SECTION 2

STRATEGIC DIRECTIONS AND INITIATIVES

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FEATURED IN THIS SECTION

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The most critical challenge facing organizations today is the imperative to stay current with the rapid pace of change in technology, harnessing innovation that delivers immediate return on investment effectively to realize the organization's strategic goals, optimize service efficiencies, and successfully meet end-user and public expectations in an environment of new fiscal challenges. As a strategic investment of County resources, technology facilitates the delivery of better and faster service and enables the County to effectively respond to growing demand at optimal cost and efficiency, thus critical to ensure investment strategies are in place, balanced and fluid. However, investments in technology can be significant, including capital, initial transformation and incorporation of technology into an organization's business, and sustainment. Without capital expenditures, capabilities can also be enabled through annual operational cost models, such as with technology 'clouds', subscription services, and other infrastructure or software-as-a-service business offerings. However acquired, new technology must be wisely adopted and carefully integrated into the organization's technology and business architecture for optimal impact.

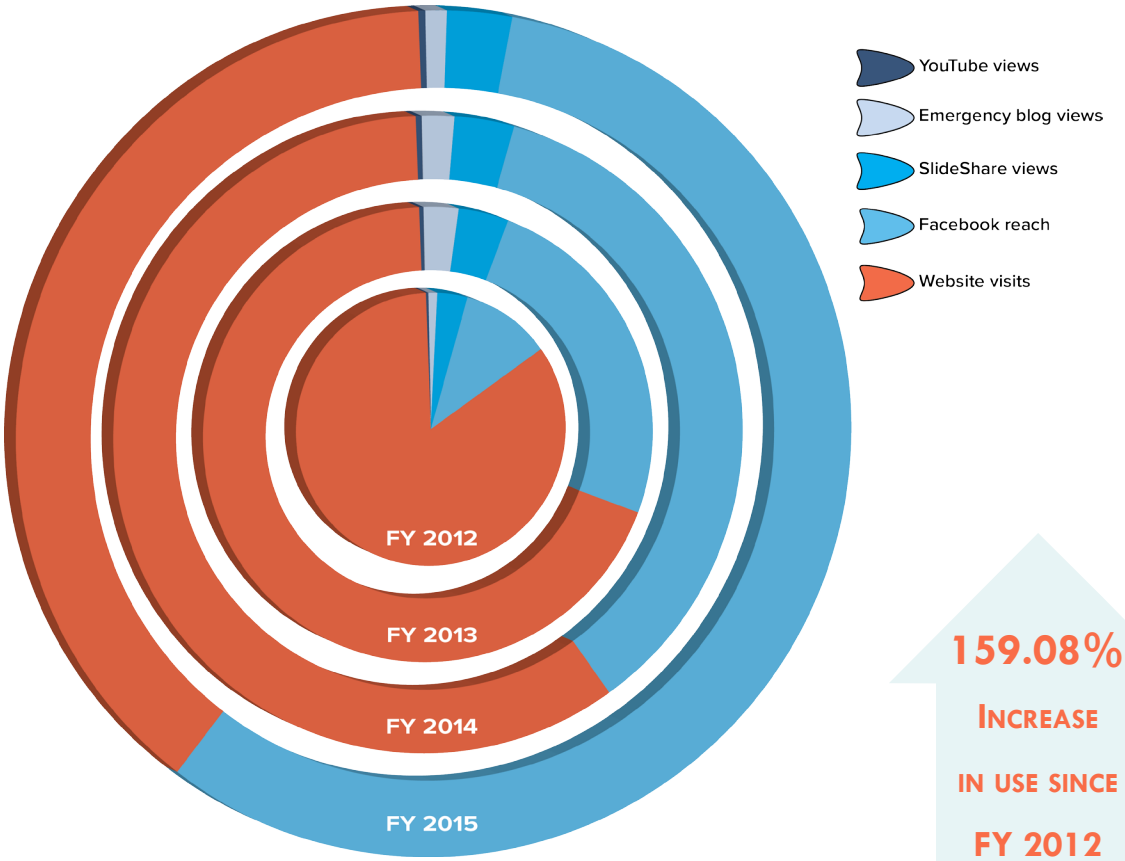
The Fairfax County technology strategy incorporates a thoughtful plan for investments at optimal time and delivery. This has contributed to the County's ability to keep pace with growing demands for services and promoted agility in facilitating response to evolving new needs and opportunities. Additionally, this strategy has helped the County address new economic realities, provide improved communication, information and open government for public engagement, leverage the overall technology portfolio and capabilities on an enterprise scale that meets the diverse needs of a wide variety of operational needs. The following key initiatives are part of the overall strategy and living portfolio of strategic opportunities and objectives on an enterprise scale designed to optimize effective, efficient and customer-oriented services for internal government and constituent engagement.

2.1 Digital Government/e-Government

The e-Government (e-Gov) initiative is a foundational program supporting the County's goal of a "government without walls, doors, or clocks", consisting of many channels, policies and processes that integrate all platforms, both for internet as well as intranet. The strategy includes initiatives for expanding channels using new media capabilities and improving mobility, and citizen engagement and experience. The comprehensive strategy includes an inclusive set of channels, using enabling technology, policy and processes and the technical foundation for the County's open government and transparency goals, as well as enabling County agencies' operational efficiencies goals and mobile workforce, emergency management and Continuity of Operations Plans (COOP). The e-Gov program develops the architecture for the WEB, other public channels and internal WEB portals, and includes the website www.FairfaxCounty.gov, online services, mobile, social media, web-based applications, Interactive Voice Response (IVR), Cable TV, the County's Public Access sites in

Libraries and Access Fairfax sites, and other tools across all agencies to enable comprehensive and cohesive access to County information and services that span over fifty agencies. In addition to efforts of on-going improvements to enhance the look, feel, navigation, and search capabilities of the Web and deploying new services, transactions, social media and other content, the strategy also includes CRM and Content Management tools for comprehensive, integrated service options.

A governance body, the e-Gov Steering Committee (see Section One) develops strategy and goals for this program. Popularity and use of the e-Gov capabilities continues to expand. Here's a sampling of significant stats as provided in the FY 2017 proposed budget:



159.08%
INCREASE IN USE SINCE FY 2012

	FY 2012	FY 2013	FY 2014	FY 2015
YouTube Views	99,131	118,350	159,919	225,120
Emergency Blog	171,374	647,577	499,967	349,977
SlideShare Views	686,062	965,798	1,029,807	1,209,467
Facebook Reach	2,088,750	6,560,341	11,603,306	28,313,758
Website Visits	15,946,100	17,911,663	19,252,748	19,105,379
TOTALS	18,991,417	29,877,327	35,303,599	49,203,701

The County has achieved much success and acclaim for its e-government focus in integrating the WEB and IVR platforms that offer a wide variety of channels for complete online public access capabilities to services and programs, and incorporation of social media capabilities in a thoughtful way that enhances service needs. Fairfax County and the city of Alexandria shared the Virginia Coalition for Open Government's Freedom of Information Award in the government category. Fairfax County was recognized for its efforts to engage the public as a regular part of the budget development process which includes extensive outreach through the use of social media platforms which received national recognition by Public Technology Incorporated (PTI). In over ten years, Fairfax County continued to be ranked in the top ten localities nationally, and received national recognition from the Center for Digital Government in the top 3 among its size in the nation-wide 2013 Digital Counties Survey competition.

Over twenty-five County agencies have deployed a variety of Social and New Media apps to support their constituent programs and services. In FY 2016 and FY 2017, the County will continue to add new online services, enhance County mobile apps, integrate with social media even more, redesign and work on re-engineering information presentation on the public website. The e-Gov program will also continue to work with the Commonwealth of Virginia, regional partner municipalities, and federal government agencies in interoperability of common service portals and developing web service standards to enable cooperative access and seamless integration of information and services regardless of the origin or the source.

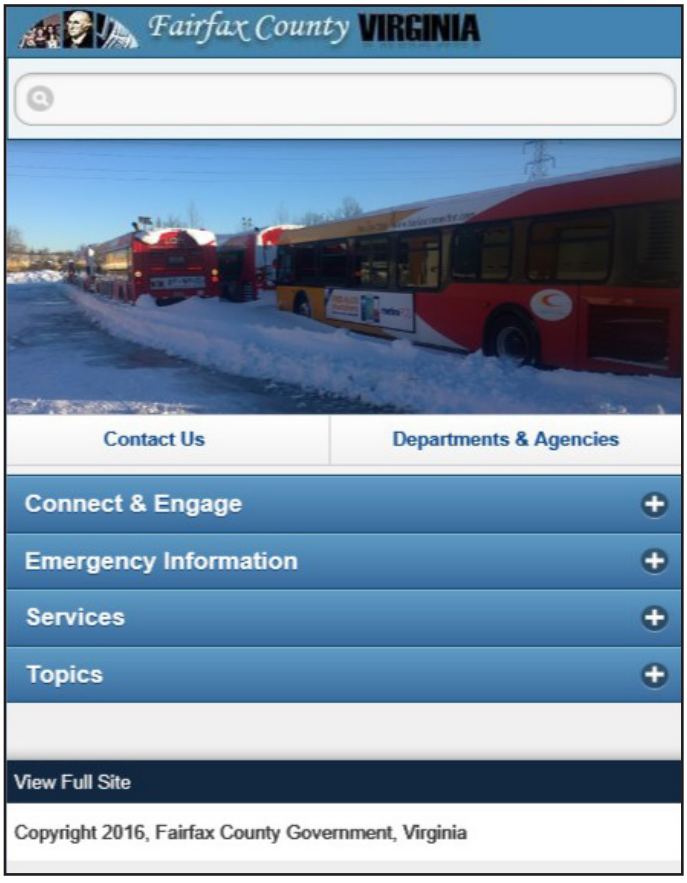
Website

The current family of homepages on the County's primary website at www.FairfaxCounty.gov uses responsive design to render seamless information across three device types: desktop, tablet and mobile. Design considerations included highlights of the key services the public is looking for online along of a pictorial representation of the County activities which was based on analysis of years of captured metrics. The most accessed services are featured prominently and easily available on the top in the "Find, Pay, Report" section of the homepage, based on the current website usage and metrics. Periodically a comprehensive review is conducted of the Website for redesign potential to update the look, navigation and over-all usability of the 34,000 page site with new functionality, content enhancements, and innovative features. The Website and CRM solutions are part of the County's overall service improvement and customer engagement enhancement initiatives and support the goals of cross-agencies' services integration and improvements projects such as in land development and social services.

