Stafford County
Strategic Technology Plan 2015

V1.0.0 FINAL

1   INTRODUCTION

Managing technology growth, minimizing risk of technology and ensuring technology is effectively aligned to support the strategic objectives of the County are all key reasons why Stafford County has embraced strategic planning for technology. While technology is very dynamic, this plan is intended to provide a blueprint for technology for the County for the immediate future. The strategies in this document reflect industry best practices and demonstrate the use of technology as an enabler for today's local governments.

This document is intended to provide details of the current technology posture of the County along with defining a comprehensive vision for the future which is supported by detailed goals and strategies.

2   CURRENT STATE OF TECHNOLOGY

As part of the strategic planning process, the current state of the County's technology environment was assessed identifying strengths, weaknesses, opportunities and potential threats which could impact the success of future initiatives. This section of the plan provides highlights of items of significance which were identified during the assessment.

1. The County has robust facilities to support the operation of technology. Multiple computer rooms in diverse physical locations provide for redundancy and resilience for the network, key systems and technology services.

2. The status of the County's network is above average when compared to other localities. The wide area network which connects remote sites together has a sound foundation and adequate bandwidth to meet current needs. While some buildings in the County have wireless access, there were some issues noted with reliability and performance of the wireless network thus there is room for improvement in this area.

3. The County's digital microwave radio system is utilized only for public safety voice traffic. With upcoming upgrades, the County will have an opportunity to utilize the microwave network for data traffic as well. Opportunities will exist to allow all departments in the County to leverage this asset for voice and data communications.

4. The overall mobility of the County's workforce is somewhat limited. Other than the Sheriff and Fire and Rescue, there is limited remote access to applications and technology services.

5. Server virtualization is a mature technology which allows organizations to "virtualize" the server environments supporting applications and technology services. This provides for greater efficiency, resilience and significantly

reduces cost. While the County has deployed a server virtualization platform, there is still significant dependence on physical servers. There is an opportunity to gain significant efficiency, improve disaster resilience, and reduce overall equipment replacement cost by escalating server virtualization.

6. While the County has progressed with technology in many areas, the user computing environment continues to present challenges. This includes desktops, laptops, tablets, mobile devices utilized by police and fire and rescue, and cell phones. The County struggles with keeping desktops updated with current operating systems and applications. There is limited technology in place to aid in the management of the desktops, laptops, and tablets.

    Budgeting and acquisition for desktops, laptops, tablets, and cell phones is not centralized. As a result, standardization on hardware, operating systems and applications is lacking. With recent advancements in technology related to the user computing environment, the County will have many opportunities to continue to advance and improve in this area. Information Technology will need to take a more proactive role in defining vision and strategy in this area.

7. The planning, design and implementation of public safety technology is somewhat decentralized. With public safety technology at a crossroads, it will be important for the County to centralize the strategy for this technology to ensure future supportability and manageability. This will also allow the County to leverage what has historically been public safety technology, in other departments across the resulting in efficiency gains and better return on investment.

8. The platform supporting the public web site and services is the same platform utilized by many other localities in Virginia. While this platform provides a sound foundation for the County's web services, there are a number of opportunities for the County to continue to improve this platform to provide more digital services to citizens utilizing contemporary technology.

9. The County relies upon Sunguard HTE software for finance, HR, payroll and utility billing. While this application has some age as does the iSeries hardware platform on which it is running, departments in the County are generally satisfied with the platform. There are currently no indications that Sunguard has any plans to diminish support for the software and IBM continues to look at the iSeries platform as a strategic hardware and software platform.

    The County does have an opportunity to improve existing processes such as time reporting by implementing an automated time reporting system. There is also opportunity to "mobilize" the customer service functions within utility billing as well to gain greater efficiency and improve overall customer service.

10. The County is making progress with applications and technology to support community development through the upgrade to the Hansen 8 platform. Through this upgrade, Planning, Utilities, Public Works and other departments

will gain access to greater functionality allow these departments to improve their processes. This upgrade will also support the ability to implement both mobile applications to support field workers as well as supporting the implementation of electronic community development applications available to businesses and citizens.

11. Stafford County's geographic information system(GIS) is well above average as compared to other localities in Virginia. GIS will continue to be a strategic enabler for the County and will continue to be integrated with other systems including public safety and community development to gain wide spread use within the County.

12. The current Information Technology organizational structure has not evolved with technology. The structure of the IT organization has remained relatively unchanged with the same groups and personnel being assigned responsibility for new technologies, applications and services which may or may not fit into their area of expertise. IT has been able to sustain support for these applications and services based on the quality of personnel which has masked the deficiency in quantity of resources. The most notable areas which lack adequate resources are public safety applications and technology and other enterprise technology such as document management and enterprise content management.

Stafford County is behind in the deployment of applications and technology which support mobilization of the workforce in areas such as community development, public works and utilities. The County's portfolio of applications and services available to citizens is average compared to other localities. Both of these efforts have been hampered due to the lack of resources on the application team.

13. Currently, the County is heavily focused on sustaining the existing technology. The velocity of implementing new technology is relatively slow due to resource constraints. There has been less focus on strategy in lieu of sustenance and as a result, departments are beginning to become more autonomous which will present challenges in managing the technology portfolio moving forward. It will be important for the County to renew its focus on strategic planning 365.

3   A VISION OF THE FUTURE

By definition, a "Strategic Plan" represents a "Vision for the Future". Through the strategic planning process, the County has crafted this vision shaped by input from departments within the County, recognized best practices in local government, and by recognizing the needs of the citizens of Stafford County. The following section of the plan is intended to provide a summary vision of what lies ahead for the County with respect to technology.

- The County will commit to providing *Technology Leadership Inside and Out*. Stafford County realizes it has a responsibility to departments to provide technology vision for the **internal** use of technology and a responsibility to citizens and businesses to provide technology vision for the **external** use of technology within the County as well. This vision will require a commitment to *Strategic Technology Planning 365*. This focuses on continually evaluating the current state of technology as well as identifying, evaluating and adopting emerging technology on consistent basis.

- The public web site will continue to grow as the mechanism citizens and businesses utilize to interface with County government. To support this paradigm, the *public web site will get a facelift* transforming the site to focus on more interactive e-government capabilities such as web video, mobile first design, cleaner more intuitive interface, improved transparency, and integration of social media.

    The County will also explore consolidating e-government capabilities into an integrated portal architecture to provide for common user identity and personalization services which will support more streamlined access to view and pay taxes, apply for a building permit, manage information and notifications, and interact with County government.

- *The user experience for devices* utilized by employees will converge to a common user interface and a reduced hardware footprint providing users with a consistent experience. Users will transition from having multiple devices to accomplish their job to a single device which will serve all needs.

    For example, Mecklenburg County, N.C., implemented its "1 to 1, One Person, One Device" initiative, which allowed the county to eliminate extra desktops and laptops, instead equipping employees with one device and enabling them to access resources via virtualization.

    Center for Digital Government

- *The workforce will become mobile.* Through the implementation of technology such as enterprise file sharing, high-speed, reliable wireless and remote access, and desktop video, employees will become mobile and more agile resulting in greater efficiency and ultimately improved service to our citizens. Focus will be placed on improving mobile access and communications through

utilization of the County's digital microwave radio system and robust mobile communication solutions. County vehicles will become a communication hub for the mobile worker providing the connection back to the County's network while supporting multiple communication links for resilience. The device of choice for mobile workers will be the rugged tablet instead of the cumbersome laptop.   Departments will focus on implementing mobile applications and solutions which can improve public safety, increase efficiency, and improve customer service.

- While already a stable foundation, the **network will be enhanced to support greater mobility and future survivability**. While there is been significant focus on the past on ensuring resilience of the network core and backbone, the focus will now turn toward the access layer of the network working to improve wireless access to support greater mobility for County workers and to future proof the network to provide for adequate bandwidth into the future.

- *Server Virtualization* will be a foundational technology for the County moving forward. By focusing on virtualization, the County will be able to increase efficiency of the management of server infrastructure, improve the ability to deploy technology more quickly, improve disaster resilience, and reduce power consumption. Initiatives such as this as well as document management and imaging will allow the County to not only do things that help employees and citizens but to also focus on initiatives which highlight "Doing the Right Thing(DTRT)."

- *The County will continue to move toward "Digital Government"* by committing to utilizing document management and imaging technology. This commitment will involve a commitment to the technology, to automating processes from a departmental perspective, and to committing the necessary personnel resources to achieve the gains which come from fully embracing this technology. This strategy will also highlight "Doing the Right Thing" by reducing paper and helping the environment.

- The County must make changes in the technology organization to *align the organization with the contemporary technology* which is being deployed and to utilize creative solutions for increasing personnel bandwidth resulting in increased velocity of implementation for key technology projects and initiatives.

4   GOALS AND STRATEGIES
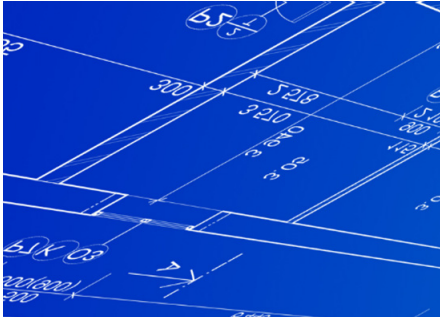
This section outlines the Goals and Strategies for the County and is intended to provide a future state reference model which represents a fully implemented strategic plan. This is the target model or the end state goal which this plan is designed to help the County achieve. While this section of the plan is a point in time representation of the target, it should be noted that neither time nor technology stands still. As a result, strategic technology planning is a dynamic process. It will be critical for the County and the County's Information Technology group to continuously monitor changes in technology, vendor software and department needs to adjust the plan and the strategy as needed to meet the goals of the organization.

1. Provide Technology Vision and Leadership Inside and Out

When it comes to technology, Stafford County has a responsibility to departments to provide technology vision for the **internal** use of technology within the County. The County also has a responsibility to provide technology vision for the **external** use of technology within the County as well. From an economic development perspective, technology has always been a factor but it is a driving factor at this point. As the County approaches economic development initiatives and promoting services within the County, technology will be a critical component moving forward.

In addition to economic development, the County's interaction with other surrounding localities will also require an external focus on technology vision. This is especially apparent with initiatives such as public safety which at this point always has a technology aspect to almost every project that is considered. In addition, businesses should be able to rely on the County to provide leadership and direction with respect to the use of technology services.

The following strategies are intended to support this goal of providing technology vision and leadership, "Inside and Out".

1.1 ESTABLISH CHIEF TECHNOLOGY OFFICER(CTO) ROLE

Operating the County's technology environment is a full time job. Resources in Information Technology are typically pushing the boundaries of their bandwidth to support existing infrastructure and applications. Little time is left to dedicate to looking forward from a strategic planning perspective. The CTO would have four primary roles within the County. First, the CTO would have responsibility for continuous monitoring and development of technology vision and strategy for all departments within the County utilizing the Strategic Planning 365 Model as noted in 1.2. Information Technology would provide continuous input into the process but would not bear the burden of maintaining the County's overall strategy and vision. Information Technology would have the responsibility for executing and maintaining the technology solutions which result from the vision.

Second, the CTO would have responsibility for working with Economic Development as an internal consultant providing input, strategy and direction for economic development projects. The CTO be a full time member of the Economic Development team when looking at and engaging in development activities. It will be commonplace for the CTO to meet

with potential businesses looking at Stafford County as a potential home. The CTO will have in-depth knowledge of technology services available in the County such as broadband, wireless, data center space, and other services.

Third, the CTO would work with any department who has a need to interface with other localities or service providers with respect to technology or services that involve technology. One such example would be with public safety. When looking at multi-jurisdictional initiatives such as digital radio systems or shared microwave services, the CTO would work with the respective County department and other jurisdictions on these initiatives serving the technology planning and design role.

