continued development and deployment of non-enterprise focused systems that jeopardize the larger benefits of enterprise consolidation, when appropriate. • ERP solutions can not be expected to solve all business challenges • Unique business needs should follow an exception validation process to ensure business leadership comprehension of the support and added complexity of non-enterprise solutions integrated into the production environment. • Develop fiscal support plans for counter enterprise solutions, map fiscal support to the operations plan • Reassess business need periodically through business process review and assessment of newer technology solutions
Industry Best Practices	■ The organization should minimize modifications by developing firm guidelines, and build a business case for each required modification or addition of a module ■ It should maintain executive level buy-in, including business unit management concurrence where organizationally applicable, and make change management a top priority by ensuring that a robust change management program is in place throughout the project's implementation. ■ The organization should create a quality, ongoing training program that educates end users and technical staff on all of the program solutions, additional modules or third party component solutions ■ It should commit quality resources to the project team for the life of the project and hire an experienced, professional project manager who has successfully implemented ERP in a similar environment. ■ ERP systems use technology to improve decision making and implement operational efficiency through information integration and process improvements, including centralization, information sharing, and elimination of data and process duplication. ■ Change Management is essential to respond to the external forces related to changing customer demands, changing technology (data, systems, and communications), and changing workforce. ■ Knowledge Management promotes the ability to identify, capture, store and disseminate information.

ROI/Potential Benefits	■ Achieve savings by increasing management improvements, and offsetting system operation costs. ■ Lead to harmonization, standardization, redesign or reevaluation of the County's current business processes. ■ Bring about real-time data exchanges with citizens, other County agencies, regional jurisdictions and other business partners ■ Formalized adoption can further integrate disparate systems when needs and outputs are continually evaluated. ■ Further align systems more closely to mission, business needs and strategy. ■ Eliminate inefficient processes, duplication of work effort, and ineffective reporting of information.
Potential Risks	■ Many organizations underestimate the cost and time required to implement – including customization, training and change management (process & communication) costs. ■ Most organizations do not take the appropriate time to do as-is and desired-state modeling of critical tasks to drive out key requirements ■ Unless the corporate culture supports the basic premises of an ERP solution, such a solution is bound to fail ■ Many organizations falter in the selection of an ERP vendor by emphasizing market trends rather than their specific ERP objectives and goals
Implementation schedule	Montgomery County leadership has adopted a reasonable timeframe for the currently planned ERP implementation. • Global Design – August 2009 • Core Financials – July, 2010 • Human Resources and Payroll – January, 2011 • Budget Preparation – July, 2011 • Financials Self Service, Portals, Enterprise Asset Management, Inventory – January, 2012 • Human Resources Self Service – July, 2012
Budget	ERP is funded through the Tech Mod Initiative. The total appropriation from inception to January 31, 2009 is $40M.
Miscellaneous	None

Customer Relationship Management (CRM) or MC311 Program Support with a focus on Communications, Business Analysis and Process Knowledgebase Documentation

Program	Establish a 3-1-1/CRM program which focuses on improving responsiveness and accountability across the enterprise through business process workflow, analysis and reengineering.
Vision/Purpose/Business Reason	*Single point-of-contact for enterprise customer service delivery and customer satisfaction. Improving functionality of existing systems and data quality across County Government.* The organization should define CRM as a business strategy, where outcomes optimize values such as responsiveness and customer satisfaction by organizing around County service segments, fostering customer-satisfying behaviours and implementing customer-centric processes. The MC311 vision requires the leadership to define MC311 key objectives, set objective milestones and determine how the County will be presented to customers. An effective CRM program can increase customer satisfaction by defining customer behaviour and requirements, and measuring satisfaction. MC311 is a customer facing initiative that will use technology to help improve how customers contact the County for information and non-emergency services. A single phone number (311) will be used for customers to call for non-emergency service requests coupled with a back office system to track responses and completion of work requests.
Alignment to IT Goals/Objectives	■ Incorporate best practices in technology management as appropriate for Montgomery County's governing model • Expand the PMO to support the lifecycle of technology services including application portfolio, CRM data and infrastructure ■ Consolidate and/or eliminate redundancies and improve the technical services to provide effective means to achieve business results and improve operational efficiency • Establish IT service levels through the standardization of IT products, services and delivery processes • Increase communication internally and externally to make both internal and external users aware of products and service offerings, ongoing complimentary DTS initiatives and activities
Industry Best Practices	Technology support organizations should have CRM program support model with business process analysis function with dedicated staff with the following responsibilities in order to make the associated technology projects and interfaces successful to build credibility with the business departments: ■ Seek and obtain Executive sponsorship for long-term