Fairfax County Website

As metrics show, more than half of the traffic to www.FairfaxCounty.gov comes from search, so e-Gov will continue to invest in this important aspect, both for the County's search appliance and to optimize web content so commercial search engines find County content. A highlighted news section provides easy access to information categorized by topics and brings into focus County functions, departments and agencies, County-wide initiatives and featured services. The Google Search Appliance augmented the overall search functionality of the website. The design won national recognition for being 'Best of the WEB' by the Center for Digital Communities. In addition to the benefits for on-line services efficiency, the public website is also a part of the County's "Going Green Initiatives". The County website is also being translated into multiple languages using machine translation powered by Google Translate. For website accessibility, website pages are tested for compliance with Section 508 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) by passing through the County's automated compliance checking tool. The e-Gov team's Web Content Review program began in early 2014 to take a fresh, systematic look at significant agency pages on the public website.

While initial e-Gov efforts were largely focused on providing access to services, Fairfax County is expanding its efforts to provide citizens the necessary tools for engagement, interaction and participation with County government in order to improve communication and services (Citizen-to-Government Networking) and greater transparency. The County's website has been one of several channels used for public input into the County's budget planning process. Fairfax County's "Online Services" is a centralized location for access to over fifty online and interactive services offered to the public to complete routine transactions such as payments, applications, and reporting with ease. In FY 2014, the County augmented its online services portfolio with number key services like online Courtroom Reservation, enhancements to Building Permits application, and Financial Transparency – a joint initiative with Fairfax County Public Schools which provides transparency to the public for both County government and public schools on their respective websites as well as on all mobile devices to view budget & expenditure data and specific vendor payments thereby promoting open disclosure.



Fairfax County main page iPhone view

In FY 2016 and FY 2017, e-Gov will continue to affirm the County's strategic vision and goals, with continual enhancement of services and focus on improving online service delivery along with coordinated process for implementation and to keep in alignment with the Customer Service and Engagement efforts. Focused efforts on re-architecting information, modifying layout and presentation

of content on the County website will continue to be of prominence. Emphasis will be placed on providing information based on topics key to the public, which will be based on metrics and usage patterns of the website. Staff intends to update and refresh County apps with the latest features of software developer kits and County content.

Fairfax County main page tablet view

Mobile

Acknowledging the widespread growth of mobile technology which added convenience of using mobile devices from anywhere at any time, a mobile version of the County website was launched. FY 2012, Fairfax County increased the value of its e-Government efforts with the add-on of mobile apps for all platforms like iPhone/iPad, Android and Blackberry for free downloads. Providing mobile accessibility from various devices further enhances citizens' convenience and reaches a wider user community with the ability to access services and information in the palm of their hands. The County expanded offerings in mobile access by making the County's public website accessible via wireless devices www.FairfaxCounty.gov/mobile which enabled citizens to interact with County government through personal wireless devices. Samples of the mobile apps deployed include:

- **Alerts -** Offers the latest updates about major incidents or weather events including text/e-mail alerts, social media, emergency RSS news feed, important phone numbers, seasonal preparedness information, recovery resources, mobile weather forecast, and links to Key County, state and federal emergency agencies.
- **NewsWire -** Each business day, the Fairfax County *NewsWire* features the latest headlines from County departments.
- **Contact Us -** One-touch calling of our main 703-Fairfax phone number, critical emergency phone numbers, libraries, parks, courts and by department/program.
- **Calendars -** Browse upcoming public meetings, community events, tax deadlines and more.
- **Library -** Patrons can browse the online catalog, get hours, locations, check reviews, place holds for pick up, modify hold requests, check account status, and renew material. Additionally, the library also has a native iPhone application.
- **Locations -** Use the GPS features of your device to find the nearest library, park, community center, fire station, police station and government buildings.
- **Services -** Key services like Childcare Central and FIDO (building permits, applications and complaints) applications. Additional service related applications are in development.

- **Social Media -** Links to the mobile versions of all official County government social media sites on Facebook, Twitter, YouTube, Flickr and podcasts on iTunes. Like us, follow us, watch a video, view pictures or listen to podcasts on iTunes through our coordinated social media efforts.
- **Elected Officials -** Quick access to the ten member Board of Supervisors with links to mobile versions of Board offices' web pages, meeting schedules, agendas and more.
- **Transportation -** Key links to major transportation resources such as the Connector bus, Metro, VRE, bikes, pedestrians, Virginia Department of Transportation and more.
- **VOTE -** Check voting places for the Office of the Registrar to include on-going enhancements.
- **Car-Tax -** Allows tax payments via e-checks, credit and debit transactions.
- **Tax Evaders -** Allows residents to report vehicles that may not be compliant with tax regulations.

The County's suite of mobile apps, "Government in the Palm of Your Hands", was showcased at the Metropolitan Washington Council of Governments (MWCOG), and won awards from the Commonwealth of Virginia IT Symposium (COVITS), from Public Technologies Inc., and was also recognized by the Center for Digital Government- Digital Counties Survey. Information about the County's Mobile Apps can be accessed on the County's website: http://www.FairfaxCounty.gov/news/mobile/. The Fairfax County Mobile App has been downloaded about 22,000 times since its launch.

News

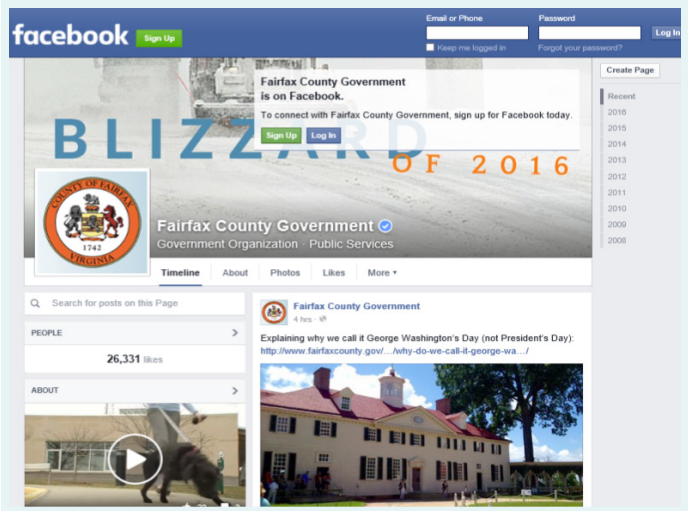
NewsCenter (http://www.FairfaxCounty.gov/news2/) is the County's one-stop news shop, which focuses on the delivery of news and information to the public: residents, businesses and other interested groups. NewsWire is a comprehensive site, that consolidates all the ways residents and employees can stay connected with the County, including: the social networking sites, information available on 703-Fairfax, E-Government services, podcasts, RSS feeds, Weekly Agenda and emergency alerts. NewsCenter is published on the website, and provides a central location for engagement and communication with the community and its residents.

NewsCenter

Ask Fairfax is an online discussion forum that has hosted hundreds of questions through the years for dozens of chat topics with County experts. This has proved to be an invaluable tool for engaging the community.

Social Media

Social media in Fairfax County has been a significant success to engage and provide services. The County currently has 15 Facebook Pages, which reached 28.3 million people in FY 2015, a 144 percent increase from FY 2014. The number of County Twitter followers has more than doubled in the last 15 months across 10 County accounts with an increase of 59.6% in Twitter impressions. The use of these tools is critical to providing two-way information with the County community. A centralized social media content management system is in place, along with a comprehensive social media policy that can be found at:



Facebook

www.FairfaxCounty.gov/opa/Fairfax-County-social-media-policy.pdf.

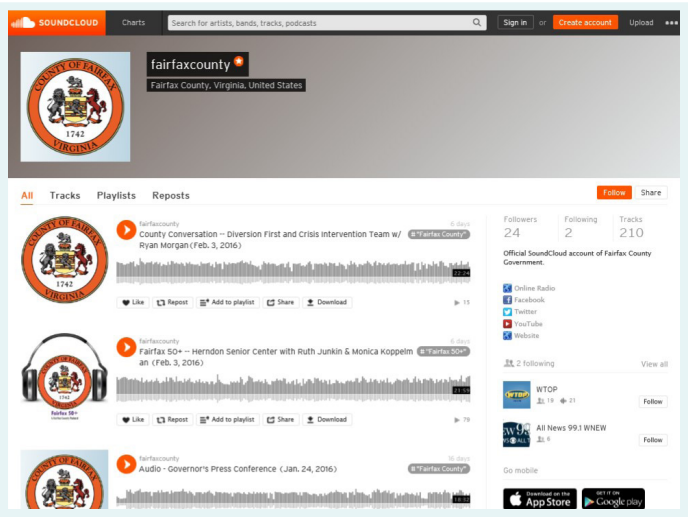
Twitter

The social media management system's user interface takes the form of a dashboard, and supports social network integrations for various social networks like Facebook, Twitter, YouTube etc. This system has helped build an engaging presence on social media with the ability to manage all our social networks and schedule messages for future publishing. Additionally, the real time analytics provided by this tool gives an in-depth view on the dashboard of how well the County's social media efforts are being received by the public with the ability to visualize the metrics in one easy place. The tool also helps monitor social media conversations that matter to the County, identify its influences and observe emerging trends.