Finally, the CTO would have responsibility for fostering innovation through experimentation. The CTO will have responsibility for identifying emerging technology would could hold value for departments within the County or for the County in general. The CTO would then be responsible for leading and executing proofs of concept to validate the technology for use within the County. Typically these POCs would be completed by County personnel within departments or within Information Technology. Unmanned aerial vehicles or UAVs is one example of technology which could have significant benefit for the County in several areas including law enforcement, providing virtual aerial tours of the County's parks and recreation sites, providing a 360 degree view of potential economic development opportunities and providing a different perspective on existing GIS data. Departments could come to the CTO with idea such as this and the CTO would also be responsible for monitoring technology which may be applicable to the County. Another example of technology which is be targeted toward local government is autonomous robots. As shown in this figure, the Knightscope K5 autonomous robot is being tested by local government to patrol parking garages and other public facilities. Could this happen in Stafford? When companies see a County embracing technologies like drones and the K5, it could make the difference whether they decide to land in Stafford.

The CTO would report to County Administration.

1.2 ADOPT STRATEGIC PLANNING 365 MODEL

Historic strategic planning is reflected by static strategic technology plans which typically have a planning timeframe such as a 3 to 5 year strategic plan. Developing these plans usually takes from 3 to 6 months to develop. This concept is no longer sufficient in today's technology environment. Strategic planning must occur 365 days out of the year because the change rate for technology is moving at fast pace. The following is the simple matrix behind the model.

	Data Center	Wireless	Network Internet	CAMA	Real Estate Billing	Server Virtualization Strategy	Desktop Virtualization Strategy
MONITOR							
STUDY							
COMMIT							
EXECUTE							
OPERATE							
RETIRE							

1. The CTO would be responsible for owning and managing this model with input from departments and Information Technology.

2. The columns across the top represent technologies which may or may not be in use in the organization. The columns shown are just an example. There are many other technologies and technology services which are part of the model.

3. The leftmost column reflects the lifecycle of a technology or technology service. When a new technology becomes visible, it would appear on the "radar screen" and the County would begin to MONITOR the technology. If the CTO determined the technology may have viability for the County, the technology would move to the STUDY status where the CTO may choose to perform a proof of concept. Once the technology is validated it may move to the COMMIT stage and ultimately move through the other stages.

This model provide a simple way to continuously monitor technology, technology services and applications which are specific to Stafford County. There components of the framework include details about what is done to MONITOR a specific technology or application as well as the detailed processes which need to be implemented to formally manage the information in the model and where lines of responsibility are drawn.

1.3 ESTABLISH BUDGET FOR TECHNOLOGY EVALUATION AND PROOF OF CONCEPT

As noted above in 1.2, one of the processes which supports strategic planning 365 is doing proofs of concept for emerging technologies. It will be important for the County to establish a budget to support these proofs of concept. In many cases, new opportunities or ideas may come up in the middle of a fiscal year and thus would not have been part of the typical budgeting process. This budget would typically include both planned items resulting from the ongoing strategic planning effort as well as money to fund unplanned initiatives.

2. Improve Digital Services for Citizens

If you look at current trends and research as it relates to improving services in local government, digital services or technology top the list. Stafford County currently provides many digital or online services through the public web site including:

- Pay Utilities Online
- Pay Personal Property Taxes Online

- Pay Real Estate Taxes Online
- Purchase Dog License Online
- View Taxes Paid Online
- Plan Reviews – Integrated Web Response
- Notify Me
- Request Tracker
- Interactive Mapping/GIS

It will be important moving forward to continue to make additional services available electronically including those services which are no available only by visiting the government center or through paper. The following strategies are intended to continue to move the County forward in terms of providing digital services to citizens.

2.1 REFRESH THE PUBLIC WEB SITE

As part of the contract with Civic Plus, the County has the option to refresh the public web site design every two years. Based on interviews with departments within the County, impressions of the public web site vary but the consensus was positive. The one consistent comment was that it is somewhat difficult to find what you are looking for on the site. Based on the experience of Virtual IT, Stafford's site is in the top 10% of the sites in Virginia. The only negative we identified is that the site is somewhat "cluttered" with information and links to information and could benefit from a "cleaner" look and feel simplifying the overall interface.

One common practice when it comes to web sites is to leverage design work done elsewhere. It is much easier to get ideas based on what someone else has done in many cases because you can actually see the work instead of starting with a blank canvas. The Center for Digital Government recently released the Best of the Web & Digital Government Achievement Awards 2014 honoring the top sites in local government. The following sites topped the list. As Stafford works with Civic Plus to refresh the look and feel and navigation of the site, these sites will provide a reference model which can provide input into the overall design process. The consistent theme with these sites as compared to Stafford's current site is that the design of these sites provide a "cleaner" and "simple" look and feel. The user sees less information on the main pages and is required to click to get additional information thus the overall site structure for these sites is more of a hierarchy compared to the current site. Special attention should be paid to Grand County, Colorado as it is hosted by Civic Plus which demonstrates the capabilities of Civic Plus as a hosting provider.

- 1st Place: Oakland County, Mich.
- 2nd Place: Sacramento County, Calif.
- 3rd Place: King County, Wash.
- 4th Place: Wake County, N.C.
- 5th Place: Grand County, Colo.

2.2 USE VIDEO TO IMPROVE CUSTOMER SERVICE

An area that is rapidly being adopted to support online customer service is using online videos. Video technology has introduced a better way to provide better online customer service. Pre-recorded videos on common questions can help the County reduce support costs and improve the overall online experience for citizens. Stafford is already utilizing YouTube as a repository for video announcements. This should be expanded to utilize video to give citizens guidance on common questions which they encounter. Another area where this would be useful would be with economic development where businesses could access video introducing and describing potential resources for companies interested in coming to Stafford County. Another example of integrating video as a mechanism for interacting with citizens is the implementation of virtual tours by the National Park Service. Stafford could utilize this same paradigm to implement virtual tours of Stafford resources such as Parks and Recreation facilities.
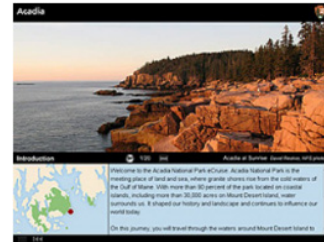
2.3 Implement Video to Enhance Citizen Interaction

Another use of video to enhance customer service would be to advance the concept of Stafford 311. Currently, Stafford 311 provides a voice interface to citizens through a phone call or a face to face interface where the citizen can visit the 311 Center in the County Administration Center. A contemporary option for the 311 service would be to add online video. Citizens could come to the Stafford 311 page on the public web site and initiate an online interaction with a customer service representative. This interaction would be via on demand video much like the service provided by Amazon.
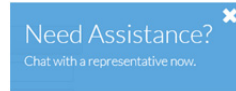
Implementing this type of service in a non-critical type of implementation would prepare the County for what is coming with Next Generation 9-1-1 or NG9-1-1 where text and video will be required to support interaction with the 911 dispatch center.

The following resources provide real-life examples and research related to the use of online video for customer support as well as providing references to vendors providing this technology.

- Mayday! Live video chat is the future of customer service
- Temasys
- Vee|24
- InstaCall

2.4 Establish a Common Vision and Portal for Online Citizen Services

Stafford County has established Stafford 311 as a single point of contact for a wide variety of county information and services. Citizens can interact and get information

through phone or face to face through the 311 Center in the County Administration Center. The concept of Stafford 311 on the public web site needs to be expanded to allow citizens to utilize 311 as an interactive online **Citizen Portal** where they can login once and then have access to services which they need. The Citizen Portal would offer a number of benefits as follows:

- Provide a single point of personalized, unified access to applications, content, and information.
- Allow citizens to utilize a single set of credentials for all County services.
- Provide a unified workspace where citizens can configure and manage the types of information they receive and how they receive it.
- Provide a single, unified workspace where citizens can manage their contact information.

The following are examples of the services a citizen would be able to access once they logged into the portal. Some of these services already exist and the portal would simply consolidate access to these services through a common set of credentials.

- View/Pay Utility Bills Online
- View/Pay Personal Property Taxes Online
- View/Pay Real Estate Taxes Online
- Pay Parking Ticket
- Purchase Dog License Online
- Manage Notify Me Subscription
- Report and Track Citizen Requests
- Report and Track Citizen Complaints
- Apply or Check Status of a Building Permit
- Schedule an Inspection
- Submit Planning Applications Online
- Apply for or Renew a Business License
- Manage Yearly Business Personal Property
- Manage/Report/Submit Meals Taxes
- Provide Ability to Report a Crime

The County's current public web site serves the purpose of a portal to some degree. However, in the current implementation, it lacks the following key services:

- Allow citizens to manage their profile information which can then be used for all applications and services.
- Allow citizens to utilize a single set of credentials to access all applications and services.

The following strategies are recommended to allow the County to implement a unified Citizen Portal which can provide the benefits which have been identified.

2.4.1   The County should establish a team consisting of representatives from Planning, Utilities, Public Works, Commissioner of the Revenue, Treasurer, Public Safety and

other departments to define a common vision for the Citizen Portal and the services which will be provided to citizens through the portal.

2.4.2   Based on the services which are identified by the team, Information Technology must map these services to the applications which are currently providing these services or which may provide these services in the future.

2.4.3   Information Technology should evaluate existing options or new options for providing the core functions necessary to support the Citizen Portal including integrated security and personalization. This evaluation will include the existing public web site and services which are available through Civic Plus as well as the technology and services which are provided through Hansen Dynamic Portal. Because the services provided through the portal will be delivered through a set of disparate applications, it is critical the portal platform provide a unified "single sign-on" capability allowing users to login once to access services. The portal's personalization service must also be able to provide necessary "input" into these other applications to prevent citizens from having to re-enter basic information which is utilized to access their information in these systems.

2.4.4   Based on the results of the previous strategies, the County will then need to develop a detailed integration design and implementation plan to implement the Citizen Portal and implement the necessary integrations to tie together the existing disparate applications into the Citizen Portal.

2.5 IMPLEMENT ELECTRONIC DISPLAYS TO ENHANCE CITIZEN COMMUNICATION

Furthering the theme of improving communications with citizens, these strategies focus on utilizing technology to provide for visual interaction with citizens. Both of these strategies are based upon discussions with departments within the County.

2.5.1   IMPLEMENT DOCKET DISPLAY BOARDS AT COURTHOUSE

Per discussion with the Clerk of Court, there is a need to provide a mechanism

within the courthouse to direct citizens to the appropriate location within the courthouse. With multiple courtrooms operating simultaneously, it is constantly a challenge for citizens to identify the correct location where they need to be. Currently, court personnel are challenged with dealing with manual routing of the public. An electronic directory like the one noted here, DocketCall, would provide for a self-service model significantly reducing the need for human resources and allowing personnel to focus on security of the environment. This is the same solution which is currently in place in other localities in Virginia including Fairfax County and Spotsylvania County.

2.5.2   IMPLEMENT DIGITAL MESSAGE BOARDS IN ADMINISTRATION AND RECREATION FACILITIES

Many government facilities have a number of events occurring within the facility. One way to utilize technology to provide guidance to citizens while also providing a mechanism to provide them with information is to utilize multi-function electronic display boards within the County's facilities. This would also provide a mechanism to communicate with County employees across the County. This type of system would support central administration of wayfinding directing visitors to the appropriate location within a building. This solution would also provide the ability to display information to visitors as well as employees.
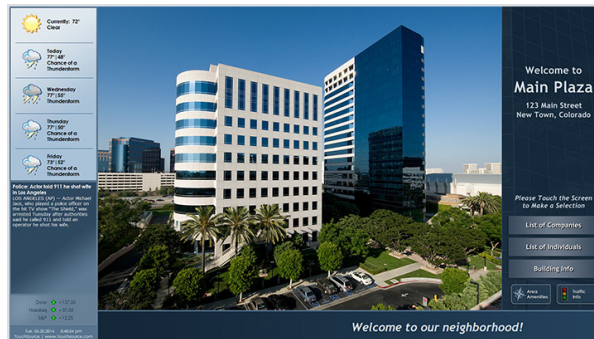
The following are solutions which could support requirements for Stafford County.