	direction technology decisions ■ Participate in a leadership Executive Steering Committee that supports a functional/business subject matter experts and dedicated project team staff, including technology and enterprise architecture professionals ■ Develop policy and identify methodologies and processes for building business cases, business process improvements, reengineering, performance management and change management. ■ Be responsible for the business consulting function—working with businesses to identify needs and to translate process and improvement needs into business technical requirements. ■ Seeks out and works to incorporate public services best practices into Montgomery County's business processes ■ Maintain strategic focus in understanding functional business ■ Communicate/interpret business/technology governance for users ■ Communicate/interpret functional business needs to technical staff ■ Focus on customer-facing programs and delivery of County services ■ Identify new service needs ■ Identify new/change requirements ■ Assist with requirements prioritizations and integrate into business case for funding ■ Communicate business value ■ Support the integration of requirements across the enterprise ■ Work closely with Countywide strategic planning, executive performance planning and County Stat reporting processes ■ Participate in acceptance testing ■ Act as liaison between business and the technology function ■ Work closely with project managers to ensure project efforts meet constituent expectations
ROI/Potential Benefits	■ An effective CRM program enables the organization to increase customer satisfaction, attract new residents/businesses ■ The organization can also enhance service opportunities, reduce programs and service costs, decrease operational costs • As part of creating greater responsiveness and accountability in meeting the needs of a very diverse county, Montgomery County will implement a single,

	one-stop shopping telephone number, 311, that connects callers to a call center to place non-emergency requests for Government service, information, or complaints. • MC311 will provide managers with real time data on how requests are handled and customer needs are met. This will provide the oversight and management system to hold the County accountable for successfully responding to the needs of the public. • MC311 calls will be answered by a person with a broad knowledge of the County's programs and services and who will be able to respond to the caller or place the caller in contact with a person that can meet their needs. ■ MC311 will enhance relationships with the County's constituents.
Potential Risks	■ CRM strategies will fail to articulate the mission values and overstate the benefit to the resident experience; the result will be a significant decrease in the benefits from CRM and further reduce resident satisfaction ■ A lack of coordinated data management will increase costs to manage information and likely produce unqualified information trends ■ User acceptance of business process change is still a challenge • Governments do not handle change well • Change Management support and emphasis is not consistent and measured • Change Management focus tends to dwindle versus increasing
Implementation schedule	■ Phase 1 Part 1 identified the customer facing services provided by County departments and offices and documented how customers contact the County to obtain these services. This phase mapped the "as is" state of the business. ■ Phase 1 Part 2 is currently underway and will identify how the County fulfills the request for service by focusing on business processes and resources. This discovery phase focuses on how these services are provided to the customer. ■ Phase 2 is the Envision Phase and will focus on Business Process Reengineering. This stage maps the "to be" state of the business. ■ Phase 3 is the Define Phase. The gaps between the "as is" and the "to be" states are analyzed to determine the changes required to achieve the desired business results.