In coming fiscal years, the use of social media beyond communications will be important. The e-Gov plan will further integrate social media into operational aspects of agency lines of business to ensure cross-platform sharing as needed. Social media tools will continue to evolve as the leading e-Gov tools of choice in the years to come.

Audio

In FY 2014, Fairfax County launched a new Internet streaming radio station simply named Fairfax County Government Radio. It is hoped that one day the County will fulfill the complete audio vision of public information by fully utilizing the 1670 AM radio spectrum. The County currently owns and produces even more audio content for the County's SoundCloud social media account. The public can listen online (http://www.FairfaxCounty.gov/radio/) as well as on mobile devices, meaning access 24 hours a day, seven days a week.



SoundCloud

During emergencies, the station will be used to share important emergency information in an audio format, the same way the County currently uses other platforms such as the emergency alert system (https://www.FairfaxCounty.gov/cean/) where residents can sign up to receive emergency alerts by both text and e-mail.

Video

The use of videos has continued to expand beyond the County's existing cable TV channel. Fairfax County YouTube channel views grew by 40.77% in FY 2015 and videos for the intranet have led to greater engagement among employees.

Customers Served	
IVR:	5 million since FY 2005
Web:	34,000 pages – 19,105,370 visitors which equates to 60,357,534 page views
Unique visits:	13,322,116 i.e. user access multiple pages or conduct business
E-services:	125

Information and Services Available	
Adult education classes	Web
Becoming a child-care provider	Web
Board Meeting minutes (searchable)	Web
Budget information and approved budget	Web
Bus tour schedule	Web
Child-care provider list	Web

Information and Services Available	
Collection of household trash & recyclables	IVR
County Code – full text	Web
County demographics	Web
County maps, scrollable, printable	Web
Courts – Circuit, General District, and Juvenile	Web, IVR
Crime statistics, Wanted List, Neighborhood Watch	Web
DTA EPay	Web
iCARE DTA Real Estate Assessment and Information Query	Web
Library Picture Books	Web
Public Meeting Calendar	Web
Fire & Rescue Media Information	IVR
Frequently Asked Questions	Web
Health Information	Web, IVR
Inspection scheduling	Web
Information for victims of crime	IVR
Job opportunities	Web
Library information line	IVR
Multi-jurisdictional information	Web
My Neighborhood	Web
Newcomer information	Web, IVR
Parks/Recreation information	Web, IVR
Public safety information	Web, IVR
Podcasting	Web
Real estate property assessment & tax information	Web, IVR
RSS Feeds	Web
Seniors information and programs	Web, IVR

Doing Business with the County	
Access Health Department food inspections database	Web
Access GIS aerial photography with pan and zoom	Web
Apply for building permit (pay and print	Web
Apply for County jobs	Web
Apply for a library card	Web
Athletic Facilities Application Request (AFAR)	Web
Board of Supervisors compliant forms	Web
Building Permit Fees Estimate	Web
Download request for proposal/invitation for bid	Web
Electronic Mailing List	Web

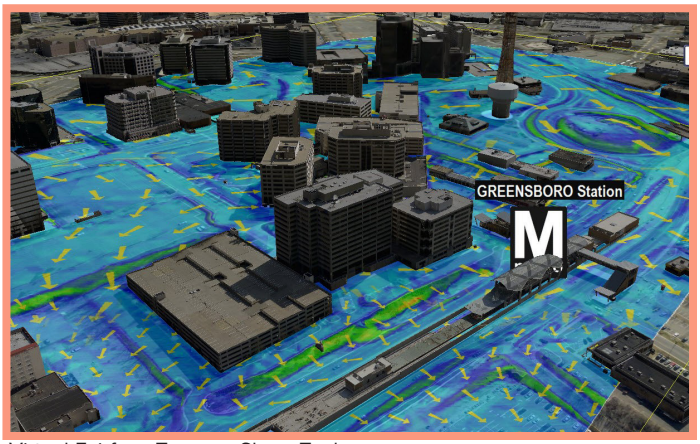
Doing Business with the County	
Estimate Electrical Permit Fee	Web
File complaints about landlord or consumer problems	Web
Find location of closest Library by entering zip code	Web
Register & pay for Park Authority classes, camps, & tours	Web, IVR
Library Audio Books	Web
Obtain permit/plan status	Web, IVR
Pay taxes with credit card	Web
Pay taxes via eCheck	Web
Pay traffic tickets with credit card	IVR
Query current site information	Web
Query current position on the Housing Waiting Lis	IVR
Query current real estate property & tax information	Web, IVR
Query Human Services online " Resource Guide"	Web
Query specific court case information	IVR
Query status of an inspection, permit, or plan	Web, IVR
Query Victim Services data for offender release date info	IVR
Register a vehicle	Web
Renew a pool license	Web
Request faxes of court fees and procedures	IVR
Request land use code enforcement	Web
Reserve a golf tee time	Web
Reserve/renew Library books – search catalogue	Web
Reserve a picnic area	Web
Report change of address for tax purposes	Web
Report a lost pet	Web
Report a zoning or noise ordinance violation	Web, IVR
Search for information in historical newspaper	Web
Search for County agency telephone numbers by keyword	IVR
Special Needs Registry	Web
Sheriff Service Civil Process	Web
Subscribe to County publications	Web
Social Needs Registry	Web
Volunteer to help in the Library or Parks	Web
Zoning and Noise ordinance compliant form	Web

2.2 Geographic Information Systems (GIS)

GIS is a strategic foundational technology, integrated with numerous County applications and business processes. It is an essential component of County operations and is heavily used by a wide range of County agencies (some of those activities are highlighted at the end).

The GIS office maintains a range of technologies, related products and data that provide the foundation for ongoing integration of GIS into County operations as well as enabling new developments.

Web-based GIS applications have become more pervasive over the past several years, with 2015 seeing a continuing increase in utilization on the County's web site as well as in field operations. One example is the election results viewer. The application has been used since its release in November of 2014 to display ongoing vote tallies through the evening of Election Day. A revamped Virtual Fairfax was released in 2016. The area of the County that now has 3-D building data more than doubled to a total of 58.74 sq. km (22.7 sq. miles). The imagery (from 2015) includes 3-D of Metro in Tysons. The latest version provides a range of new analytical tools, enabling users to create slope maps (slope with directional arrows) terrain profiles and 3-D view shed, as well as measure distances, areas, and elevations among other features offered. The latest version also enables users to link to the Police Incident Viewer, the Land Use Data Warehouse, in addition to My Neighborhood, Property Assessment – ICARE- and LDSNet.



Virtual Fairfax - Tysons - Slope Tool

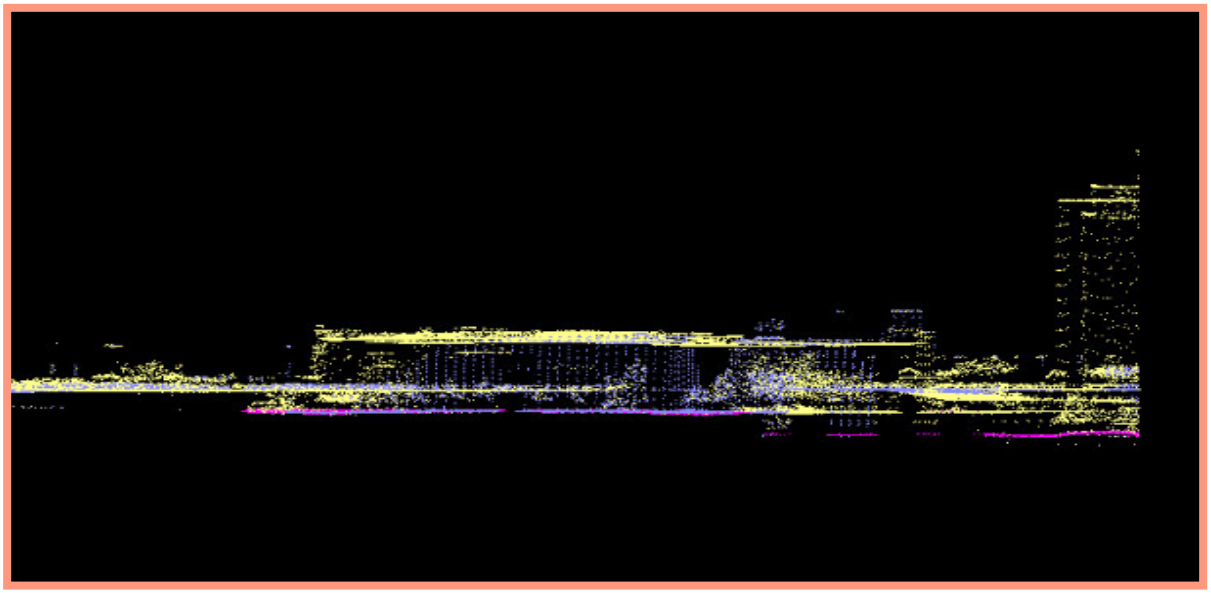
As County agencies continue to switch from Blackberry to iOS devices, deployment of field data collection applications becomes much easier to do than before. The Park Authority, Urban Forestry, and the Fire and Rescue department are using mobile applications to collect information on invasive species, trail erosion, and fire hydrant location. Other agencies, such as Public Health Department are considering using mobile data collection in some of their business processes.

The GIS Office released a GeoPortal page on the County web-site that is a single location to access the growing number of GIS enabled web-applications available for use. As of January 2015, thirty-five applications are available to constituents. The most recent application is the address/parcel/street "Validator" which enables users to confirm the validity of any address/parcel number.