- Displays2Go
- TouchSource

3. Establish and Implement a Contemporary End User Device Strategy

The County pays $850 for a typical desktop and $1,375 for a typical laptop. Overall, approximately $70,000 a year is spent on replacements not including the Sheriff's Department and Fire Department which handle their own inventory and replacement schedule.

For example, Mecklenburg County, N.C., implemented its "1 to 1, One Person, One Device" initiative, which allowed the county to eliminate extra desktops and laptops, instead equipping employees with one device and enabling them to access resources via virtualization.

IT continues to go through the laborious process of cycling through computer replacements to just keep up with the new operating systems Microsoft rolls out. Historically, some users have utilized desktop computers, some have used laptop computers, some have used a combination of both and some users utilize a desktop, laptop, a touch screen tablet such as an iPad along with a smartphone such as an iPhone or Android device. The user interfaces and the method the user interacts with these devices vary across the devices. Most of the desktop computers deployed within the County are similar in terms of their performance while the needs of the users may vary greatly with many machines being underutilized.

It is time to think out of the box and modernize the end user computing model. Moving forward the County must establish an enterprise strategy for the devices which are in the

hands of the user. The strategy for these devices will include a number of components including:

- User Interface
- Hardware
- Software Deployment and Management
- Acquisition of the Technology
- Standardizing the Workspace
- Mobilizing the Workspace
- Managing the Device and the Workspace

Without defining a comprehensive strategy, efficiency will suffer, costs will be higher, supportability will continue to be a challenge and security will be put at risk. In addition, IT will continue to fight the never ending equipment replacement cycle while not truly improving the user computing environment.

3.1 CLASSIFY AND DEFINE REQUIREMENTS FOR THE DIFFERENT TYPES OF USERS

One size does not fit all. This applies to many things in the world and users within the County are no exception. However, it is possible for us to group users into different groups when it comes to how they use technology devices. While there may be some exceptions, users in the County can typically be categorized into the following groups.

1. *Desktop Worker*. These workers typically site down at the same desk each day and perform the same set of tasks utilizing the same applications on their computer.

2. *Mobile Worker*. These type of workers are in the minority today due to the lack of workforce mobilization within the County. However, this type of role will continue to grow as the County continues to follow the "Mobile First" mantra. These types of workers would typically never be at a desk. They may be working in the field or a remote location. Examples of these type of workers would be employees who support functions in Utilities where they are constantly in the field responding to service requests, assessors working in the field, and building inspectors handling inspections and code compliance duties.
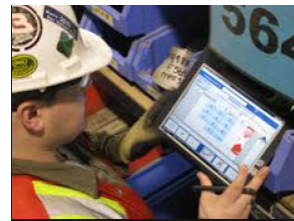
3. ***Hybrid Worker.*** This is the most complex of the workers in the County. On a typical day, this type of worker would come into their office and begin their day sitting at

their desk working from a computing device that allows them to access a standard set of applications such as Microsoft Office. They may also access HTE for a variety of functions and would likely interact with web-based applications utilizing a web browser. They will typically work on documents which may be stored and shared with others. They will also likely make or receive phones calls and access and return voice mail. This worker then may attend an on-site meeting in a conference room. The desire would be to have them be able to pick-up their "workspace" and take it with them so they would have all the same services available to them while they were attending the meeting. In addition, they may also have a need to have a mobile phone with them along with a device which would allow them to access their "workspace". This type of worker may also need to attend an offsite meeting during the day in another County building or in a facility offsite. Once again, the desire would be to have them be able to take their "workspace" with them. The worker may also have a need to work remotely from home or other offsite locations requiring them to be able to access their "workspace" remotely as if they were in the office. While working remotely, the worker may need to use a device other than a computer such as a mobile phone to be able to access email, voice mail or possibly pull up a document for quick access.

4. ***Public Safety.*** This type of worker is either a police officer, firefighter, EMS technician, Fire Marshall or other similar type of role. This type of worker is similar to the Mobile Worker in that they are in the field most of the time and thus they would require reliably, secure, high speed mobile access. They would typically have their

computing device with them and have a need to use the device while in the vehicle. Workers such as an EMS technician would typically take the device in the vehicle with them as they enter a site to address a call. Both police and fire may have the need to carry their device into a County office environment and work with the device while connected to the County's network. While not the norm, the police officer may also need to take their device out of the car and take it with them when answering a call. Some of these workers will also have the need to have a cell phone as well to be able to send/receive both voice calls and data through text or other messaging formats allowing them to communicate in a highly mobile fashion while in the field.

3.2 DEFINE A USER INTERFACE AND OPERATING SYSTEM STRATEGY

It is important to standardize on a minimum number of operating systems which can provide a consistent user interface to the users. Since versions of operating systems are constantly changing, choosing a standard operating system is not about standardizing on a version. It is about choosing a platform that will carry similarities across versions and minimizing impact to the user experience. Another consideration is also how the user interacts with the device; do they use a mouse, a keyboard or a touchscreen. It will be important to standardize on the UI and OS for the following devices:

- *Desktop/Laptop Computer.* Stafford County will continue to standardize on Windows as the operating system platform for desktop and laptop computers and workspaces. This a best of breed approach driven by market forces and availability of applications and hardware supporting this operating system.

- *Hybrid.* This represents the current iteration of tablets which can also serve as a desktop and laptop including the Microsoft Surface Pro 3 or the Dell Venue Pro 11 which are the two predominant platforms in this category. Windows 8 will be the standard OS which will be utilized on this platform.

- *Tablet.* Because there has been no direction set for this platform, the County has a combination of iPads and Android devices. In order to simplify the user experience and simplify supportability and manageability, it is recommended the County standardize on Windows 8 for this platform as well. This is the recommended decision because:

    - There are more hardware choices when running this OS.
    - It will provide a consistent user experience whether the user is using a desktop, laptop, hybrid or tablet.
    - The same tools can be utilized to manage desktops, laptops, hybrids and tablets.
    - The same knowledge is required to support and manage desktops, laptops, hybrids and tablets.

- *Mobile Data Terminal(MDT).* This relates primarily to the devices which are utilized by Police and Fire but will also include mobile devices utilized by other offices such as Utilities and assessors in Commissioner of the Revenue's office. These devices will utilize Windows 8 or above for the same reasons as mentioned above for the Tablet device.

- *Mobile Phone.* Standardizing on the OS and UI for this device is the most challenging of the decisions. The County has three primary options when it comes to the OS and UI for this platform as follows. The implementation plan identifies tasks which the County should follow to evaluate the requirements in order to standardize on the appropriate smartphone platform. If it is determined that standardization is not feasible, the County should evaluate adopting a BYOD strategy with employees providing their own devices and the County providing a financial stipend to those employees who need a smartphone as a part of their job.

1. **Choose Windows**

    - Consistency of user interface across ALL devices
    - Multiple Hardware Choices
    - Consistent Manageability across ALL devices
    - Consistent Configuration of Applications and Services across ALL devices
    - Consistent Knowledge to Support ALL devices

2. **Choose IOS/iPhone**

    - More simple to use overall
    - Apps more simple to use
    - More stable and reliable
    - Interface inconsistent with desktop, laptop, tablet or hybrid
    - Would require a different mobile device management(MDM) solution to be able to manage the platform
    - Would require a different knowledgebase to be able to support from an enterprise perspective.

3. **Adopt a BYOD Strategy**

    Stafford County can also adopt a BYOD strategy. With this strategy, each user would be able to select either a Windows phone or an iPhone. Even with this choice, it will be important to limit the supported options from a supportability perspective.

    - Would give users a choice
    - Interface may be inconsistent with desktop, laptop, tablet or hybrid
    - May pose security risks because the device would not be under an enterprise MDM strategy
    - Stafford County would have to decide at level of support would be provided for these devices

3.3 DEFINE THE USER COMPUTING STRATEGY FOR THE DESKTOP WORKER

For users who have a job which does not require mobility, continued deployment of desktop computers will continue to be an appropriate strategy. In addition to the legacy desktop strategy, the County should consider utilizing desktop virtualization to support specific use cases. Below are examples of use cases where desktop virtualization is an appropriate fit.

- Kiosk situation such as a library or public kiosk where users are utilizing a consistent desktop image with consistent applications requiring average or below average hardware computing power.

- Situation where there is a worker or group of workers that utilize a minimum number of applications where it makes sense for them to have a common desktop image. One example would be the computers which serve the counter positions in the Treasurer's Office.

- Provide a "common mobile workspace" to the Mobile Worker working in the field where they can connect and attach to a workspace to run an application or group of applications. This would typically be done to support consistency, security and performance for mobile applications.

3.4 DEFINE THE USER COMPUTING STRATEGY FOR THE HYBRID WORKER

For users that have a need for a computer to use in the office as well as out of the office, a strategy to utilize devices which can serve as a desktop, laptop and tablet should be evaluated. Based on current industry best practices, Microsoft's Surface Pro 3 or the Dell Venue Pro tablet can serve this type of multi-function role reducing the overall cost per user allowing a single device to handle what was being handled by three individual devices. These multi-function devices can be utilized with a docking solution as a desktop. By adding a detachable keyboard, they can transform immediately to a laptop for mobile use. They can also standalone to function as a tablet for applications requiring this type of use model. The overall cost of this solution would be $1,327 which includes the following components:

Surface Pro 3 - 128GB / Intel i5	$ 999
Docking Station	$ 199
Keyboard	$ 129
Total	$1,327

Microsoft Surface
Dell Venue Pro 11

3.5 DEFINE THE USER COMPUTING STRATEGY FOR THE MOBILE AND PUBLIC SAFETY WORKER

The strategy for the all mobile workers is similar because they share very similar requirements. This strategy applies to mobile workers in Utilities, assessors in the Commissioner of Revenue's office, Fire and EMS personnel, and Police.

- Requires durability of the device

- Require ability to utilize the device from a mobile mount within a vehicle
- Must support 4G/5G connectivity when WiFi is not available
- Should support the ability to connect to the County microwave radio network via WiFi
- Should be able to interact with the device using a keyboard/mouse or touch screen
- Should support the ability to work offline with local storage
- Should be easy to take out of the vehicle and work with from a mobile perspective
- Should be able to take the device into an office environment and work with it in that environment

The County will benefit by choosing a common solution for the mobile worker instead of having each department choose and decide their own. The following benefits will be realized:

- Efficiency through consistency in the acquisition of the devices
- Common knowledgebase required to implement and manage the devices
- Leverage a common enterprise MDM solution for troubleshooting, software deployment, configuration and security
- Support the ability to deploy a standard security configuration to protect the County
- Support integration with other enterprise strategies and services

Panasonic Toughbooks have long been the gold standard for public safety agencies across the U.S. Some agencies and even departments within Stafford County have begun looking at more consumer grade devices such as iPads and other tablets primarily due to the cost of the Toughbooks. At this point in time, the Panasonic devices continue to be the most durable and reliable in the world and have a proven track record working with both Police and Fire first responders.

The following are recommendations for this platform:

1. Choose the Panasonic ToughPad FZ-G1 tablet as the future state mobile platform for Police, Fire and other departments that require a rugged, mobile tablet.

    - Panasonic ToughPad FZ-G1
    - Eaton County Michigan Case Study
    - CRN Reviews The Panasonic Toughpad FZ-G1

2. Manage all mobile units through a common enterprise mobile device management solution as discussed below in 4.6.

3. Centralize purchasing, acquisition, configuration and implementation to gain economies of scale and ensure consistency across the County.

3.6 SELECT AND IMPLEMENT AN ENTERPRISE MOBILITY MANAGEMENT SOLUTION

As the County progresses with mobilization, it will be important to be able to effectively manage mobile devices. The County should evaluate, select and implement an enterprise mobility management(EMM) solution which can be utilized to manage mobile devices for Police, Fire and other County users.   EMM solutions are intended to provide for management of the following three aspects:

- Mobile Device Management(MDM)
- Mobile Application Management(MAM)
- Mobile Content Management(MCM)

This type of approach not only addresses the device but also the applications and the content which will reside on the devices. There are a number of vendors in the market providing this type of solutions. Some of the most well-known which have clients in local government are as follows:

- MobileIron
- Good Technology
- AirWatch

4. Focus on Mobility to Improve Customer Service, Efficiency and Public Safety

One consistent contemporary theme in local government is that government is looking for ways to maximize the time employees spend in the field responding to the needs of citizens and to finding ways to do more with less through increases in efficiency. By mobilizing the workforce, Stafford County can realize a number of benefits including the following:

- **Enhance Productivity** – Manage work orders, complete site visits & code enforcement, record & track violations on site.