	■ Phase 4 is the Build and Deliver Phase. ■ Soft Launch is planned for January, 2010. ■ Public Launch is planned for March, 2010.
Budget	MC311 is funded through the Tech Mod Initiative.
Miscellaneous	None

Complete Automated Timesheet Implementation (MCtime)

Program	Complete the implementation of automated time and attendance collection across the enterprise.
Vision/Purpose/Business Reason	The organization should continue to complete the business strategy that has identified time and attendance data collection in an automated process. The County has identified work time issues, especially in the tracking of hourly wage and overtime challenges as a significant opportunity for improvement. The County's vision for this solution is a more defined and documented solution to track employee time and attendance, identify opportunities where overtime appears to be excessive and allow for factual validation of employee work hours for specific jobs and services. Additionally, removing a highly manual process improves the accuracy of time data collection, removes costly third party services for data entry and reduces the information collection for the bi-weekly payroll process. Electronic Time Reporting (MCtime) replaces the labor intensive, error prone manual process of handling thousands of paper timesheets every two weeks, with and automated solution that will enable more efficient business processes and accurate accounting of compensatory and overtime hours. MCtime streamlines the County's overall payroll process by creating efficiencies in individual departments and payroll. Providing clear analytics, enhanced time and attendance information reporting and emphasis on overtime reduction opportunities contribute to the County's mission of a more accountable government. As of February, 2009, MCtime has been successfully implemented in eighteen departments and is targeted to rollout to the remainder of the County in phases through June, 2010.
Alignment to IT Goals/Objectives	■ Incorporate best practices in technology management as appropriate for Montgomery County's migration to an enhanced automation and enterprise model • Follow PMO best practices to complete the project and establish long-term support throughout the application lifecycle using appropriate technology support services • Implement opportunities from lessons learned from early stages of from project initiation through implementation ■ Revalidate and improve technology project services to provide effective means to achieve a final solution that delivers business results and improves operational efficiency • Establish and maintain project milestones incorporating the process improvements during the remaining

	implementation. • Document and standardize product support through the use of appropriate vendor services and solution delivery processes • Continue to improve communications to make users aware of the solution and work toward improving ongoing training as well as future project initiatives and activities
Industry Best Practices	IT Organizations have the responsibility to develop and implement process improvement solutions through an ongoing business process analysis function with appropriate dedicated staff. Success factors of major automation projects include: ■ Define and maintain project management best practices throughout the effort ■ Develop policy and identify methodologies and processes for building business cases, business process improvements, reengineering, performance management, and managing change. ■ Responsible for the business consulting function—working with County departments and offices to identify gaps and to translate process and improvement needs into business requirements. ■ Identify new or changed requirements ■ Participate in acceptance testing ■ Work closely with project managers to ensure project efforts meet project expectations
ROI/Potential Benefits	■ An effective automated time and attendance solution enables the organization to validate employee payroll, minimize the impact to the organization and users by achieving the highest level of accuracy in payroll processing as well as identify and correct any inconsistencies in work hours, overtime or other paid benefits. ■ The elimination of the paper timesheet process and the implementation of enhanced business rules for overtime will reduce staff time spent handling and compiling time and attendance information.
Potential Risks	■ Completion of the implementation in line with public safety requirements and an aggressive implementation plan remains a challenge. ■ User acceptance of change is still a challenge • Largest departments remain to be implemented • Integration with public safety scheduling systems remains a high risk and complex program component.
Implementation schedule	■ Hire recommended staff to attain the aggressive project plan ■ Monitor implementation plan and completion dates

	alignment to achieve the ERP timeline ■ As of February, 2009, MCtime implementation is on schedule. • Currently deploying to Group 2 – DOCR • Working on Operational Readiness with Group 3 – DPS, RSC, HRC, SHF, SOE, BOA, IGO, MSPB, OZAH, ECM and OPC. • Sessions for documentation and configuration are being conducted with Group 4 – FRS and Group 9 – POL/DHS.
Budget	MCtime is funded through the Tech Mod Initiative.
Miscellaneous	None

Integrated Justice Information System (IJIS)