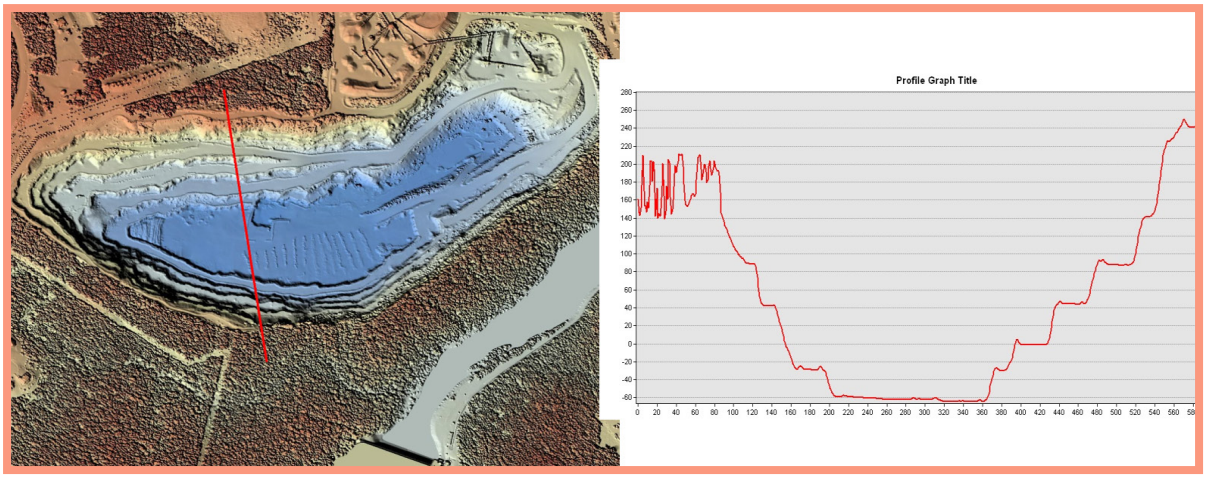
In 2015 the County took delivery of LIDAR for the entire County. Obtained in partnership with the US Geological Survey and the Department of Public Works and Environmental Services, this immensely detailed data set contains over 9,000,000,000 data points (250 GB of data), approximately 6 per sq. yard, that provide elevation data on the entire County surface,

including, trees, terrain, and the built environment. The first Picture below shows a side view of LIDAR returns in Tysons. The second set of LIDAR images in shows the Quarry next to Occoquan dam with a profile line drawn through it. The second image shows the elevation profile of the quarry across the red profile line. All of the data are from LIDAR. It will be highly useful for surface water modelling and analysis.

Oblique imagery and its related software is another core data set and technology for GIS and the County. Originally implemented in 2003 with GIS support, it has become a key tool for multiple County agencies. Oblique imagery is integrated into CAD/911 operations, Department of Tax Administration, Geographic Exploration & Mapping (GEM) and many others. It also serves as the source of the data used to construct the 3-D buildings in Virtual Fairfax. The oblique imagery acquisition under the contract was delivered the summer of 2015, the next acquisition is scheduled for 2017. Below is also an example of oblique imagery of the Reston town center. Note the view of the side of the buildings.



Tysons LIDAR side view.



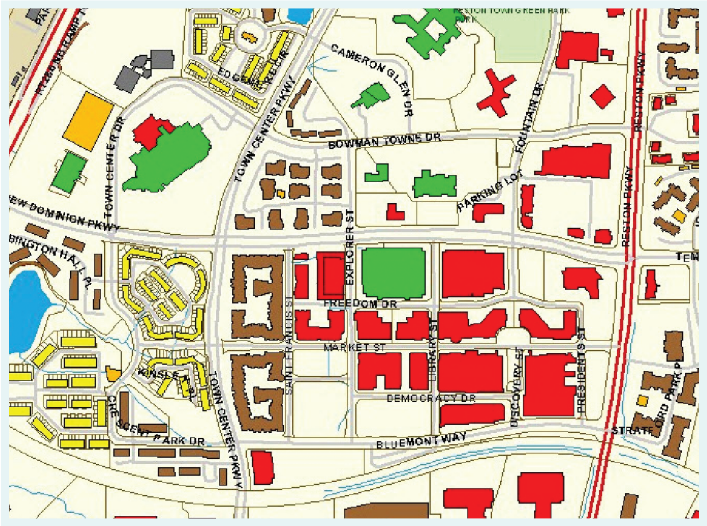
Quarry next to Occoquan Damm and elevation profile of the quarry across the red line.

Web-based tools were implemented to simplify viewing and use of the oblique imagery for County staff. These tools are simpler and available on desktop and mobile. Plans are underway to enable public web-users to view the oblique imagery as well.

Oblique image of Reston Town Center.

Planimetric data is another foundational data set for almost all County applications including Police and Fire and Rescue vehicles, various desktop applications, and various County mobile applications. The planimetric data update was jointly funded and completed through a partnership with the Department of Public Works and Environmental Services. The work significantly expanded the planimetric features in the GIS data warehouse: over 13 million new planimetric features were added to the GIS planimetric data – an increase of over 400%. GIS is now working with DPWES to determine the optimum refresh cycle and funding approaches. The plan is to commence an update of the planimetric data based on the 2017 imagery.

Accurate planimetric data depends on having high resolution and high accuracy ortho imagery. The County partners with the state every four years to purchase new ortho imagery for the County. The partnership significantly lowers the cost of the imagery. That imagery is used on the web and as a foundation for all of the GIS data layers since they can be easily overlaid on the imagery as well as be derived from the imagery. 2017 will be the next acquisition year, based on the four year refresh cycle.

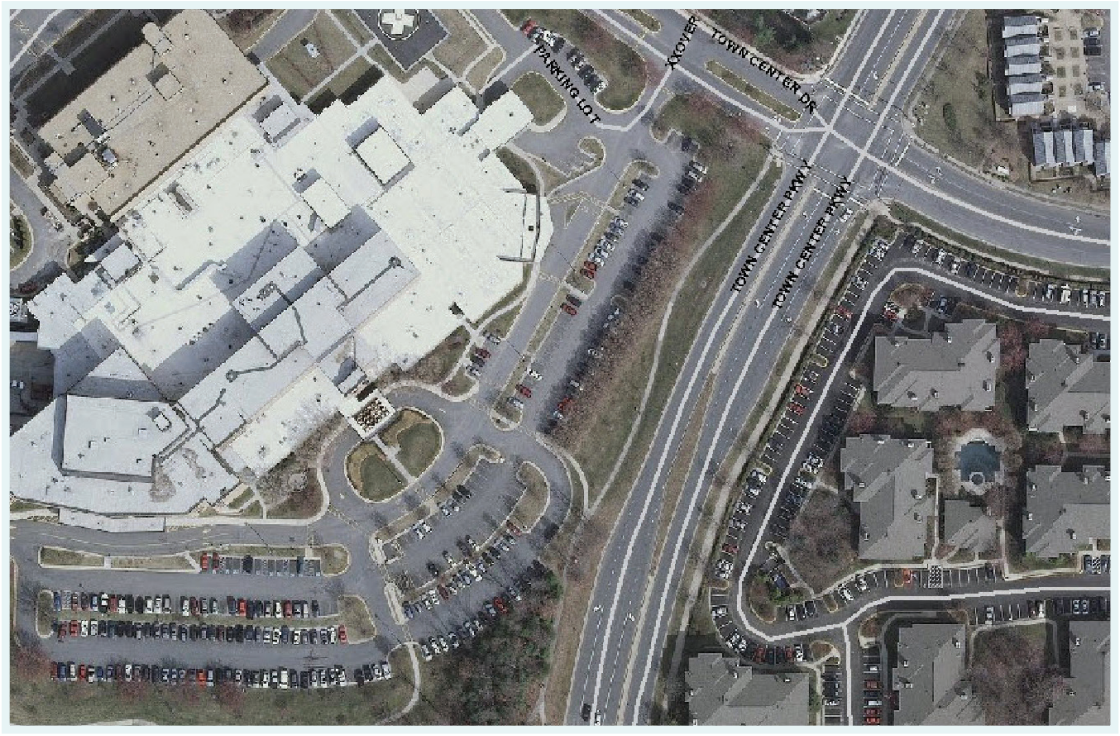


Planimetric Data for Reston Town Center. Buildings colored by zoning.

Addresses are essential to almost all County operations. The GIS office collaborated with other County agencies to bring the Master Address Repository online in 2004. GIS

maintains much of the data in the system on a daily basis. The Master Address Repository (MAR) project has proved to be invaluable for the CAD/911 system as well as other key County systems such as FIDO, LDS and iCARE. The MAR is the authoritative source of parcel (sites) addresses in the County essential for effective operation of the CAD/911 system.

Interoperability is a significant and ongoing strategic activity for GIS, both within Northern Virginia and regionally through the Washington Council of Governments (COG). Interoperability across National Capital Region (COG) and with the Federal government for emergency response purposes is also crucial. Fairfax is a member of the COG GIS Executive Committee and has helped guide the development and implementation of the National Capital Region Geospatial Data Exchange through its membership in the project's executive committee and project management. The project went live in spring 2012 and a revision of the software was released in August 2014. The system integrates with the federally funded Virtual USA network and provides a convenient tool to enable fast exchange of geospatial data to registered users of the system. It was a valuable asset for interagency collaboration for the presidential inauguration in January 2013 – enabling sharing of much more spatial data among federal and local agencies than was possible in the 2008 elections. NCR GDX was successfully used in the 2015 World Police and Fire Games, which were held across the region. Plans are underway in Northern Virginia and the Washington Council of Governments to include regional data sharing (via NCR GDX) as part of emergency training and drills.



Example of orthoimagery of the Reston Hospital area. Note the straight down view.

Interoperability is crucial in Northern Virginia as emergency response regularly crosses jurisdictional boundaries. Access to accurate street centerline data is particularly important to the Fire and Rescue personnel who may have to cross jurisdictional boundary lines when responding to an incident. Emergency Response today regularly involves units from neighboring jurisdictions responding to each other's events. This speeds response time since there are a number of locations where the neighboring jurisdiction's fire station or equipment in route is closer to the event. The GIS office maintains Fairfax's street centerline data used in the CAD/911 system, it is working to obtain similar data for the neighboring jurisdictions. The Regional Routable Centerline project has been an important and ongoing project enabling centerline data sharing for the CAD/911 system. The Regional Routable Centerline project was funded by a grant from the State's Wireless 911 Board. The project enables Fairfax County and neighboring jurisdictions to share up-to-date centerline data for their CAD systems, and enables member jurisdictions (Loudoun, Prince William and Arlington counties and the cities of Alexandria and Fairfax) to share routable centerline data with Fairfax County. This regional effort also supports the statewide routable centerline data set. This initiative not only benefits CAD/911 implementations state-wide, but other business processes that need routable data.