- **Respond to Citizen Requests** – Improve community relations through the increased accuracy & speed of citizen service request fulfillment.

- **Service Field Requests** – Allow office personnel to quickly share information with field crews or allow administrative personnel to have immediate access to information from field crews to ensure accurate customer service.

While the County has successfully deployed technology to support mobility for public safety functions, other non-public safety functions have had limited success to date. There are two factors which have significantly impacted this ability. The first issue is connectivity. To date, there has been limited standardization on how mobile workers could or should connect to the applications and services which they need to utilize. Speed, usability and availability have all presented challenges for mobile workers resulting in limited use. The other factor which has limited mobilization of functions is the availability of applications which allow the mobile worker to do their job. Police and fire have had greater success because the connectivity solutions they are utilizing are different than the solutions utilized by non-public safety functions and the availability of mobile applications to support their functions have been implemented within the County and have greater maturity.

Moving forward, it will be important for the County to standardize and broaden the technology which can be utilized by both public safety and non-public safety functions. This will include the following departments and functions at a minimum:

- Sheriff
- Fire and Rescue
- Planning
- Utilities
- Commissioner of the Revenue
- Stafford County Public Schools

The following strategies are intended to allow the County to move forward with embracing mobilization of the workforce in a broader sense and to future proof the existing mobile technology implementation.

4.1 IMPLEMENT A STANDARD MOBILE COMMUNICATION ARCHITECTURE

Mobile workers whether police, fire or service providers, must be able to count on connectivity to support their work functions. The County must also break down departmental barriers and utilize a consistent mobile communication architecture to support remote access across all departments. The contemporary mobile communication architecture for local government must have the following characteristics:

- Support for voice, data and multi-media such as video
- Have wide-spread availability within the County borders
- Provide for multiple types of connectivity including 4.9Ghz, 802.11, EVDO/UTMS and satellite
- Provide for redundancy of communications
- Must allow multiple, disparate types of devices to be utilized by the mobile worker
- Must support vehicle and personnel mobility allowing the worker to be able to connect when they are out of their vehicle
- Must support secure communications to provide for compliance with industry best practices as well as government regulations including compliance with the current CJIS Security Policy

4.1.1   IMPLEMENT FUTURE STATE MOBILE CONNECTIVITY FOR COUNTY VEHICLES

This strategy will focus on defining a standard model to support remote connectivity for County vehicles and to allow these vehicles to act as a network access point for workers working remotely outside of the vehicle. Implementing integrated services routers in County vehicles needing remote access will provide a solution which will allow devices within the vehicle as well as workers outside the vehicle to connect to County technology resources. Integrated services routers such as the Cisco 3200 series router will support connectivity within the vehicle and will support a variety of wide-area wireless connections including network connections such as General Packet Radio Service (GPRS), LTE, satellite, 802.11a/b/g, and licensed 4.9-GHz connections for public safety use.
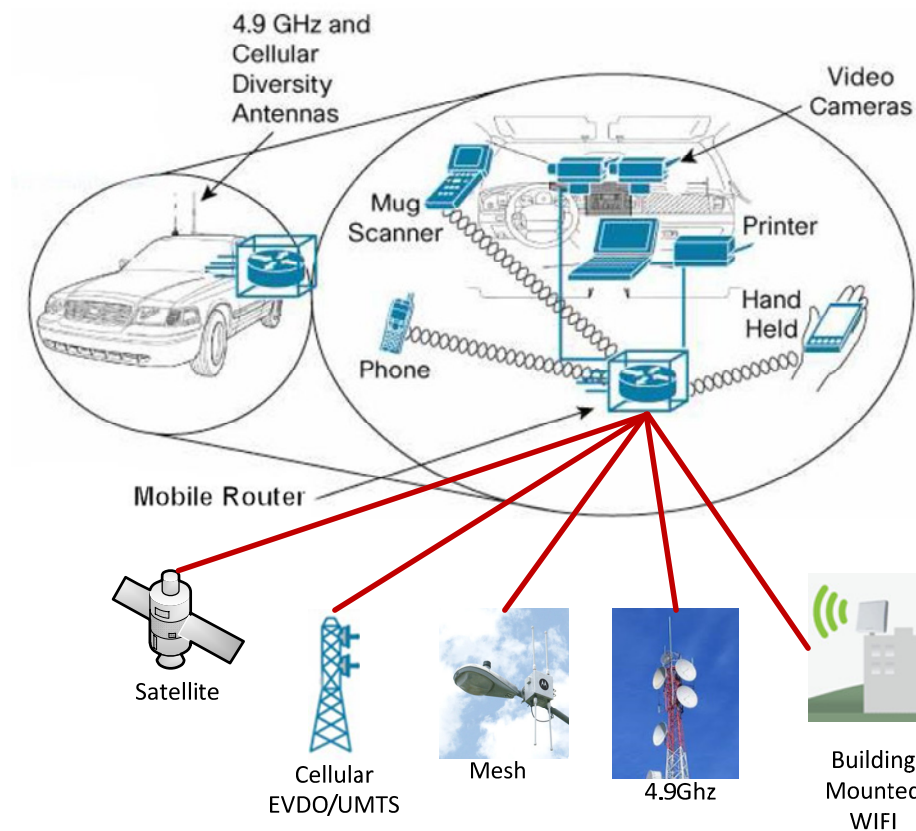
This architecture will support the current cellular connectivity which is available and will position the County to leverage the upcoming upgrade to the digital microwave radio system. This will also position the County to leverage mesh wireless implementations should the County move in this direction. Satellite connectivity can also be utilized as a redundant backup for vehicles that need this type of resilience.

Workers needing to work outside the vehicle such as police, fire and field service workers can then utilize handheld devices which would connect back to the vehicle via 802.11a/b/g. The router in the vehicle would then provide the necessary backhaul connectivity to technology resources residing in the County's data centers. Examples of these types of use cases are as follows:

- **Mobile Video for Police** allowing body cameras to communicate back to the vehicle to store video or to send real-time video back to dispatch during traffic stops or other types of situations.

- *Fire and Rescue Command and Control* allowing fire and rescue personnel to utilize tablet devices away from the vehicle when dealing with an incident scene. Personnel can readily access GIS, Pictometry, existing maps and in the future integrated information about structures when answering calls.

- ***Utility Service Orders*** could be sent to technicians in the field immediately. These technicians could then work the service order and remotely enter information about the request which would be available and visible to office personnel to support more efficient customer service and prevent timing issues where service is disconnected because technicians did not have current information to work with.

- ***Building Inspectors*** are able to take a tablet to a job site to complete the necessary inspections on the spot. Information about the inspection is updated at the job site in real-time improving overall customer service.

- ***Assessors*** are able to take tablets into the field and complete sketches on-site instead of having to complete the sketches on legal pad and then transfer the information into ProVal when they return to the office.

Integrated services routers like the Cisco 3200 are available from several different vendors as follows. These devices vary in price but average approximately $3K per device.

- *Sierra Wireless*
- *Trophos Networks*
- *Cisco Rugged Integrated Services Routers*

4.1.2   LEVERAGE DIGITAL MICROWAVE FOR DATA CONNECTIVITY

The County has a planned upgrade to the existing digital microwave system. The details of this upgrade and the capability of the system after upgrade were not available to Virtual IT during the strategic planning process. However, it is understood that additional channels are being added to expand the capacity of the microwave system. The County should leverage this connectivity option consistent with the architecture noted in 4.1.1 to support connectivity for both public safety and other departments needing remote access. As the County moves forward with this upgrade, consideration should be given to the connectivity needs of departments other than just public safety.

4.1.3   DEPLOY NETMOTION WIRELESS TO SUPPORT ENTERPRISE MOBILE CONNECTIVITY

The County has already deployed NetMotion Mobility to support secure connectivity for public safety. The current deployment has multiple servers deployed in a co-location architecture supporting access through redundant Internet connections. This solution should be adopted as the enterprise solution to support all remote access including the following:

- Police MDTs and Tablets
- Fire and Rescue MDTs and Tablets
- Assessor MDT and Laptop Access

- Remote MDT, Tablet and Laptop Access for Planning, Utilities and Public Works
- General Remote Worker Laptop Access
- General Remote Worker Tablet Access

By utilizing the NetMotion VPN client on all devices, the County can improve overall remote access and manageability. In addition, the NetMotion solution is a cross platform solution providing clients for all remote devices which are part of the County's future state strategy.

4.2 COMPLETE IMPLEMENTATION OF HANSEN MOBILE TO SUPPORT BUILDING INSPECTIONS
The County is actively working to implement and deploy Hansen Mobile to support mobile community development functions including permitting, inspections and asset management.

4.3 MONITOR AVAILABILITY OF HANSEN MOBILE TO SUPPORT MOBILE INSPECTIONS AND WORK MANAGEMENT FOR UTILITIES
Hansen is currently working on a mobile solution to support mobile inspections and work management for utilities. The County should continue to actively monitor progress and availability of these solutions to support needs as noted in 4.4.

4.4 EVALUATE OPTIONS TO MOBILIZE UTILITY SERVICE ORDERS
The County has an opportunity to greatly improve efficiency and customer service by automating the service order process for Utilities. Currently, service orders are printed and given to meter technician. They complete the work in the field many times writing notes on the actual service order which could impact the citizen. While the service order is with the technician, office personnel do not know the status.

Utilities would like to automatically deploy to a technician and then have the technician update the service order in the field so the system is updated automatically so office customer support personnel know the status of the order when talking with the customer.

The County should investigate the availability of this functionality through the existing HTE Customer Information System(CIS) as well as evaluating options for utilizing Hansen Mobile to support this function with a backend interface to CIS.

5. Establish and Implement Services to Support the Mobile Workspace

For the purpose of this plan, the users "workspace" represents the applications and services which they are able to access from their computing device or devices. A focus of this plan is to mobilize the workspace to allow the user to access their workspace from anywhere. The user should be able to come into an office and plug their computing device into a docking station. They would have full access to a large monitor, keyboard and mouse. They would then have access to a standard set of applications they need to utilize to perform their duties from their desk.
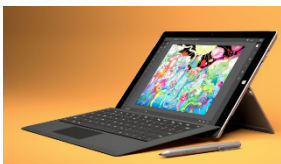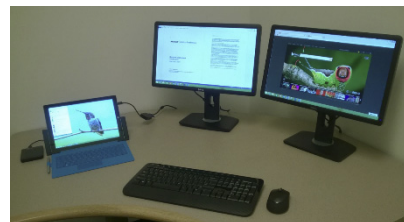
Some users will have the need to pick up and carry their endpoint device with them. If they are working remotely away from their

desk they should be able to use the endpoint device as a display and have a full keyboard/mouse to use. They should be able to turn on the device and work independent of a network connection if a connection is not available. They should still have access to a minimum number of workspace services while in a disconnected mode.

When available, they should be able to connect to the Internet through either a 4G/5G or through WiFi if available. Once connected to the Internet, they should be able to have full access to their "workspace services" as if they were in the office. They should be able to access Microsoft Office, eMail and all of their individual or shared files. Files they worked on while offline would update back to the central file storage so others could access the new versions of these documents if they were shared documents. Personal documents which were worked on offline would synch back so they would be backed up.

Each "user workspace" should have a standard set of enterprise workspace services which are available which support the concept of mobility. The County should leverage cloud based, software as a service(SaaS) to deliver these services. Why? Because these services can be implemented with high velocity and will require less bandwidth from internal personnel to implement and support. In addition, by "renting" these services, the County will be in a pay as you go type of model instead of an initial up front capital expenditure.

The following services should be included as part of the enterprise workspace services.