Program	Support and enable an IJIS solution to facilitate the exchange of data about criminals and criminal activity between Montgomery County agencies, the State of Maryland, and the Federal Government.
Vision/Purpose/Business Reason	IJIS allows for electronic access and sharing of law enforcement and criminal justice data at various key decision points throughout the County's justice system processes. IJIS uses standard web-based technologies to provide a single user entry point to link together mission-critical information from various systems. IJIS is the means by which the criminal justice agencies are able to uncouple the current all in one Criminal Justice Information System (CJIS). While CJIS is a set of data tables that holds all Criminal Justice data together in one older, limited and failing system, IJIS allows the individual agencies the flexibility to replace their core components with systems that are specialized for their business processes rather than making agencies fit into the CJIS framework. IJIS will ensure that criminal justice agencies can accomplish their individual missions, while still exchanging data that is vital to the public's safety. IJIS will directly improve the delivery of public safety services to an estimated one million residents of the County and facilitate easier data transfers between the County and both State and Federal public safety agencies. The IJIS Core consists of: • Inquiry - Allows end users to query other agency databases for needed criminal information. • Arrest History - Allows end users to query for Non-E*Justice (RMS) arrest information, i.e., Maryland State Police and Park Police • Transport - Performs an automated check of all inmates against both the Circuit and District Court Dockets and prepares a transport list based on the matches. ■ IJIS Subcomponents consist of: • Juvenile Justice Information System (JJIS) - The JJIS system will allow end-user agencies to access the appropriate data needed during each step in the juvenile justice process, while minimizing duplicative entry of data by each agency. • E*Justice (RMS) - The records management application will integrate the operating units of MCPD into one records and case management system and allow the Sheriff s Office to tie work processes together into a single system. The mobile report writing application will

	enable officers in their squad cars to perform data entries in the field and submit electronically to the records management system. • Correction and Rehabilitation Information Management System (CRIMS) - The jail management system will provide for improved information sharing and biometric controls for both initial identification and subsequent verification of offenders. The system will provide the benefits of onetime data entry for multiple uses, powerful reporting capabilities, and specific technology improvements that will modernize all functions of DOCR and replace a large number of secondary, shadow systems and manual records. • State's Attorneys Office Case Management System (SAO CMS) - The case management system will revolutionize the administrative mechanics at the SAO, allowing a transition from an antiquated, manually intensive business process to an automated system that will dramatically increase efficiency, facilitate easier and faster access to case information and related events, improve productivity, provide accurate and timely statistical information, and offer digital storage capability for closed cases. • Circuit Court Case Management System (CCT CMS) - The system will provide judges with access to critical information in the courtroom pertaining to a defendant s status, prior to making a judicial ruling, while sharing that information with other criminal justice agencies.
Alignment to IT Goals/Objectives	IJIS allows the County to move its criminal justice system infrastructure off of 1970's mainframe technology that has very limited support and therefore limits the functional and collaborative capabilities. The objective of IJIS is to allow the agencies to continue to coordinate and share information regardless of their distributed applications In 2004 the Montgomery County Criminal Justice (CJ) agencies embarked upon major business process changes: • CJ agencies introduced the use of open and flexible information technology systems to meet their agency's records management needs • Individual systems are being designed around the needs of each organization • Individual system integration and data sharing happens under the IJIS umbrella.