GIS support for the CAD/911 system is a core GIS office responsibility, involving data maintenance requirements which continue to be a significant effort. Maintenance of the CAD GIS data is carried out daily.

Next Gen 911 is a total re-engineering of the underlying operation of 911 emergency call routing by moving it to an internet based system. The National Capital Region is rapidly moving to NextGen 911 due to its features and the impending end of life of the legacy 911 telco hardware in the NCR. GIS is the foundation of Next Gen 911 call routing. The service depends on having accurate seamless road centerline and jurisdictional boundary data. Fairfax and its neighbors are in excellent position to transition to Next Gen 911 due to the regional routable centerline – which developed a seamless, dataset. Changes will need to be made to the data for use in NextGen 911 data model and requirements and some clean-up will be needed too, but the region is well down the path of having its GIS data ready when Next Gen 911 goes live in the next several years.

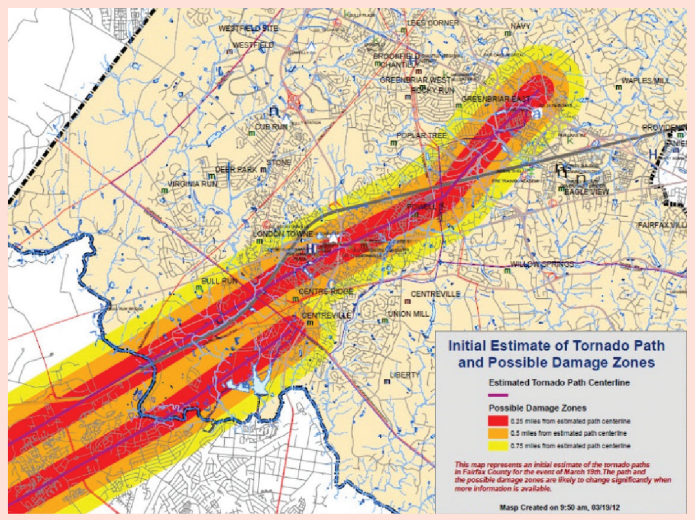
The County's GEM application was be completely revised and re-implemented in a new software platform.

The Digital Map Viewer (http://www.FairfaxCounty.gov/gisapps/pdfViewer/default.htm), a heavily used application, was completely rewritten and was released in 2012.

Over the past years there have been a number of examples of the importance of GIS technology to County operations. GIS participated in the Derecho, Hurricane Sandy and the Inauguration – each one requiring extensive GIS support. One of the better examples of what a large scale County emergency response would involve was an exercise called Operation Enduring Collaboration.

The three day exercise was held from March 19-21, 2012 and was based on the scenario of an F-3 tornado striking the Sully/Springfield area of the County. The intent was to practice a total County response to such

a major disaster. In planning for over a year, the exercise involved all County departments that would be involved in a disaster response. GIS played a key role throughout the three day event.



Tornado Path and Damage Analysis. Operation enduring collaboration map.

In preparation, GIS staff assisted event planners and produced the map-based exercise control products that would drive the exercise. For instance, a realistic tornado path was created with specific F-level damage zones for use as the ground truth of the scenario (shown here). Using this information, the population of those impacted was estimated and damage assessments were derived. GIS provided some 75% of the information used to run the exercise.

Once the operation began, GIS was tasked with 40+ requests for maps and analyses over the three days. The volume was such that the GIS Branch opened a Departmental Operations Center (DOC) at the GIS office to augment staff and handle the numerous requests. The team's efforts played a large role in helping to guide the decisions that were made by other participants from the operational agencies.

The Director of the Office of Emergency Management (OEM) subsequently noted that "the work between OEM and GIS has quickly become the model in the region and state for WebEOC/GIS collaboration. OEM has been invited numerous times to demonstrate this product to first responders and EOC staff that are always amazed by the work of the GIS staff."

The volume of GIS information continues to grow in Fairfax County. The GIS data warehouse holds over 800 layers of Fairfax County data and several hundred more of neighboring jurisdictions. The overall size of the vector data stands at over 100 GB (including business data tables), and the raster data is now over 9 TB on line with an additional 4.5 TB currently archived. The LIDAR data is expected to add over 500 GB of data. As a result of new software tools, more imagery and historic maps will be added and made available. The volume of data in the digital map viewer has increased annually as new sets of property and zoning maps were added. Currently there are nearly 46,620 pre-made maps and images of historic maps available online. Table 1 lists the number of features in some of the categories and their change over time.

The availability of key County data digitally through the GIS provides a range of benefits to constituents as well as County staff. Digital orthoimagery is widely used within GIS as well as over the web. With the parcel and zoning data now maintained digitally, production of the County's parcel and zoning books has been greatly accelerated. Time consuming manual steps were replaced with a digital production process enabling staff to capture additional features in the GIS (e.g., more easements, particularly conservation easements). All map changes are posted to the internet daily, providing web users of the Digital Map Viewer with the latest versions of the maps. Prior to these enhancements, maps were printed for distribution annually. Digital production has enabled the use of color maps,

and development of new symbolization of zoning patterns are added features. The popularity of the frequently updated data is evident by the steady increase in usage of the Digital Map Viewer and reduced demand for the printed books. Currently over 10,000 DMV maps are viewed or downloaded per month on average.

In addition to the GIS branch itself, over 25 County agencies use GIS in their operations. These include:

Data Layers	FY 2005	FY 2007	FY 2009	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Parcel	341,000	356,000	358,300	358,140	358,630	358,765	359,610	360,472
Addresses	360,000	368,000	365,100	365,669	366,295	366,488	367,130	369,972
Building outlines	248,000	257,000	257,300	264,361	267,729	274,078	273,960	273,817
Miles of roads (County)	4,000	4,700	4,736	4,825	4,904	4,943	4,959	4,982
Miles of roads (regional)				7,628	7,652	7,729	8,240	8,313
Number of streetlights		57,939	59,937	60,448	60,557	60,825	61,257	61,373
Linear miles of sanitary sewer lines		3,350	3,390	3,410	3,424	3,440	3,455	3,466
Miles of trails and walkways								4,800

Table 1 - Some of the significant layers in the GIS database

- **Northern Virginia Soil and Water Conservation District** – The soil maps (both the 1990 and 2011) are available with seven other digital map series on the County's web site. The 2011 soil series maps were added to the digital map viewer in FY 2010. The new soil data based on the Countywide soil evaluation program conducted jointly with the federal Natural Resource Conservation Services and the Northern Virginia Soil and Water Conservation District was added to the digital map viewer. Sales of the printed property and zoning maps has fallen steadily as more users turn to the free, digital online maps.

- **Public Safety** – The centerline file was modified to reflect Northern Virginia's common centerline elements and made available to County agencies. IT has been substantially enhanced with additional data needed for CAD and for regional routability of emergency response vehicles. That will continue to change as a result of the regional/state centerline grant. Public safety is one of the heaviest user of oblique imagery (at call taker and dispatch workstations) as well as planimetric features (in over 1,000 emergency response/public safety vehicles).

- **Department of Public Works and Environmental Services (DPWES) – Solid Waste Division** – Substantial savings are realized in the Department of Public Works and Environmental Services through the use of GIS. The agency was recognized by the State of Virginia for integrating GIS with refuse vehicle routing for additional flexibility and cost savings. GIS is currently working with DPWES to revise the refuse truck routing and incorporate new GPS technology to speed operations.

- **DPWES Stormwater Management** – GIS technology enabled the Department of Public Works to complete the mapping involved in the Streams Characterization Project in weeks rather than months. They have been using GIS to help analyze the age of the storm water infrastructure

to identify areas where there were lengthy systems that were reaching their service lifetimes and would need replacement or maintenance. Additionally for watershed analyses, some of the analyses time has been cut in half through the use of planimetric data, LIDAR and satellite imagery. The GIS also enables the Storm Water Management Branch to track easements around storm water facilities. It also maintains maps of the stormwater features in the County and makes them available via the Digital Map Viewer. They are now using mobile GIS to document the condition of walkways they maintain and prioritize those needing repair.

- **DPWES Urban Forestry Program** – Used mobile data collection and GIS to effectively track the emerald ash borer. Directly collecting data into the GIS database which enabled more efficient and detailed data collection. Based on the analyses, new and accurate, treatment thresholds for infestations have been identified.

- **DPWES Waste Water Management** – The Department of Public Works digitized the sanitary sewer lines into the GIS and maintains them regularly. Those maps are available online for viewing and download in the Digital Map viewer. The Department also uses GIS as part of its automated sanitary sewer permit application tool which greatly speeds preparation of the permit by automating cost calculations. GIS is also used to help call takers identify problem areas and prepare work orders.

- **DPWES Storm Water Planning Division** – Used GIS to analyze flood inundation areas from possible dam breaches and to identify properties at risk of inundation.

- **The Health Department** – GIS has been a vital part in the planning and response for health issues that include: H1N1 Influenza vaccinations; childhood lead risk evaluations; Medical Reserve Corps staffing; and mapping of private drinking water supplies and sewage disposal systems. Most recently, GIS was used to validate a request for a Governor's Exceptional Medically Underserved Population (EMUP) designation in an area of the County where barriers to accessible primary and preventive health services adversely impact the health status of under and uninsured populations.