Service	Product/Solution
Enterprise File Sharing	Citrix ShareFile
Collaboration	Cisco WebEx
Desktop	Microsoft Office 365
Unified Communication Services(UCS)	Cisco IP Communicator

5.1 IMPLEMENT OFFICE 365 AS AN ENTERPRISE WORKSPACE SERVICE

Many organizations are moving toward implementing Microsoft Office utilizing the Software as a Service(SaaS) model. This is a pay as you go yearly subscription model where you pay for Office on a per user basis. One of the challenges many organizations deal with is the constant upgrade cycle of Microsoft Office. Utilizing this subscription model, users will always have the latest and greatest version of Office. For $12/month each user will have:

- Office Suite installed on their computer or ability to access Office Online without a local installation. This may be one of the greatest benefits for the County. There are many users who can utilize this model without having to install the software on their computer. This will prevent dealing with software deployment for these users.
- License to run Office on 5 PCs including a home PC, a Windows tablets, an iPads, an iPhone or a Windows phone
- Centralized administration of users allowing a Stafford administrator to add and remove users with access to Office
- Integration with Active Directory to allow Stafford to manage users and credentials through AD

**5.2 IMPLEMENT CITRIX SHAREFILE FOR ENTERPRISE FILE SHARING**

The County's file storage environment is representative of a "legacy" file storage architecture with most files stored in a file server located inside the County's network. Users access files through Windows Explorer or other applications. There is minimal remote access for users connecting to the network through VPN. There is a desire for users to "work from anywhere, anytime" as well as the need to have mobile access to files and information. Some departments are using services such as Dropbox to support their individual needs and thus the County has lost control over the information security related to this information. Other departments within the County reported challenges in sharing large files externally with other entities. The County has an opportunity to implement a contemporary file storage and access solution in order to meet the needs of the users moving forward in order to "recapture" control of information.

A contemporary file storage platform will have the following key characteristics and features:

- Meets the mobility and collaboration needs of all users
- Meets the data security requirements of the County
- Support the ability to store data inside the County network or in the cloud
- Audit and report and activity within the system
- Support for Windows and other mobile platforms
- Support the ability to remotely wipe stolen devices
- Integration with Microsoft Active Directory for authentication and authorization
- Allow users to access, store and synch files across multiple devices including desktops, laptops, tablets and smart phones
- Access files when offline and re-synch when connected
- Support for large files up to 100GB
- Support for strong encryption for transmission and storage of files

Virtual IT has evaluated current enterprise file storage and sharing technology and Citrix ShareFile is the solution which will meet all of the requirements noted above at a reasonable cost. One of the most impressive features of ShareFile is the ability to use ShareFile while keeping the data inside the Stafford County network. This will allow Stafford to move forward with this service without getting caught up in having to decide whether to store data in the cloud or not. The following figure provides an overview of how this architecture works.
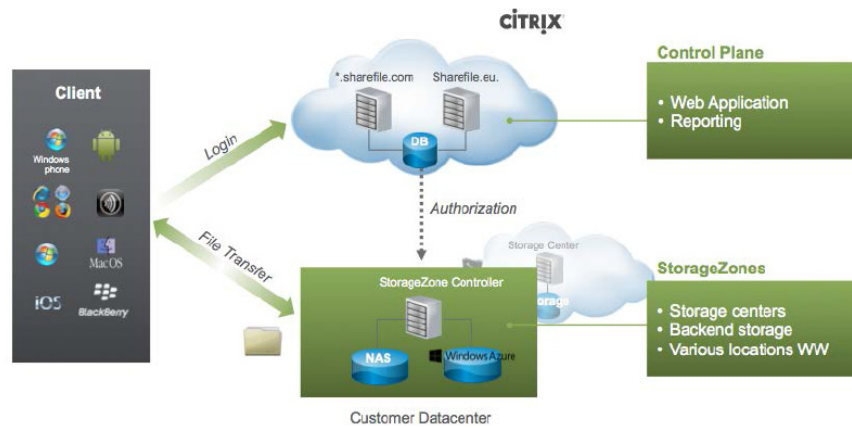
In addition to utilizing ShareFile to support file storage and sharing for County workers, ShareFile is also a robust solution for sharing large files externally. Instead of dealing with limitations on sending and receiving files through email, the County can utilize ShareFile to support public file sharing.

Citrix ShareFile Enterprise

5.3 IMPLEMENT CISCO WEBEX TO SUPPORT ENTERPRISE VIDEO COLLABORATION

Video conferencing and collaboration is not a new technology. It has been utilized for many years primarily to tie together companies that have multiple sites preventing workers from having to travel extensively. However, the focus on video collaboration now is focused more on person to person communication instead of site to site. A video collaboration service will help the County foster a work anywhere mindset. No longer will physical "out of sight" mean "out of mind". By providing video conferencing as an enterprise workspace service, workers can stay connected with others in the County, individuals in other localities as well as with citizens. Below are examples of potential use cases for Stafford County.

1. *Virtual Meeting Spaces.* Workers in the County can utilize video conferencing establish a virtual meeting space. Individuals within the County can attend meetings virtually sitting at their workspace saving time when participants are not in the same building. In addition, if others outside of the County are needed to participate in meetings such as an engineering firm working with Utilities, those parties can also join the meeting without have to gather onsite.

2. *Candidate Interviews.* The County can expand the geography looking for candidates for positions by utilizing video conferencing. HR and others involved in the interview process can conduct initial or follow up interviews virtually without having to have the candidate on-site.

3. *Personalized Citizen Interaction.* Video conferencing can be made available to citizens allowing citizens to actually meeting with County personnel virtually without having to

come on site. This would be advantageous especially for departments such as Utilities or Public Works. This would allow a developer to meet with the appropriate personnel at the County to discuss a development without having to come on-site.

4. ***County-Wide Town Hall Meeting for Employees.*** This capability would allow the County Administrator or other departments with a need to address all employees to hold a virtual County-wide Town Hall Meeting. Employees could join the meeting from anywhere using computers, tablets or cell phones.

5. ***Board of Supervisor Meetings.*** While the board meetings are currently broadcast, adding a video conferencing interface would allow citizens to interact virtually without having to physical attend the meetings.

6. ***Public Safety.*** Police or Fire from multiple jurisdictions can meet and interact regarding incidents that may be occurring. This capability could also be utilized in an EOC format as well providing a method for localities to interact without needing to have specialized equipment, hardware or connections.

Meeting Spaces provides a comprehensive virtual meeting environment that support video and voice collaboration along with the ability to share and collaborate on documents or other types of medium.
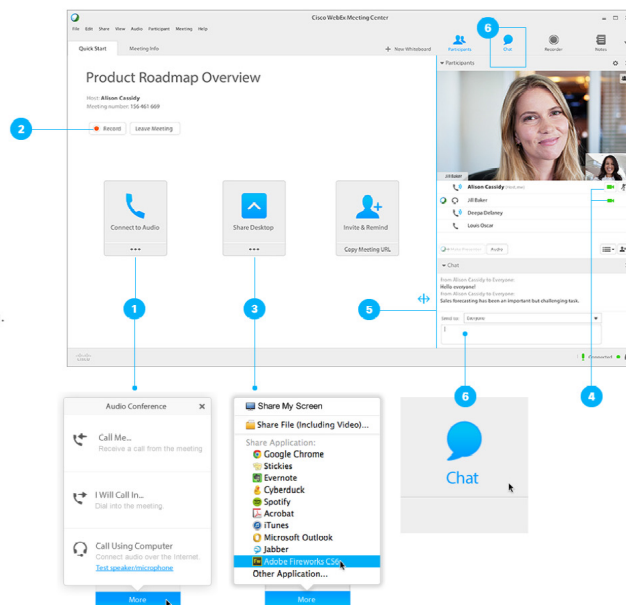
Multi-point video capability allows you to bring together many people at once. While this capability works effectively on a single computer, it also works well in a conference room setting utilizing a projector to project the video onto a large display.

5.4 IMPLEMENT CISCO IP COMMUNICATOR TO SUPPORT UNIFIED DESKTOP COMMUNICATIONS

Stafford County has a robust Cisco VoIP telephone system. In order to support the mobile workspace, users need the ability to make and receive calls as well as access their voice mail while at the desk or while away from their desk.

Cisco IP Communicator is a Windows-based soft-phone application that will allow the user to bring their telephone with them on their computer. This application gives computers the features of IP phones, enabling high-quality voice calls on the road, in the office, or from wherever the user has access to the network.

6. Enhance the Network to Support Mobility and Future Survivability

The County's network provides a sound foundation for the future. There is significant resilience which has been built into the core of the network with components co-located in both the CAC and PSB including redundant Internet connections. Overall, connections to remote sites are utilizing a sound model which provides for adequate bandwidth and resilience. There are a few sites which need to have their connectivity improved.

One area where the County is behind is mobilization of users and technology. As a result, there has been no need for the network to be able to support a mobile workforce or mobile population. Moving forward, steps will need to be taken to allow the network to support a more mobile workforce and to support mobilization technology such as a strong WiFi implementation in County facilities. As a part of the strategic planning process, opportunities to further progress the network, to make the network more resilient and to "future proof" the network were identified as follows.

6.1 DIVERSIFY WAN ROUTERS TO PROVIDE FOR COMMUNICATION REDUNDANCY

The County has an opportunity to improve resilience of the existing WAN architecture. Currently, there are approximately 35 remote sites which terminate in a WAN router in the CAC computer room through T-1 or DMVPN. The County should consider moving one of the existing WAN routers to the PSC computer room which would provide resilience for remote connections in the event a disaster renders the CSC computer room unusable. DMVPN supports dual-hub designs, where each spoke is peered with two hubs, one at CAC and one at PSB, providing rapid failover should either computer room be unavailable.

Secure On-Demand Meshed Tunnels

Hub
VPN
Spoke 1
Spoke n
Spoke 2

- - - - DMVPN Tunnels
——— Traditional Static Tunnels
● Static Known IP Addresses
○ Dynamic Unknown IP Addresses
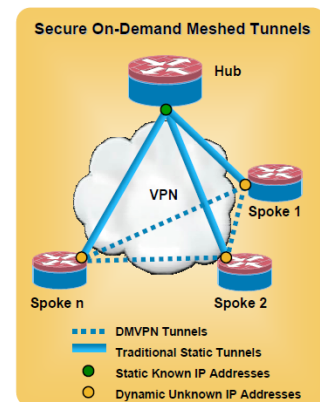
6.2 IMPROVE CONNECTION SPEED FOR REMOTE SITES

The connection to the Utilities offices which are located across the street from the CAC experiences latency and slowness resulting in the need to implement localized storage and other technology to compensate for this issue. The building which houses Utilities is approximately 100 yards from the CAC.   Based on this distance, either running overhead fiber or implementing a point to point wireless bridge would both be solutions which would support upgrading this connection.   Below are three vendors which offer point to point wireless solutions which are proven in the industry and in local government.
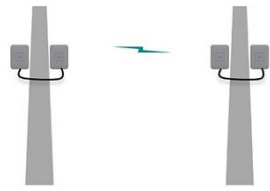
- Cisco 1530 Wireless Bridge
- Proxim Wireless Backhaul
- Bridgewave Multi-Gigabit Wireless

6.3 REPLACE DISTRIBUTION AND ACCESS SWITCHES TO SUPPORT HIGH SPEED ACCESS

Most of the network distribution switches in the County are limited to 100Mbps to the desktop. Currently, this is not a significant problem but the standard speed to the desktop in the industry is currently 1Gbps. It will be important for the County's network backbone to be a minimum of 1Gbps along with supporting 1Gbps to the desktop. In addition to providing 1Gbps to the desktop, this will also support the ability to connect wireless access points to a gigabit backbone to maximize the throughput of the wireless connectivity as well.   Switches with PoE should be implemented to alleviate having to install power transformers to power the access points, VoIP phones and IP video surveillance cameras. The same network distribution and access infrastructure can be utilized to support data, voice and video. Separate VLANs should be implemented to separate traffic from both a performance and security perspective.