Industry Best Practices	IJIS will be designed with modern internet-based architecture, open standards, and security features that meet current demands for information exchange and are highly flexible. IJIS will be flexible enough to allow individual agencies to improve internal information technology architecture for business process improvement, while maintaining proper links to other agency databases crucial to public safety.
ROI/Potential Benefits	For the State's Attorney's Office, IJIS will greatly improve the ability to share information systemically by improving the capabilities for receiving bond information from the Department of Correction and Rehabilitation; warrant and arrest information from the Sheriff s Office and the Police Department; and case information from the District and Circuit Courts. For the Police Department, IJIS brings the migration from CJIS to a full integration of criminal justice information systems. The E*Justice system will initiate much of the data flow through IJIS and between the IJIS partners. The status of cases and individuals will be clearly available to all IJIS users. Current business processes will be streamlined, data will be available when needed, and coordination between agencies will be easily accomplished. This data will significantly improve the interaction with citizens and overall safety of citizens and officers. For the Sheriff s Department and the Department of Correction and Rehabilitation, IJIS will bring significant productivity gains through more efficient data sharing and retrieval capabilities. With automated case data feeds directly from the Circuit and District Courts, the IJIS Inmate Transport utility allows for faster and more accurate data sharing between Department of Correction and Rehabilitation and the Sheriff s Office for the transport of inmates to and from court. In addition, the IJIS Transport utility allows for automated scheduling of non-court inmate transports, such as medicals, as well as ad hoc transports that will facilitate the efficiency of all inmate transports. For the Circuit Court, IJIS will provide Judges with instant access to critical information in the courtroom pertaining to a defendant's status prior to making judicial rulings while sharing that information with other agencies, i.e., State s Attorney s Office, Public Defenders Office, Police Department, Sheriff s Office, Parole and Probation, Department of Health and Human Services (DHHS), Department of Corrections and Rehabilitation. The Judges will have access while in the courtroom of recognizing scheduling conflicts for police officers, probation agents and other County officials prior to scheduling case hearings.

	The ROI for IJIS Core must be measured with value as a consideration. There are several areas within IJIS Core where gains will be measured and quantified: • IJIS Inquiry - Reduction in seek and find time for needed offender data and faster response results to queries • IJIS Arrest History - Faster retrieval of data specific to non E*Justice jurisdictions • IJIS Transport - Reduction in missed appearances or special transports and more timely and precise preparation of inmates for transport
Potential Risks	Continuing financial crisis – continued pressure and additional savings plans Ability to staff resources in the timeframe required New State CIO – building working relationship Single threaded resources
Implementation schedule	IJIS Core: • IJIS Inquiry is in production as of October, 2008, and is ready for departmental data migrations from CJIS. IJIS Inquiry support is planned to transition to DTS during the first quarter of 2009. • Arrest History was completed September, 2006. • Transport was completed April, 2006. IJIS Subcomponents: • JJIS Version 1.9 was promoted to production in November, 2008. • E*Justice – Currently undergoing data migration efforts from CJIS to E*Justice. Data migration tentatively scheduled to be completed April 2009 • CRIMS contract was signed in December, 2008. Phase 1 planning is underway and tentatively scheduled for an end of year 2009 completion. CRIMS core solution is targeted for completion by end of Fiscal Year 2012. • SAO CMS completed training in January, 2009. The first phase of SAO is scheduled to be complete in June 2009. SAO CMS core solution is targeted for completion by end of fiscal year 2010. • CCT CMS planning is targeted for fiscal year 2010. • Complete IJIS solution is targeted for fiscal year 2013.
Budget	The total budget for IJIS is $13M
Miscellaneous	None

Corrections and Rehabilitation Information Management System (CRIMS)