- **Park Authority** – Uses GIS for a wide range of planning and management activities including conducting existing site condition analysis and impact analysis; identifying environmental and cultural resource features, constraints and spatial relationships; preparing graphics, base maps, Countywide park network maps; park trail maps; as well as in analyzing candidate properties for addition to the park system. Parks also released a web-based mobile application for navigating County trails. Mobile GIS is used in assessment of invasive species and carrying out trail condition assessments. GIS is an essential tool regularly used in all park planning, resource management and development projects.

- **The Department of Planning and Zoning** – Uses GIS programming and analysis to handle tasks that would have been an overwhelmingly manual effort in the past. The assignment of regional transportation analysis zone numbers to each of the County's' 360,000 individual parcels has made this a routine and quick process. GIS streamlines the Area Plan Review (APR) through the use of the Comprehensive Plan Amendment Tracking System (CPATS) which uses GIS to generate notices for plan amendments applications. This has largely eliminated errors and provided easy access to the latest information. GIS is integrated into DPZ's Land Information Systems (DPZLIS) with a number of benefits including, easy and quick access to staff report maps, generating environmental assessments, and custom page size maps of any County location. These specialized features have been particularly beneficial in zoning enforcement issues where the public can now view maps to check permit and enforcement cases via the internet. They have been using 3-D analysis to visualize and analyze building size and impact on neighboring properties and thereby make more informed determinations about proposed

construction. Most recently they implemented the Planning and Zoning Map web portal and have implemented an interactive Planning and Zoning map viewer to find the location of zoning applications and are developing an Interactive Comprehensive Plan Map as well.

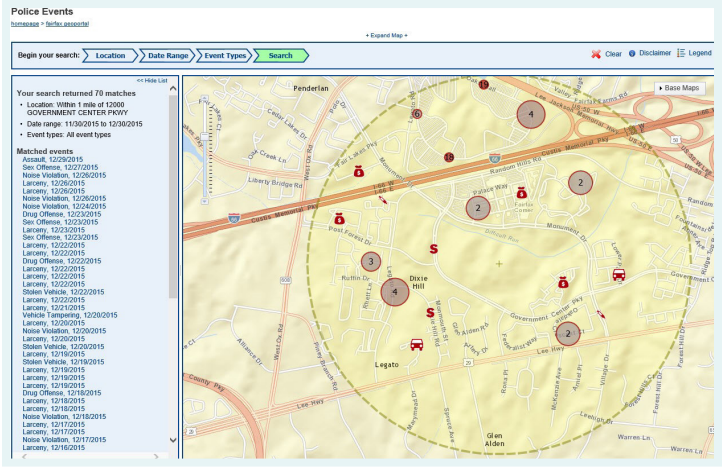
- **Department of Transportation** – Utilized GIS for a variety of agency needs and projects. GIS provided tremendous insight in understanding and predicting commuter use of Park & Ride facilities and helps direct the department to locate and manage new/potential facilities. The Department of Transportation uses GIS technologies for the Fairfax Connector bus system's demographic analysis, route planning, and bus stop management. Many of these techniques are also used for the Employer Services program to best promote commute alternatives for Fairfax employers and their staff. In addition, a number of transportation features, including the Residential Permit Parking Districts (RPPD), Yield-to-Pedestrian, and No Parking inventories are managed through GIS. GIS is used to plan and analyze bus stop locations and pedestrian safety improvements. New uses of GIS include interactive mapping to better aid the public in navigation and identifying recreational features for bicycle riders.

- **Pest and Disease Management** – Rabies, West Nile virus, Tuberculosis, and Lyme disease are compiled and analyzed spatially on a continuous basis using GIS. GIS is also used extensively in the planning, routing, surveillance, and/or enforcement activities for environmental health (food, water, onsite and vector).

- **Fire and Rescue Department** – Makes substantial use of GIS and as a result is experiencing significant savings. For instance, in the process of responding to Fire Hydrant and Insurance queries, the GIS saves about 50% of staff time in determining distances. Additionally a 98% staff time savings were estimated in the Countywide analysis of identifying five-minute response time areas for fire stations – a factor crucial to establishing areas within response time limits. More recently they contributed to building a routable centerline for the new CAD/911 system which will improve response times. They also used GIS to help evaluate possible alternative locations of a fire station near Herndon.

- **Fairfax County Police Department** – Has had significant success in its use of GIS for crime analysis. In multiple instances, the Department's crime analysts identified spatial patterns in crime incidents, successfully predicted subsequent crime locations, and arrested suspects (for instance, GPS larcenies, burglaries). The training of police crime analysts as criminal profilers is heavily dependent on the use of GIS. The GIS Branch worked with the Department to implement a total new Police Incident viewer which will include a substantially larger map and faster response time. A mobile version is available. Police also used GIS to plan the County-wide events for the National Night Out – Community Watch Program. It highlighted all the activities and enabled efficient routing of staff to cover the large number of events in one evening.

- **Emergency Management** – GIS was used extensively in planning the response to flooding in the Huntington area. The GIS maps were helpful for both field personnel and staff in the Alternate



Police Incident Viewer

Emergency Operations Center. It was also used for extensive planning for the inauguration of President Obama – since close coordination with federal and neighboring agencies was necessary. GIS also supported 'snowmaggedon' in 2010, super storm Sandy and the Derecho responses in 2012, and regularly supports the Office of Emergency Management in table top exercises.

- **Department of Systems Management for Human Services** – Uses GIS regularly as part of tracking and analyzing County demographics. Their key system is the Integrated Parcel Life-cycle System (IPLS) which contains demographic information by parcel. Most recently they have used GIS to analyze and demonstrate the wide range of languages spoken in the County, broken out by language, area and are doing ongoing analyses with the 2010 census update.
- **Office of Community Revitalization** – Now has a web site with GIS maps as an integral part. The site and its maps provide a geographical context for people interested in revitalization in the County.
- **Government Partners** – The GIS now contains data from Fairfax Water and the Cities of Fairfax and Falls Church on hydrants – an important data element for the CAD/911 maps.

The breadth of GIS utilization across the County, and the extent of its integration into the overall IT architecture are reflected in the award winning plans and efforts of the preceding years. The awards recognize GIS's achievement in fostering and expanding the use of GIS applications to improve County operations:

- In CY 2015, Fairfax County was ranked #1 for jurisdictions with population over 500,000 in the Digital Counties Survey of the "Most Innovative, Pioneering Counties". The award specifically referenced a GIS application developed by the Department of Neighborhood and Community Services. That application was also a winner of one of the Counties GIS excellence award the year before.
- In FY 2014, Fairfax County was awarded a Special Achievement in GIS award by Environmental Systems Research Institute (ESRI) for its contributions to ESRI's national community mapping service. Now a highly detailed base-map is available for all users of ESRI's tools.
- In FY 2011, Fairfax County GIS, as part of the regional team carrying out the Regional Routable Centerline project, was awarded a Special Achievement in GIS award by ESRI. The award recognizes organizations that use GIS to "improve our world – and set new precedents throughout the GIS community."
- GIS was also the recipient of the 2010 VA Governor's Technology COVITS award for its 'Virtual Fairfax' web based application, also written in the Washington Post.
- County GIS programs received the VA Governor's Technology COVITS award for DPWES' use of GIS in routing refuse collection vehicles.
- In FY 2005 the County's GIS won FOSE's E-Town Award for GIS Integration.
- The County's GIS program received a "Best of Breed" award in the 2003 Digital Counties Survey. This survey and award recognition was conducted by the Center for Digital Government, in partnership with the National Association of Counties.
- Fairfax County's GIS received international recognition via the ESRI Special Achievement in GIS (SAG) Awards for both the GIS Branch work and the Countywide efforts in GIS.
- The National Association of Counties recognized Fairfax County for its use of GIS in the reapportionment process.

Fairfax County is a member of the Northern Virginia GIS managers group, an informal group that regularly meets to coordinate activities. The GIS Branch also works closely with the State's GIS agency (Virginia Geographic Information Network, now part of Virginia integrated Services Program), and now directly participates in the Emergency Operations Center when it is activated.

The County is a member of NACo's GIS committee which looks at key GIS issues affecting counties. Each year, GIS hosts "GIS Day" which promotes the use of GIS and development of new GIS applications through Countywide competition and awards.

2.3 Customer Relationship Management (CRM)

Expectations for modern access and interaction with government services continue to expand dramatically. Agencies need automated ways of capturing interactions, providing and tracking response to inquiries, requests for services and complaints, and the enterprise needs a common solution that integrates with e-government capabilities and the Web, enables improved customer experience and public engagement, and provides an enterprise-wide view of constituent needs and concerns, and County response. Fairfax County continues to respond to this growing need through Customer Relationship Management (CRM) technology applications. CRM provides agencies and their staff improved opportunities for providing citizens quick and convenient access to information about County programs and services. Current solutions in place that have served a variety of agencies' needs for tracking interactions, response to citizen inquiries and requests, as well as issues management include Internet Quorum (IQ), and Siebel commercial-off-the-shelf(COTS) products. These solutions were successfully implemented over time for a variety of applications and have resulted in significant staff productivity and efficiency improvements in supporting information exchange with citizens through multiple communication channels: in-person, telephone, e-mail, via the internet and mobile devices.

For example, the Offices of the Board of Supervisors and the Clerk to the Board provided enhanced opportunities to record, route, and manage interactions with constituents and organizations. Subsequent phases have provided expanded capability throughout the County. The web enabled system replaced several custom applications and provides functionality for the Office of Public Affairs, Consumer Protection, Office of Human Rights and Equity Programs Department of Public Works and Environmental Services, County Executive and the County's Legislative function within the County Executive's office, Department of Purchasing & Supply Management, Department of Transportation, and the Alternative Dispute Resolution Program.