6.4 IMPLEMENT ENTERPRISE WIRELESS TO SUPPORT MOBILITY

Wireless infrastructure will continue to grow in importance for the County as more and more devices will highlight the concept of "mobile first" which is the growing trend in the industry. Legacy, wired desktop computers are being supplanted in many organizations by multi-function laptop tablet computers which users can pick up and take with them anywhere in the building. Individuals visiting County facilities have come to "expect" reliable, fast, public WiFi. Departments such as Parks and Recreation need to provide WiFi access at many of its facilities to meet the needs of citizens.

Currently, wireless access is provided in some County buildings through consumer grade D-Link access points. These access points are sufficient for small installations but do not provide enterprise manageability, capacity or security. Specific issues were noted by departments with respect to situations where a high volume of users need wireless access which is the case during Board of Supervisor meetings.   These access points support 802.11g or a total bandwidth of 54Mbps per access point.   This is half duplex and

shared by all clients on that access point which is likely why users are experiencing performance issues.

Based on industry standard requirements as well as needs specific to Stafford County, the following are characteristics of an enterprise wireless network which is needed to support both internal needs of Stafford County as well as to support services which need to be provided to citizens.

- Wireless Privacy – Full support for 802.11i, WPA and WPA2
- Authentication – Strong authentication using 802.1X with RADIUS and Active Directory
- Rogue Detection and WIDS – Wireless DoS detection and prevention and wireless IDS for rogue detection and compliance monitoring
- Centralized management across multiple sites from a single console or online service
- Users can easily and securely roam between access points with no loss in connectivity
- Mesh Technology for AP-to-AP Direct Communications
- Secure Guest Access Isolating Guest Traffic from Internal Traffic
- Support for PoE to eliminate power transformers
- Support for 802.11ac to support up to 1300Mbps throughput in the 5Ghz band
- Support for 802.11b/g/n for legacy support
- RF Optimization

Contemporary enterprise wireless implementations consist of wireless access points and a wireless management platform that enables management of the wireless network and also support enterprise security features such as wireless intrusion detection. Legacy wireless implementations have involved access points plus expensive wireless controllers which add significantly to the cost of the implementation. In addition, these wireless controllers also raise the bar in terms of the knowledge required to manage these platforms. Two of the leading wireless vendors in the industry are providing centralized management of the wireless network through a cloud-based service. Instead of having the controllers and software running on the network, the access points communicate to an external data center which is hosting the wireless management platform. This eliminates the need for the expensive wireless controllers and reduces the knowledge necessary to manage the enterprise wireless platform. Two of the leading vendors in the industry which Stafford County should consider in implementing an enterprise wireless infrastructure are as follows:

- Aerohive
- Cisco/Meraki

7. Implement Technology to Support Proactive Monitoring and Management

One of the greatest strengths for Stafford County are the two facilities which are utilized to host technology. Both the County Administration Center(CAC) and Public Safety Building(PSB) provide a sound foundation for data center facilities. Utilizing these two facilities as co-location facilities for disaster resilience places the County well ahead of most localities in terms

of resilience of facilities. The following goals and strategies were identified to continue to improve on a sound foundation already established for technology facilities.

7.1 IMPLEMENT TECHNOLOGY TO PROACTIVELY MONITORING THE COMPUTER ROOMS

Currently, there is no automated monitoring of temperature, humidity, moisture or other environmental factors of the two computer rooms. Implementing this type of monitoring in these rooms may prevent a significant disaster should there be a failure of cooling systems, water leak or other issue within these rooms. One common solution to handle this monitoring is the APC NetBotz solution as shown below. This single devices can monitor the following aspects of the computer room:

- Video Security
- Temperature Sensor
- Humidity Sensor
- Fluid Sensor
- Smoke Sensor

7.2 IMPLEMENT PROACTIVE MONITORING OF NETWORK INFRASTRUCTURE AND SERVICES

Information Technology currently owns SolarWinds which is a robust tool for handling common network monitoring and management tasks. The use of SolarWinds should be expanded to implement proactive monitoring of key network infrastructure. In the event a device is having issues, appropriate personnel should be notified via text or email alerting for potential problems. This

will provide staff with the ability to proactively respond to potential issues before they become real issues impacting users in the County.
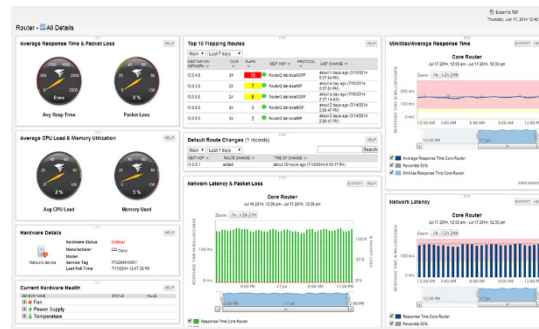
7.3 IMPLEMENT PROACTIVE MONITORING OF APPLICATIONS

In addition to monitoring the network, SolarWinds is also capable of monitoring server or other infrastructure supporting applications as well as monitoring aspects of the

applications themselves. Information Technology has an opportunity have the network team take responsibility for implementing basic monitoring for servers and other infrastructure and to then work with the applications group to then implement custom application monitoring. This would provide the organizatoin with a real-time view of the overall operational health of applications and the infrastructure supporting these applications along with gaining important proactive information which could prevent possible outages which could impact employees or citizens.
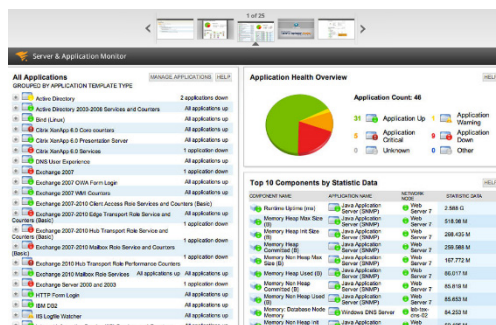
7.4 IMPROVE ABILITY TO MANAGE EXTERNAL DOMAIN NAME SERVICES(DNS)

The County's external DNS is handled by Verizon in cooperation with VITA. In order to request a change in DNS, the County must initiate a manual request.   This limits the County's ability to make timely changes to DNS which may be required in the event of a disaster situation.   The County can improve this situation to migrating external DNS to a provider that has tools to support self-service management of DNS entries.   There are a number of external DNS providers but one which other local government clients are utilizing successfully is DNS Made Easy.

8. Implement Enterprise Content Management and Collaboration Strategy

Stafford County has implemented document imaging and management in some departments utilizing the existing OnBase solution. Based on the work performed during this plan, many departments did not know there was a solution available. Others seemed unsure of what they would do with it and others felt embracing document imaging and management is a critical strategic initiative but felt the existing OnBase solution did not meet there needs.

Document Imaging and Management is a true enterprise technology service which should be used by every department in the County. While this technology has been around for many years, projects where departments commit to this technology and changing the way they do business can still provide one of the highest returns on investment of any technology project. It is time for the County to embrace this as a true enterprise technology and commit to its implementation and use.

The Price of Not Using a Document Management Solution

Recent estimates show that an average office administrator will take 12 minutes to process a single document.

Nine of these 12 minutes are spent searching for, retrieving and refiling the document—meaning that only three minutes are spent actually using the information they've found.

The County is utilizing a combination of mechanisms to store documents and make information available to departments including legacy file server storage and the use of the iStafford intranet platform. Neither of these mechanisms will likely support future state initiatives such as mobilizing the workforce.   It will be important to gain control over this content and implement a cohesive content management strategy.

8.1 ESTABLISH A LONG TERM STRATEGY FOR DOCUMENT IMAGING

Stafford County has been utilizing OnBase for document imaging and management. While it is beyond the scope of this plan to do a full evaluation of this solution, a general review of the functionality of the solution along with the overall technical architecture of OnBase is consistent with industry best practices.   There are a number of departments utilizing this solution within the organization and within other organizations very successfully.   The primary reason document imaging and management is not more widely utilized within the County is because it has not been a priority and thus has not been staffed to be a true enterprise application.   In order truly reap the benefits of document management and imaging, it is recommended the County follow these strategies:

8.1.1   COMMIT TO AN ENTERPRISE DOCUMENT MANAGEMENT INITIATIVE

The County needs to recognize document management as a strategic initiative or as a component of a greater initiative such as "Going Green". There are a number of federal grants available for local governments who want

to pursue opportunities for sustainability. Document imaging is one of the types of projects which may quality as well as other types of projects such as server virtualization. Departments within the County need to realize this is a priority for the County. There are very projects which can promise the same return on investment as this type of project in addition to providing benefits as follows:

- Save Time
- Increase Productivity and Efficiency
- Decrease Costs
- Increase Communication and Collaboration
- Enable Automation
- Improve Disaster Resilience for Paper Records

8.1.2   STAFF FOR SUCCESS

One of the reasons the County is not further along with an enterprise document management solution is that it has not been staffed to succeed.   Currently, responsibility for support of the OnBase application is in Information Technology in the Network Group.   Document management is a complex enterprise technology. Implementing the technology is only a small component of the overall solution. Understanding the business processes which are candidates for automation and understanding the content which is a candidate for digitization are fundamental aspects of this enterprise service. It will be important for the County to implement the necessary roles and responsibilities to provide internal consulting support to departments to help them analyze their processes and information to define how this enterprise solution should be implemented to gain the benefits of digitizing their content and automating their processes. In addition to the "consulting role", it will be important to also staff the "support" role so that departments will have ongoing support for this enterprise technology. This will be critical once departments transition their paper-based processes into a digital system. At that point, they will be totally reliant on the system and thus will not be able to operate without it.

8.2 REPLACE ISTAFFORD WITH MICROSOFT SHAREPOINT PLATFORM

The County should consider replacing the existing iStafford intranet platform which a scalable platform which can support enterprise content and collaboration.   Microsoft SharePoint is an industry standard platform that is utilized to support these needs.   In addition, the County can elect to implement SharePoint internally or implement as a hosted service through the implementation of Microsoft Office 365. These options will provide Stafford with the ability to transition to SharePoint with greater velocity with less reliance on internal resources.   Using SharePoint in a hosted model is feasible for the County. Trying to implement and support the platform internally would likely be a challenge due to staffing concerns.

When fully implemented, SharePoint will provide the County will an enterprise platform which can be utilized to support enterprise content management and support greater collaboration and communication within the organization.   Below are examples of the functions which would be supported with this platform.

- Intranet Home Utilized for Communicating Announcements to All Employees
- "Centralized Portal" Providing Starting Point for Access to Applications and Resources in the County
- Internal Department Sites Supporting the Ability to Make Information Available to Employees
- Support for Project Team Sites to enhance Collaboration and Communication for both internal and external projects
- Utilize to implement centralized "Report Center" to eliminate paper reports and have a centralized location to host reports for all departments

9. Improve Physical and Information Security

Physical security and information security can no longer be addressed as separate issues. In the world we live in today, physical and information security has converged and technology has provided the catalyst for the convergence. The strategies in this section of the plan are intended to help the County continue to improve overall physical and information security.

9.1 STANDARDIZE ENTERPRISE VIDEO SURVEILLANCE PLATFORM

The need and demand for video surveillance technology will continue to grow within the County. The County currently has several disparate video surveillance systems in place at different locations throughout the County including the Public Safety Center, Courthouse, water treatment facilities and several Parks and Recreation facilities. Each department who has a need for this technology has typically had the autonomy to choose their own system to meet their needs.

The County has an opportunity to select an enterprise video surveillance platform moving forward. Standardizing on an enterprise platform will provide the ability to centrally monitor and manage all remote sites from a single location such as the Public Safety Center. Law enforcement can leverage this tool to view a remote site where an issue may

be occurring allowing them to respond more quickly as well as prevent issues from occurring through proactive monitoring. In addition, by choosing a standard platform, the County will save money when it comes to the selection, implementation and maintenance of this type of technology.

The County should also consider video surveillance technology which is in use in the school system as well. Once again, giving public safety the ability to have access to digital video at all County sites including the schools, is an industry trend which is occurring to improve overall safety and enhance law enforcement's ability to respond quickly to situations.