Program	Support and enable a CRIMS solution to bring automation to the Department of Correction and Rehabilitation (DOCR).
Vision/Purpose/Business Reason	The CRIMS project will bring complete automation to the DOCR by eliminating paper-based processes and procedures and increasing productivity and efficiency. The jail management system will provide for improved information sharing and biometric controls for both initial identification and subsequent verification of offenders. CRIMS will provide the benefits of onetime data entry for multiple uses, powerful reporting capabilities, and specific technology improvements that will modernize all functions of DOCR and replace a large number of secondary, shadow systems and manual records.
Alignment to IT Goals/Objectives	As part of IJIS, CRIMS promotes the same IT goals and objectives. IJIS allows the County to move its criminal justice system infrastructure off of 1970's mainframe technology that has very limited support and therefore limits the functional and collaborative capabilities. The objective of IJIS is to allow the agencies to continue to coordinate and share information regardless of their distributed applications In 2004 the Montgomery County Criminal Justice (CJ) agencies embarked upon major business process changes: • CJ agencies introduced the use of open and flexible information technology systems to meet their agency's records management needs • Individual systems are being designed around the needs of each organization • Individual system integration and data sharing happens under the IJIS umbrella.
Industry Best Practices	As part of IJIS, CRIMS will be designed with modern internet-based architecture, open standards, and security features that meet current demands for information exchange and are highly flexible. As part of IJIS, CRIMS will be flexible enough to allow individual agencies to improve internal information technology architecture for business process improvement, while maintaining proper links to other agency databases crucial to public safety.
ROI/Potential Benefits	The ROI for CRIMS must be measured with value as a consideration. There are several areas within CRIMS where gains will be measured and quantified: • Faster identification of repeat offenders

	• Reduced booking processing time • Decreased manual data entry, reduced opportunity for data entry errors
Potential Risks	Continuing financial crisis – continued pressure and additional savings plans Ability to staff resources in the timeframe required New State CIO – building working relationship Single threaded resources
Implementation schedule	CRIMS contract was signed in December, 2008. Phase 1 planning is underway and tentatively scheduled for an end of year 2009 completion. CRIMS core solution is targeted for completion by end of Fiscal Year 2012
Budget	The CRIMS allocations fall under the IJIS budget
Miscellaneous	None

State's Attorneys Office (SAO) Case Management System (CMS)

Program	Support and enable an SAO CMS solution to bring automation to the State's Attorneys Office (SAO).
Vision/Purpose/Business Reason	The SAO CMS project will bring complete automation to the SAO by eliminating paper-based processes and procedures and increasing productivity and efficiency. The case management system will revolutionize the administrative mechanics at the SAO, allowing a transition from an antiquated, manually intensive business process to an automated system that will dramatically increase efficiency, facilitate easier and faster access to case information and related events, improve productivity, provide accurate and timely statistical information, and offer digital storage capability for closed cases.
Alignment to IT Goals/Objectives	As part of IJIS, SAO CMS promotes the same IT goals and objectives. IJIS allows the County to move its criminal justice system infrastructure off of 1970's mainframe technology that has very limited support and therefore limits the functional and collaborative capabilities. The objective of IJIS is to allow the agencies to continue to coordinate and share information regardless of their distributed applications In 2004 the Montgomery County Criminal Justice (CJ) agencies embarked upon major business process changes: • CJ agencies introduced the use of open and flexible information technology systems to meet their agency's records management needs • Individual systems are being designed around the needs of each organization • Individual system integration and data sharing happens under the IJIS umbrella.
Industry Best Practices	As part of IJIS, SAO CMS will be designed with modern internet-based architecture, open standards, and security features that meet current demands for information exchange and are highly flexible. As part of IJIS, SAO CMS will be flexible enough to allow individual agencies to improve internal information technology architecture for business process improvement, while maintaining proper links to other agency databases crucial to public safety.
ROI/Potential Benefits	The ROI for SAO CMS must be measured with value as a consideration. There are several areas within SAO CMS where gains will be measured and quantified: • Faster retrieval of case information

	• Increased ability to reference and store efficiently
Potential Risks	Continuing financial crisis – continued pressure and additional savings plans Ability to staff resources in the timeframe required New State CIO – building working relationship Single threaded resources
Implementation schedule	SAO CMS completed training in January, 2009. The first phase of SAO CMS is scheduled to be complete in June 2009. SAO CMS core solution is targeted for completion by end of fiscal year 2010.
Budget	The SAO CMS allocations fall under the IJIS budget
Miscellaneous	None