The Clerk to the Board of Supervisors uses the IQ Boards and Commissions Module to track appointments and nominations to boards, committees, and councils and maintain a complete correspondence history regarding contact with these individuals. Consumer Protection Division's modules include Complaint Tracking, License Administration and Taxicab Inspections. The systems enable staff to rapidly open and begin investigating cases. By expediting the administrative components of case investigations, the initial response time is reduced, resulting in earlier detection of consumer protection violations. The historical research required to discern how past cases were resolved is now expedited; cross-referencing cases between investigators allows department staff to share online information pertaining to the same or similar consumer protection violations. Further, the system

facilitates collaboration between department investigators on complaints and resolution techniques, and also enables citizens to access complaint histories of businesses online in order to research and determine the pros and cons of doing business with those merchants. In addition, the system allows Fairfax County Police access to license information for all solicitors, peddlers, pawnbrokers, massage therapists, taxi drivers, etc.

The Office of the County Executive uses the IQ Legislative Tracking Monitor application to assist County agencies monitor, review, respond to and track state legislation when the Virginia General Assembly is in session. The system includes the automated downloading of legislative bill information from the Commonwealth's Legislative Information System, thus eliminating the need for a legislative aid to manually track constituent requests. The Human Rights Commission uses the system to create, track and report on case workflows allowing the HRC investigators to meet multiple requirements. The system also streamlines complex discrimination processes and addresses privacy concerns for investigator and conciliators.

A project steering committee consisting of DIT and agency staff that use or have interest in call center functionality was established to manage the implementation and integration of the CRM. Initial efforts involved development of the overall framework and pilot application in the Office of Public Affairs and supports Office of Public Affairs customer center sites in several locations. Frequently requested information and telephone numbers for County services and home owner association data is available in a centrally used knowledge base to support consistent distribution of information.

The Office of Public and Private Partnership (OP3) is the clearinghouse for partnership information in Fairfax County. CRM efforts in OP3 have consolidated disperse contact lists of, business partners, and resources, enabling staff to utilize the system as a data depository for contacts, accounts, cases, service requests, solutions, correspondence, activities, and allocation of staff and volunteer resources. The Department of Tax Administration (DTA) Audit Division migrated from the use of multiple Microsoft Access databases and Excel spreadsheets to the CRM which offered improved accountability, increased security, and instant interactive reporting tools.

Enterprise-wide CRM supports a holistic view which aids in making well-informed decisions about service delivery to the County's diverse population and improves communication through seamless unified access to information via the County's web site, IVR systems, cable TV, in-person, live Call Center agent, mobile devices, and most importantly going forward - Social Media. Goals for the refreshed strategy include enabling screen pop interaction with case record information, contact interaction records, transparent case escalation, and consolidation of the legacy CRM solutions. The enhancements will provide cross-browser mobility access to CRM, reduce maintenance, training, and support while increasing productivity in efficient seamless integration with the County's office products. Assessment of the next generation of CRM technology that provides improved native integration with the County's messaging environment, more agile mobile app development and viability for 'cloud' solution opportunities in alignment with County agencies' initiatives determined that Microsoft Dynamics to be the best overall fit for integration with the County's enterprise information systems environment, user friendly screens and navigation, flexibility and overall cost. Cloud version is also used for on-demand, as needed CRM requirements. In FY 2016 -2017 the project will continue to migrate legacy CRM applications into the consolidated platform and coordinate business processes to align with enhanced public access and customer engagement goals.

2.4 Enterprise Content and Document Management

The County established a strategic approach to content and document management by developing an integrated solution on an enterprise platform. Content Management is the foundation for the organization and use of information from structured data (through business applications), and unstructured data in electronic or imaged documents (word processing documents, spreadsheets, e-mail, and reports).

The County's enterprise information architecture continues to be refined to provide efficiencies and enhanced capabilities to support enterprise document management. This solution enables the County to have a rich document management and business process flow for retrieval and storage of vast quantities of required paper records. The enterprise document management technology with incorporated workflow solutions improves business process efficiency and productivity by providing the capability to view hard copy records through automated applications in order to provide required services. In addition to fast and reliable business processes, the document management solution minimizes the need for storage of paper records, reduces storage space needs, protects against mounting storage costs, and reduces human and physical plant asset risks associated with handling voluminous stacks of paper.

Content management integrates with document management. For business activities that also rely on a variety of documents, the document management initiative employs technology at the beginning of a document's life cycle (originated as hard and soft copy) using the system to catalogue and track the documents and enable automated workflow processes through the entire life cycle. This comprehensive approach and associated implementation of technology is called Integrated Document Management (IDM). In seeking enterprise technology solutions that satisfied multiple needs, the County found that the best products for content management engines also incorporated document management needs. The integrated solution is more cost-effective, and provides a seamless integration for use of information found in imaged documents and information in databases and other systems required for a complete business transaction. The integrated document and content technology provides the ability to organize electronic documents, manage content, enable secure access to documents, route documents, automate related tasks, and facilitate document distribution.

Document imaging is another component of IDM which has been embraced to provide a more efficient and effective way to store and retrieve documents for normal work productivity and to handle legal mandates for records retention and retrieval associated with case management, FOIA and e-Discovery as well as to enhance information published via the WEB in WEB searches. With the dynamically growing volumes of information, management of paper based documents which often times has extended retention time requirements is not effective and for many processes, not feasible. Consequently, many County agencies are implementing IDM with their business systems to alleviate the demand for increased storage space, improve business processes, and protect against disasters that can potentially destroy important paper documents. Integrated Document Management solutions encompass core business practices, as well as provide better archival and disaster recovery capabilities.

IDM technology has been implemented in a number of agencies over the past five years, for example, document work flow projects in the Office for Children (OFC), multiple initiatives for the Department of Family Services, the Commercial Inspections Division of Land Development Services in the Department of Public Works and Environmental Services to meet the needs of the sewer lateral section and complaints tracking, the core modules of an automated

Accounts Payable System in the Department of Finance and on-going work for the Juvenile and Domestic Relations District Court. Although the individual departmental business requirements vary for the use of IDM technology, the following benefits and quality improvements have resulted from these projects:

- Increased staff productivity from employees' ability to share and act on accurate information through the delivery of the right documents at the right time
- Enhanced communication and collaboration through shared information
- Improved speed of information and transaction flow throughout County agencies
- Improved access and security through controlled access to sensitive documents
- Reduced time spent searching for critical documents
- Improved disaster recovery through electronic storage and backup of information that is far more secure than paper
- Reduced clerical, paper, printing and storage costs

Document management and imaging projects, especially when work flow automation is used, can greatly improve operational efficiency and effectiveness. In addition, these projects deliver enhanced information security. Granular control over each piece of data enables access by authorized users, and only for the specific information they need and are authorized to access. These solutions provide business units with the capability to reduce costs, accelerate business transactions, ensure regulatory compliance, and support cross-department communication.

IDM is an integral part of the County's FOCUS (ERP) project, where images of hard copy documentation that may need to be embedded in an electronic profile or case record. Documentum-Captiva is the primary enterprise-wide platform, compatible for use by the SAP ERP application implemented for FOCUS. The solution is integrated with business processes supporting Accounts Payable, Contracts, and Human Resource Management. First phases went live in 2011 for the accounts payable processes with the Documentum/EMC Invoice Manager and Captiva scanning for invoice processing for the Department of Finance. The integration of the FOCUS SAP financial and procurement modules allow for automated matching of properly submitted vendor invoices against authorized encumbrances and receipts, reducing the amount of time program managers and the Department of Finance would spend approving and paying standard invoices. IDM is also an important technology for other agencies supporting major programs such as the Department of Family Services in the Self Sufficiency and Children, Youth and Family programs. In FY 2015 the County will continue to support the current initiatives of IDM and workflow technology for projects in the Department of Family Services, Office of Children, and other agencies. The Juvenile and Domestic Relations Court and the General District Court are collaborating with the VA Supreme Court on workflows and document management for court files and possible integration with the state's case management system. Future strategy includes interfaces with Circuit Court systems.

Fairfax County continues to expand Enterprise Content Management System (ECMS). Department of Planning and Zoning determined that an ECMS and Scanning would afford the best solution for automating business processes and ending the dependence on ever-expanding physical files. DPZ ECMS will provide immediate access to Planning and Zoning related documentation, record recovery, re-filing process and minimize expenses associated with space, shelving, storage of paper documents. DPZ will continue work to develop the ECMS in FY 2016. The on-going strategy also includes integration with the County Archivist goals for over-all records management both in-house flow from agencies and also using cloud based solutions.

New contracts for Records and Archival Document management system, cloud, and related professional services were awarded in FY 2015. The new solutions will accelerate the ability for agencies to streamline processes across various agencies and allow the user community to retrieve and view records on demand.

Content and document management will continue to be a long-term strategy to affect the integration of structured and unstructured electronic and paper-based information and file types in optimizing and enhancing overall information management, transparency and decision processes.

2.5 Technology Infrastructure Initiatives

To ensure continuous delivery of quality services in a cost-effective and resource-efficient manner, Fairfax County's technology infrastructure is designed with the flexibility to respond to the County's evolving technology and business requirements, and to take advantage of new trends that provide improvements in operational efficiencies and cost. The County established a strategic approach to building agile enterprise infrastructure architecture by consolidating and standardizing IT resources, implementing scalable and elastic infrastructure components, moving toward service-based technologies, and automating processes while ensuring visibility, security, and accountability. This strategy has been recognized by the County's ITPAC (see Section 1), national IT research firms, and industry providers as a well-developed capability with a resulting competitive overall cost (TCO).

Virtualization and Consolidation

Virtualization and Cloud Computing technologies serve as the fundamental foundation for this strategic direction. In FY 2007 - 2008 Fairfax County established virtualization as the primary means to deliver server-based (hardware & OS) infrastructure services. The virtualization of server-based infrastructure services introduced technologies such as VMware, Symmetric/Asymmetric multiprocessing, enterprise-class server hardware, grid computing, etc. The virtualization of server-based infrastructure not only provided a means to securely and efficiently share server resources ("do more with less"), but the County utilized virtualization to consolidate and standardize the overall server landscape. By implementing virtualization for server infrastructure platform, Fairfax County eliminated and/or consolidated server hardware which not only increased total cost of ownership (i.e. predictable costs, streamline of upgrades), but also reduced power, cooling, and physical server hardware footprint in the data center, thereby contributing to Countywide "Going Green Initiative". These resource efficiencies also allowed Fairfax County to optimize management of resources, maximize data throughput, increase control over delivery of IT services, simplify administration, and ultimately has established a foundation for the virtualization and standardization of other infrastructure components and cloud technology.