9.2 EVALUATE EXISTING INFRASTRUCTURE TO ENSURE COMPLIANCE WITH CJIS REQUIREMENTS

The CJIS Security Policy provides Criminal Justice Agencies (CJA) and Noncriminal Justice Agencies (NCJA) with a minimum set of security requirements for access to Federal Bureau of Investigation (FBI) Criminal Justice Information Services (CJIS) Division systems and information and to protect and safeguard Criminal Justice Information (CJI). This minimum standard of security requirements ensures continuity of information protection. The essential premise of the CJIS Security Policy is to provide the appropriate controls to protect CJI, from creation through dissemination; whether at rest or in transit.

CJIS Security Policy directly impacts the Stafford County Sheriff Department and the technology which is utilized to support key functions of that department including 9-1-1 dispatch and related mobile dispatch functions. Recent changes in the CJIS Security Policy have raised the bar in terms of what is required of agencies and their technology environment. Stafford County should evaluate existing security controls in the following CJIS Policy areas to ensure compliance with the CJIS Security Policy.

- Policy Area 5—Access Control
- Policy Area 6—Identification and Authentication
- Policy Area 7—Configuration Management
- Policy Area 8—Media Protection
- Policy Area 10—Systems and Communications Protection and Information Integrity

Please reference the CJIS Security Policy for the detailed requirements which Stafford must adhere to as it relates to information technology.

10 Shrink the Physical Server Footprint and Improve Disaster Resilience

The County has established a highly available iSeries platform to support the HTE application. The County has also established a robust server virtualization platform. These two foundational investments can provide significant value into the future. With these two platforms, the County has the opportunity to use these platforms to provide support for Stafford County Public Schools. The County also has the opportunity to utilize the server virtualization platform to reduce the number of physical servers which are currently in use. By reducing the number of physical servers, this provides an opportunity to avoid replacement costs and to leverage the virtualization platform for disaster resilience.

10.1 CONSOLIDATE COUNTY AND SCHOOLS ISERIES PLATFORMS

Both Stafford County and Stafford County Public Schools are running HTE on an iSeries platform. The County and Schools should evaluate the possibility of consolidating these platforms. Stafford County's iSeries platform is configured in a high-availability architecture which could provide for better disaster resilience for school system. In addition, by consolidating these platforms, the County overall will experience cost savings.

10.2 ESCALATE SERVER VIRTUALIZATION

The County has approximately 135 physical servers supporting application and technology in the County. This number of physical servers presents several challenges including replacement cost and management. Many of these servers support a very specific application and are typically highly underutilized. The County has established a robust VMWare server virtualization platform. The County can utilized this virtualization

platform to shrink the number of physical servers. By consolidating many of these physical servers into a virtual server platform, the County can gain a number of benefits including:

- Avoid replacement costs
- Gain better asset utilization
- Improve overall manageability
- Improve disaster resilience

This should become a priority from an infrastructure perspective as the County can gain significant value through escalating the process to virtualize the server infrastructure.

11 Organize to Foster Success

One of the most important components of an organization's technology continues to be the people that plan, design, implement and support the technology. Stafford County currently uses a hybrid model where much of the technology is managed by Information Technology. There are some departments within the County who have their own IT resources including:

- Stafford County Sheriff's Office
- Fire and Rescue
- Treasurer

While this model is functioning today, there continue to be challenges in providing adequate bandwidth to staff projects, providing for redundancy of resources for critical support functions, and dealing with roles and responsibilities in terms of support functions for technology and applications. It will be important moving forward for the County to address changes in these areas to improve the overall velocity for the implementation of technology and to ensure long-term supportability and sustainability for current and planned technology. The following figure shows the recommend future state organizational structure for Information Technology.
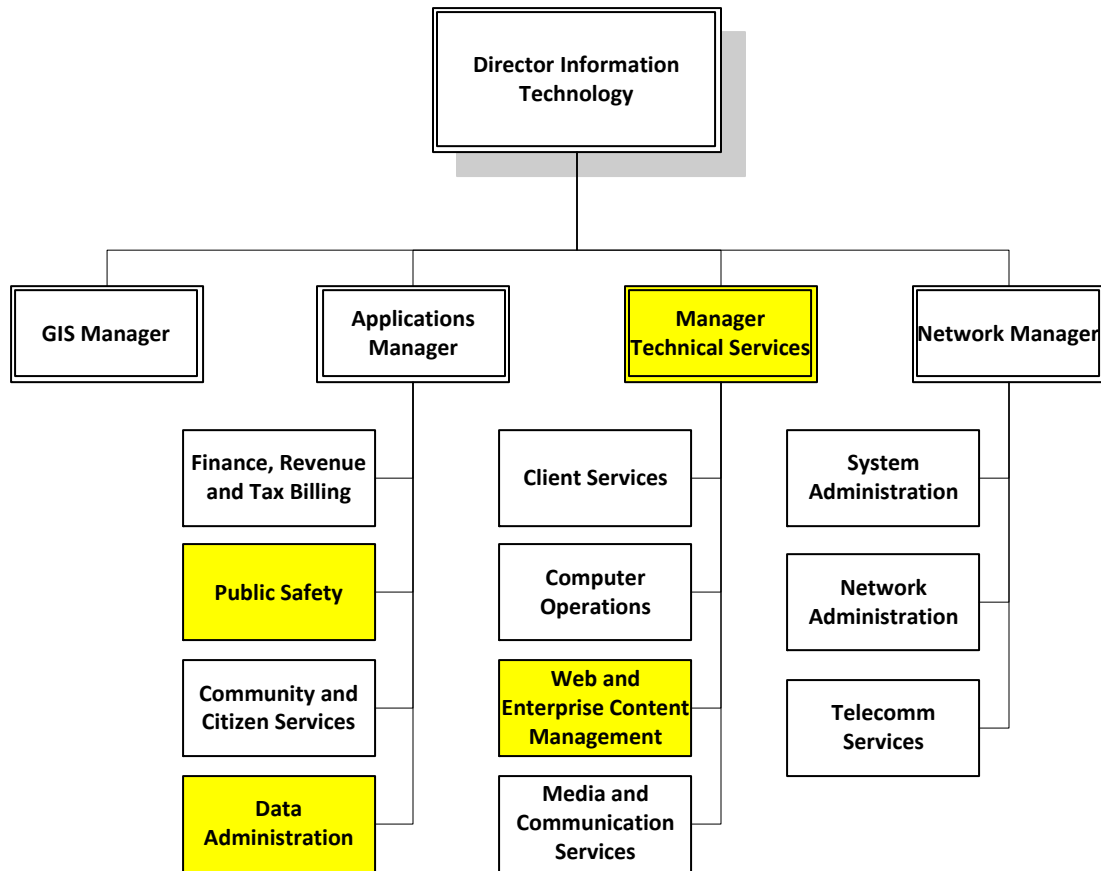
This structure represents industry best practices and resembles the organizational structure for several local governments in Virginia which are similar to Stafford County in terms of size and the overall technology and application footprint. The items highlighted in YELLOW represent the addition of positions or resources to support these functions. The following strategies represent required changes in order for the County to reach the target organizational structure as noted above.

11.1   ESTABLISH TECHNICAL SERVICES TEAM AND TECHNICAL SERVICES MANAGER POSITION

A number of important technical services have evolved over time and as a result, responsibility for these services were placed in existing groups having these groups handle administration along with their other duties. As a result, these services have been neglected. The County needs to establish the Technical Services group within IT to be responsible for the design, implementation and support of these services to ensure an appropriate level of leadership and support. Establishing this team will require the addition of the Technical Services Management position. This position would not only manage the functions of this team but would also be a hands-on practitioner as well much like the current Application Manager and Network Manager. Services which would be managed by this group would include:

- **Client Services.** This function would include the existing Help Desk function and would include overall responsibility for desktop support. This function would also have responsibility for licensing and asset management. Existing personnel would continue to staff this function.

- **Computer Operations.** This function would leverage existing staff and would continue to perform existing functions related to operations and management of the iSeries platform and related services. No additional staff are necessary to support this function.

- **Web and Enterprise Content Management.** This function was previously being performed by the Network Team. This new function would be responsible for design, implementation and management of the County's onBase document management platform. This function would also be responsible for working with departments to understand their document management and workflow needs and to work with them to implement document management in their respective department.

  This function would also be responsible for the County's intranet web platform which is currently iStafford. As the County evaluations transitioning this platform to Microsoft SharePoint, this function would be responsible for tasks related to the planning, design, implementation and support of this future state platform.

  This function would also be responsible for the management of the County's public web site, platform and related services working in conjunction with the hosting provider as well as departments within the County. The existing part-time position in the network team would be moved over to continue in this role.

  This function will require the addition of an Integration Specialist to focus on the support of these services. In addition, external contract resources would be utilized where necessary to supplement this function. This role would also backup the personnel assigned to support Media and Communication Services as detailed below.

- **Media and Communication Services.** This function will handle the planning, design, implementation and support of multi-media and video services within the organization. This will include support of multi-media and video functions in the Board Chambers as well as other rooms and locations in the County. This function will be staffed with existing personnel who would also work with the ECM function as described above.

11.2   ESTABLISH SPECIALIZATION WITHIN APPLICATION SERVICES

Information Technology continues to be challenged to provide the necessary bandwidth to achieve the necessary velocity to provide support to departments for new application implementation and to support existing applications. One of the reasons is because the existing staff is too small to support the functional areas of the organization. Many other local governments have their application team focus on a specific area such as:

- **Public Safety**
  This team would be led by the Integration Specialist Public Safety and would be responsible for the planning, design, implementation and support of public safety

systems and technology working in concert with resources in Sheriff, Fire and Rescue and Emergency Management as well as the respective vendors who supply the public safety technology.

- **Finance, Revenue and Tax Billing**
  This team would focus on the HTE, PCI and related applications and technologies which are utilized to support the finance, revenue and tax billing functions. There would be a single full-time Systems Analyst assigned to this function who would be supported and supplemented by external contract resources to support new projects and support of existing systems.

- **Community and Citizen Services**
  This team would focus on the applications and technologies which support community development functions including permitting and inspections, utility work order management, utility service requests, parks and recreation applications and other applications supporting citizen services. There would be a single full-time Systems Analyst assigned to this function who would be supported and supplemented by external contract resources to support new projects and support of existing systems.

- **Data Administration**
  Currently, administration of the County's database platforms is handled by an individual responsible for new projects and supporting existing systems. Since this is not a full-time job, Information Technology will outsource the database administration function to an external entity. This entity will work with existing full-time personnel to support new and existing application needs on an as needed basis.

Stafford County can accomplish this model utilizing existing resources in the application group while adding only one additional full-time position coupled with external contract resources in order to support greater project velocity and support existing applications. It is recommended the County add the position of Integration Specialist Public Safety. This position would focus on the planning, design, implementation and support of public safety technology and systems. This position would work in concert with positions in the Sheriff's Department, Fire and Rescue and Emergency Management.

11.3   UTILIZE ON-SITE CONTRACT RESOURCES TO HANDLE PEAKS IN PROJECT WORKLOAD
There will be situations where the project load is greater than available resources. The County and departments will then either have to wait for resources to be available or the County has the option of supplementing internal resources with contract resources. The most effective model for the County will be to include these resources which would work on-site under the direction of existing personnel as part of the implementation cost of a project. If this cost is budgeted as part of the project, it can be supported as part of the project cost instead of being seen as an increase to the IT budget.

11.4   DEVELOP SERVICE LEVEL AGREEMENTS FOR EACH DEPARTMENT

It is clear that at this point, there is some confusion with respect to roles and responsibilities between IT and departments who have their own technology resources. It will be important moving forward that IT work with these departments to develop service level agreements that clearly define roles and responsibilities. This will ensure there are no gaps in terms of the support that is needed and will ensure that everyone is on the same page with respect to expectations. This is common in many local governments, especially when it comes to public safety where there is most always resources trying to support the same applications and infrastructure in both public safety and IT.

12 Improve Upon Technology Governance

While the technology organization is a critical component of Stafford County's technology, sound governance processes provide a foundation to allow the staff to manage and support the technology environment effectively. Stafford County already has a change management process in place where changes to infrastructure and applications are logged and reviewed. While Stafford County several necessary components of technology governance in place, the following strategies are recommended to continue to further the overall governance structure.