9 Appendix 1 – Acronym List

Acronym	Title, Subject, or Phrase Usage
AGC	Architecture Governance Council
ATM	Asynchronous Transfer Mode
ATM	Asynchronous Transfer Mode
AVL	Automatic Vehicle Location System
BIA	Business Impact Analysis
Bitmap	.bmp
BPS	Bits per second
CAD	Computer Aided Dispatch
CATV	Cable Television
CCCT CMS	Circuit Court Case Management System
CE	County Executive
CIO	Chief Information Officer
CJ	Criminal Justice
COG	Council of Governments
COOP	Continuity of Operation Plan
COOP	Continuity of Operations
COTS	Commercial Off
CPR-Central	Compliance & Policy Resource Central
CRIMS	Correction and Rehabilitation Information Management System
CRM	Constituent Relationship Management
CTO	Chief Technology Officer
DED	Department of Economic Development
DHHS	Department of Health and Human Services
DHS	Department of Emergency Management and Homeland Security
DOCR	Department of Correction and Rehabilitation
DoT	Department of Transportation
DR	Disaster Recovery
DR/COOP	Disaster Recovery/Continuity of Operations Plan
DTS	Department of Technology Services
EA	Enterprise Architecture
e-commerce	Electronic Commerce
EDI	Electronic Data Exchange
EJB	Enterprise Java Bean
eMessaging	Information about Exchange, it's Network architecture, available training and questions
EMG	Emergency Management Group
ERP	Enterprise Resource Planning
e-text	Electronic Text
E-time	Execution Time
ETSP	Enterprise Technology Strategic Plan
ETX	End of Text
EULA	End-User License Agreement
FCE	Flatten Consolidate Extend

GIS	Graphic Information Systems
GIS	Geographic Information Systems
GIS	Geographic Information System
HIPPA	Health Insurance Portability and Accountability Act
HOC	Housing Opportunities Commission
HTML, XHTML	Hyper Text Markup Language
HTTPS	Secure Hypertext Transfer Protocol
IDS	Intrusion Detection System
IJIS	Integrated Justice Information System
IPAC	Information Technology Policy Advisory Committee
ISATP	Security Awareness and Training Program
ISP	Internet Service Provider
IT	Information Technology
ITPCC	Interagency Technology Policy Coordination Committee
ITSP	Information Technology Strategic Plan
IVR	Interactive Voice Response Services
JJIS	Juvenile Justice Information System
JMS	Java Messaging Services
LDAP	Lightweight Directory Access
MC311	Montgomery County Constituent Relationship Management
MCCATS	Montgomery County Consulting and Technical Services
MCFRS	Montgomery County Fire and Rescue Services
MCG	Montgomery County Government
MCPS	Montgomery County Public Schools
MITIRPS	Mercury Intake and Request Process System
MNCPPC	Maryland National Capital Park and Planning Commission
MNCPPC	Maryland National Park and Planning Commission
NCR	National Capital Region (Council of Governments – COG)
ODBC	Open DataBase Connectivity
OPI	Office of Public Information
PBX	Private Branch Exchange
PBX	Private Branch Exchange
PCI	Payment Card Industry
PMO	Project Management Office
PPP	Point-to-Point Protocol
PSCS	Public Safety Communications Systems
PSRS	Public Safety Radio Systems
QSR	Quality Service Review
RMS	Record Management System
RMS	E*Justice
RSS	Really Simple Syndication
SaaS	Software as a Service
SAO CMS	State's Attorneys Office Case Management System
SAP	Systems Applications Products
SDLC	System Development Life Cycle
SHIP	Self Help Information Portal
SOAP	Service Oriented Access Protocol
TCP/IP	Transmission Control Protocol

TDM	Time Data Multiplexing
TOMG	Technical Operations Management Group
UDDI	Universal Description Discovery and Integration
VoIP	Voice Over Internet Protocol
WAN	Wide Area Network
WMATA	Washington Metropolitan Area Transit Authority
WSDL	Web Services Description Language
WSSC	Washington Suburban Sanitary Commission
WWW	World Wide Web
XML, XSLT	Extensible Markup Language
.zip	Compressed Archive File