12.1   REVIVE THE INFORMATION TECHNOLOGY LEADERSHIP TEAM

One of the recommendations from the 2008 strategic plan which was implemented was the Information Technology Leadership Team(ITLT). The purpose of this team was to involve the departments in the decision making for technology projects on a recurring basis. Unfortunately, this team has become dormant due to lack of participation. The County should re-instate this team and commit to its use and purpose. The following is a summary of the overall intent and application of this team.

All telecommunications and information technology projects meeting any of the specified criteria will be evaluated by the Information Technology Leadership Team (ITLT), which will annually provide its recommendation for consideration and use in the appropriate budget processes. In addition, as County departments determine they have specific technology needs throughout the year; these needs are brought to the Information Technology Leadership Team for evaluation. The ITLT will then establish appropriate priorities for Information Technology who is then responsible for delivery of the defined projects. The following figure provides a visual representation of the technology governance process that is recommended for initiating projects within the County.
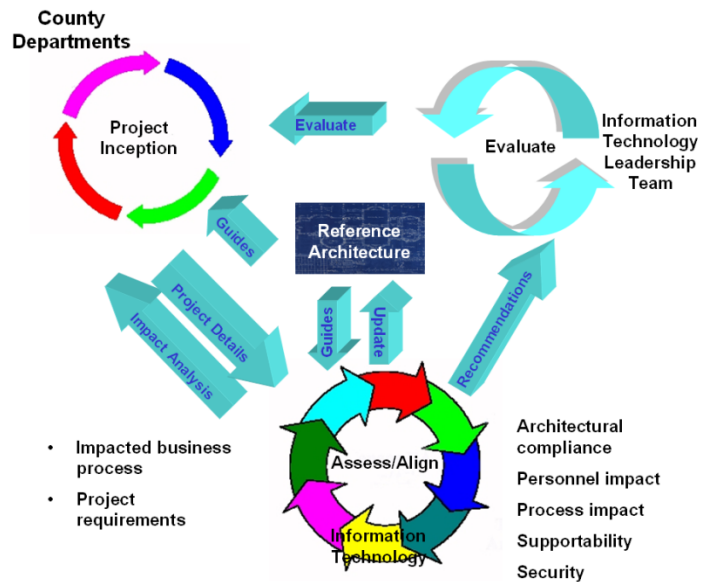
All telecommunications and information technology projects, regardless of funding source, meeting any of the following criteria are subject to this policy:

- The project's development schedule, consisting of the analysis, design, and development or acquisition (including testing) of the proposed solution, is estimated to exceed 6 months,

- The total project cost is estimated to exceed $10,000,

- The project will consist of the development, acquisition or installation of computing or telecommunications technologies not currently supported by the Information Technology Department or the user department,

- The proposed solution will be or has the potential to be used by more than one County department, OR

- The proposed solution is estimated to require additional staff to be hired to develop, acquire, or support the system.

Projects that do not meet the above criteria and cannot be accomplished with existing, budgeted resources must be submitted by the using department to the appropriate budget process.

The objectives of this policy are:

- To coordinate the advancement of the County's Information Technology Strategic Plan

- To ensure that all major investments in telecommunications and information technology are reviewed for conformance with the County's technical environment and inter-operability with existing systems;

- To identify the highest priorities County-wide for investment in telecommunications and information technology.

The following figure, provides an overview of the responsibilities related to technology governance for the County.

Roles and Responsibilities

Information Technology Leadership Team

❏ Ensure feasibility from a cost-benefit perspective

❏ Establish project priorities

❏ Assess alignment with strategy and goals

Information Technology

❏ Ensure project technology fits with County technology architecture

❏ Assess impact of project on available personnel

❏ Determine if external resources or services are necessary to support project

❏ Recommend technology to department/ITLT to meet need

❏ Implement technology solution

As this figure shows, the ITLT is responsible for determining what projects will be of greatest value for the County. These projects are then prioritized accordingly. The responsibility of the Information Technology department is then to evaluate resources, both internal and external, and evaluate the overall impact of the project on Stafford County's technology environment. In addition, the Information Technology department will identify the appropriate technology direction or decision for moving forward with implementation of the project or to advise the ITLT that the project is not appropriate in the environment based on specific criteria such as misalignment with the County technology environment.

12.2   FORMALIZE TECHNOLOGY PROJECT MANAGEMENT

Information Technology should define and implement a repeatable technology project management process which is utilized and followed for all technology projects within the County. Other local governments have implemented this type of process which ensures consistency of the process, keeps track of project schedules, resources, issues and overall status. Utilizing project sites for each project in SharePoint is one way many organizations have accomplished this. The following is an example of a project site which is used to track overall project status and progress and to manage project documents and artifacts.

5   IMPLEMENTATION PLAN

This section of the plan provides a summary of the implementation plan. The following plan matches the goals and strategies which were identified in the previous section and includes an estimate of costs as well as a projected implementation timeframe in terms of the fiscal year in which the strategy will be targeted for implementation. It should be noted these costs are estimates and should be validated as each strategy is embarked upon. Detailed tasks for each strategy are contained in separate detailed implementation plan.

The following table provides a summary of costs by fiscal year.

Fiscal Year	Capital Cost	Expense Cost	Yearly Recurring Cost
2015	86,832	60,760	100,528
2016	97,869	0	125,828
2017	503,050	0	238,303
2018	73,701	7,200	0
TOTALS	**761,452**	**67,960**	**464,659**

The following table provides a detail of costs for each goal and strategy.

Goal	Strategy	Fiscal Year	Capital Cost	Expense Cost	Yearly Recurring Cost
PROVIDE TECHNOLOGY VISION AND LEADERSHIP INSIDE AND OUT			**50,000**	**55,000**	**100,000**
1.1	*Establish Chief Technology Officer(CTO) Role*	2015	*0*	*0*	*100,000*
1.2	*Adopt Strategic Planning 365 Model*	2015	*0*	*5,000*	*0*
1.3	*Establish Budget for Technology Evaluation and Proof of Concept*	2015	*50,000*	*50,000*	*0*
IMPROVE DIGITAL SERVICES FOR CITIZENS			**44,000**	**0**	**5,000**
2.1	*Refresh the Public Web Site*	2016	*0*	*0*	*0*
2.2	*Use Video to Improve Customer Service*	2016	*5,000*	*0*	*0*
2.3	*Implement Video to Enhance Citizen Interaction*	2016	*0*	*0*	*5,000*
2.4	*Establish a Common Vision and Portal for Online Citizen Services*	2017	*0*	*0*	*0*
2.5	*Implement Electronic Displays to Enhance Citizen Communication*	2017	*39,000*	*0*	*0*
ESTABLISH AND IMPLEMENT A CONTEMPORARY END USER DEVICE STRATEGY			**23,454**	**5,760**	**17,850**
3.1	*Classify and Define Requirements for the Different Types of Users*	2015	*0*	*0*	*0*
3.2	*Define a User Interface and Operating System Strategy*	2015	*0*	*0*	*0*
3.3	*Define the User Computing Strategy for the Desktop Worker*	2015	*10,454*	*5,760*	
3.4	*Define the User Computing Strategy for the Hybrid Worker*	2015	*3,000*	*0*	*0*
3.5	*Define the User Computing Strategy for the Mobile and Public Safety Worker*	2015	*10,000*	*0*	*0*

Goal	Strategy	Fiscal Year	Capital Cost	Expense Cost	Yearly Recurring Cost
3.6	*Select and Implement an Enterprise Mobility Management Solution*	*2016*	*0*	*0*	*17,850*
FOCUS ON MOBILITY TO IMPROVE CUSTOMER SERVICE, EFFICIENCY AND PUBLIC SAFETY			**37,690**	**7,200**	**3,900**
4.1	*Implement a Standard Mobile Communication Architecture*	*2016*	*37,690*	*0*	*3,900*
4.2	*Complete Implementation of Hansen Mobile to Support Building Inspections*	*2016*	*0*	*0*	*0*
4.3	*Monitor Availability of Hansen Mobile*	*2017*	*0*	*0*	*0*
4.4	*Evaluate Options to Mobilize Utility Service Orders*	*2018*	*0*	*7,200*	*0*
ESTABLISH AND IMPLEMENT SERVICES TO SUPPORT THE MOBILE WORKSPACE			**90,050**	**0**	**98,771**
5.1	*Implement Office 365 as an Enterprise Workspace Service*	*2017*	*0*	*0*	*86,753*
5.2	*Implement Citrix ShareFile for Enterprise File Sharing*	*2017*	*64,050*	*0*	*11,550*
5.3	*Implement Cisco WebEx to Support Enterprise Video Collaboration*	*2015*	*0*	*0*	*468*
5.4	*Implement Cisco IP Communicator to Support Unified Desktop Communications*	*2016*	*26,000*	*0*	*0*
ENHANCE THE NETWORK TO SUPPORT MOBILITY AND FUTURE SURVIVABILITY			**441,579**	**0**	**5,478**
6.1	*Diversify WAN Routers to Provide for Communication Redundancy*	*2015*	*0*	*0*	*0*
6.2	*Improve Connection Speed for Remote Sites*	*2015*	*12,400*	*0*	*0*
6.3	*Replace Distribution and Access Switches to Support High Speed Access*	*2017*	*400,000*	*0*	*0*
6.4	*Implement Enterprise Wireless to Support Mobility*	*2016*	*29,179*	*0*	*5,478*
IMPLEMENT TECHNOLOGY TO SUPPORT PROACTIVE MONITORING AND MANAGEMENT			**978**	**0**	**60**
7.1	*Implement Technology to Proactively Monitoring the Computer Rooms*	*2015*	*978*	*0*	*0*
7.2	*Implement Proactive Monitoring of Network Infrastructure and Services*	*2015*	*0*	*0*	*0*
7.3	*Implement Proactive Monitoring of Applications*	*2015*	*0*	*0*	*0*
7.4	*Improve Ability to Manage External Domain Name Services(DNS)*	*2015*	*0*	*0*	*60*
IMPLEMENT ENTERPRISE CONTENT MANAGEMENT AND COLLABORATION STRATEGY			**73,701**	**0**	**0**
8.1	*Establish a Long Term Strategy for Document Imaging*	*2016*	*0*	*0*	*0*
8.2	*Replace iStafford with Microsoft SharePoint Platform*	*2018*	*73,701*	*0*	*0*
IMPROVE PHYSICAL AND INFORMATION SECURITY			**0**	**0**	**0**
9.1	*Standardize Enterprise Video Surveillance Platform*	*2018*	*0*	*0*	*0*
9.2	*Evaluate Existing Infrastructure to Ensure Compliance with CJIS Requirements*	*2015*	*0*	*0*	*0*
SHRINK THE PHYSICAL SERVER FOOTPRINT AND IMPROVE DISASTER RESILIENCE			**0**	**0**	**0**
10.1	*Consolidate County and Schools iSeries Platforms*	*2018*	*0*	*0*	*0*
10.2	*Escalate Server Virtualization*	*2015*	*0*	*0*	*0*
ORGANIZE TO FOSTER SUCCESS			**0**	**0**	**233,600**
11.1	*Establish Technical Services Team and Technical Services Manager Position*	*2016*	*0*	*0*	*93,600*
11.2	*Establish Specialization within Application Services*	*2017*	*0*	*0*	*140,000*
11.3	*Utilize On-Site Contract Resources to Handle Peaks in Project Workload*	*2015*	*0*	*0*	*0*
11.4	*Develop Service Level Agreements for Each Department*	*2016*	*0*	*0*	*0*
IMPROVE UPON TECHNOLOGY GOVERNANCE			**0**	**0**	**0**

Goal	Strategy	Fiscal Year	Capital Cost	Expense Cost	Yearly Recurring Cost
12.1	Revive the Information Technology Leadership Team	2015	0	0	0
12.2	Formalize Technology Project Management	2015	0	0	0
	TOTAL		761,452	67,960	464,659