In FY 2008 - 2009 Fairfax County continued the move toward virtualization/ consolidation of infrastructure architecture by implementing storage virtualization (SAN, NAS, Grid storage), application virtualization (Terminal Services, Citrix), virtual desktop infrastructure (VDI), and network virtualization (VLAN, Load balancers) technologies. Virtualization of the infrastructure architecture has not only improved overall physical and operational efficiencies, but also provided better resource/ capacity planning and provisioning of resources. This scalable, resource-efficient, and standardized architecture has become the base for Fairfax County to build out the "dynamic" data center. The dynamic data center provides the enabling infrastructure to move

Fairfax County to the next phase of the strategic goal for the infrastructure architecture which is providing infrastructure as a service or the establishing of an internal private cloud. In FY 2010 Fairfax County received federal stimulus funding for energy consolidation projects of which a portion is dedicated to initiatives related to desktop power management, enterprise server consolidation and telework initiatives designed to lower power consumption, decrease greenhouse gases and reduce the County's carbon footprint. The virtualization/ consolidation effort has reduced servers on an average ratio of 60:1.

In FY 2011 IT enterprise platform and infrastructure projects received national recognition for reducing the County's carbon footprint as well as providing operational efficiencies. The 1E PC power management deployment automatically shut down 14,000 - plus end-user PCs across 55 offices when not in operation resulting in energy and cost savings. The County also deployed Nomad Enterprise to deliver operating system upgrades, software deployments, and patches to PCs, servers, and sites without disruption. Additionally with implementation of a self-service software deployment portal, users can locate and install software without requiring IT staff to leave their office.

The virtual infrastructure environment was further improved in FY 2013 through FY 2015 with the ultimate goals of reducing cost and providing highly available infrastructure without compromising the quality of services. Several key examples include:

- **Self-Service Virtual Resources -** With an automated workflow, platforms and associated resources (OS, Storage, Network, Virtual Service Machines, etc.) will be pre-allocated for users to choose from service catalogues. With the design and deployment of self-service provisioning resources, the County and agencies will gain great efficiency, visibility and flexibility into supporting business needs through the use of IT.

- **Highly Available/DR Ready Virtual Infrastructure -** Started in FY 2013, critical services and systems were identified for high availability and for being capable of sustaining unplanned events such as data center outage. Such services shall be designed to serve customers in a distributed/load-balanced mechanism, rather than standby/failover. The completion of production failover, in the event of an unplanned outage, for the County's ERP system (i.e. FOCUS) has been completed successfully. DIT is continuing to expand this HA/DR capability for County mission critical systems and agency applications to be able to failover to an off-site data center.

- **Verisign Identity Protection (VIP) -** Application installed on County-owned or employee-owned desktops and mobile devices provides two-factor authentication for remote connection to County computer resources. VIP improves convenient and safe remote accessibility for employees.

- **Microsoft Skype for Business -** A collaborative tool that has the ability to improve efficiencies and communications. This best-in-class communications application is an instant messaging client with video conference capabilities, online meeting, and telephony that enables real-time unified communication and resource sharing between employees at work and from remote locations. Along with PC's, Skype for Business can also be accessed from smart phones and tablets for increase mobility, allowing for increased productivity and support for agencies delivering services to its citizens. The implementation of Skype for Business' enterprise-wide Unified Communications (UC) platform for IM, conferencing, video, and Enterprise Voice will give the County a feasible future transition from the current voice platform, allowing for a reduced Total Cost of Ownership of IT communications. Primary business drivers for the deployment of Skype for Business included improved communications; increased collaboration; Enterprise Voice (EV) and Unified Communications (UC); reduced TCO of IT; increased mobility and; improved business integration.

Cloud Computing

In FY 2010, the County considered the potential benefits of in internal private cloud infrastructure by leveraging features from virtualization/consolidation base and other enterprise infrastructure initiatives (i.e. County institutional network, PSTOC, e-Gov enhancements, etc.). Complimentary technologies such as enterprise data backup/recovery, mirroring, clustering, data de-duplication, replication, centralized infrastructure management tools, enable the County's private cloud capability. In addition to server provisioning services, with the advancement of the enterprise dynamic data center, the County provided additional cloud-based infrastructure services such as storage provisioning, password management, application provisioning, and business continuity. By using virtualization as the base technology, the County's dynamic data center/private cloud is able to have internal and external components that provide different services based on costs, capabilities, needs, and SLAs. This is being aligned with the requirements of agencies and delivers value by enabling improved and incremental solutions, products and services that can be more effectively deployed. With this strategy, County agencies do not need to implement independent infrastructures for most services, and can minimize costs associated with common applications that are not needed by all employees at all times.

The County will continue to build on the internal private cloud by standardizing and enhancing the dynamic data center infrastructure (i.e. unified network/server/storage infrastructure, more efficient business continuity technologies, enhanced security infrastructure, etc.). The remote access portal that went live in 2014 enhanced employee access to the County's ERP system FOCUS (based on their security profile) from anywhere over any device securely. The data renders itself to the appropriate form factor.

The County also integrated selected Public Cloud services as part of the effort to increase the quality of service, security and reduce cost; for example, Symantec VIP is a cloud based service that has replaced hardware token and serves as a second factor of authentication. With these enhancements, the County will meet its strategic goal for an agile infrastructure architecture meeting technical and business demands by providing a platform to not only deliver infrastructure services via Internet in a shared, measured, secure, service-based, scalable, and elastic means; but also applications, business processes, and security services.

Microsoft Office 365- Cloud Collaboration and Productivity Services

In order to provide business productivity solutions to County users and agencies, DIT deployed a solution which allows users to write documents, create spreadsheets, develop presentations, and transparently collaborate to carry out agency business functions, as well as cross-agency business functions.

In FY 2015, DIT began deploying Microsoft Office 365, a cloud-based suite of business productivity and collaboration services which the County has adopted to help meet its needs for robust security, reliability, and user productivity. Office 365 combines the familiar Microsoft Office desktop suite with cloud-based versions of Microsoft's next-generation communications and collaboration services—including Microsoft Exchange Online, Microsoft SharePoint Online, Office Online, and Microsoft Skype for Business Online—to help users be productive from virtually anywhere through the internet.

The deployment of this cloud-based business productivity technology solution will allow for integrated document collaboration, Skype for Business messaging, e-mail, content storage, and online learning for County personnel to expand their skills to stay competitive in an increasingly technology-based environment. Most importantly, Office 365 has enabled the County to deliver increased redundancy of services to agencies and end users, as well as cloud-based storage, providing significant cost-savings for IT storage of County data.

Enterprise Communications Integration

Contemporary voice communications integrated with data, video, presence and messaging is an organizational requirement in today's technological landscape. As government agencies are asked to do more with less, they rely heavily on a variety of communications technologies to improve effectiveness in meeting the growing needs of constituents. Integrating voice, video, data and presence information onto a common broadband infrastructure is the new reality. This convergence brings tremendous benefits to geographically dispersed enterprises such as Fairfax County. The near-term strategy implemented Session Initiation Protocol (SIP) provider network trunking services replacing legacy carrier circuits, and implementation of pure IP connections to the carrier cloud. These will yield a communications architecture that is secure, robust and scalable at a lower cost than traditional Public Switched Telephone Network (PSTN) connections and enable advantages in functionality and features this leading-edge technology provides.

The County's strategy for the next generation voice architecture takes into account complex technical requirements for an integrated network strategy. The solution supports a range of configurable telecommunication instruments and communications technologies and also provides a single logical architecture for addressing the business and operational needs of agencies located in multiple locations throughout Fairfax County. Integration of the voice and office productivity platforms, often referred to as Unified Communications, was implemented as a pilot in selected County facilities, with wide-scale implementation imminent. The integration of the Avaya platform with Microsoft Skype for Business creates a seamless work environment where information and communications share common attributes and interwoven capabilities. The integration of voice and the enterprise Microsoft messaging platforms will result in a Unified Communications (UC) capability, resulting in agencies and end users being able to make phone calls from Microsoft Skype for Business from anywhere on mobile, wireless devices and ultimately reduce traditional desk telephones. This also includes opportunities to integrate with commercial wireless platforms to be deployed as part of smart-phone Windows Surface and iPad device capabilities.

The County is also embarking on a strategy that enhances its wireless communications and broadband capabilities designed for integration with the County's robust, secure fiber infrastructure. This initiative will leverage the County's private voice wireless (radio), network and telecommunications programs for a unified architecture

and support scenario. This strategy, designed to leverage federal broadband grant opportunities and public-private partnerships, will provide improved services and better cost efficiency than similar commercially available broadband solutions, especially supporting public safety response operations and regional interoperability.

Mobile Device Management (MDM) and 'Bring Your Own Device' (BYOD)

To enhance the County's goals for mobility, telework, operational cost efficiency, Continuity of Operations Planning, and environmental stewardship and 'green' IT, a major component of the enterprise technology infrastructure initiatives includes technology that enables secure use of hand-held wireless mobile devices for data and business transactions, to include County issued and as appropriate employee personally owned devices. Enterprise mobile device management (MDM) solutions are policy and configuration management tools that can be incorporated into an organization's enterprise network and platform enabling infrastructure. Today's solutions allow smart-phones, and tablets to include Apple, Blackberry, and Android (for example). The primary solution delivery model is on-premise, but it can also be offered as a service (SaaS), or through a cloud. With the County's mature 'private' enterprise cloud, this technology was adopted and is being implemented and integrated with the enterprise network (see Section 5). In assessing the most optimal tools for use, the County considered lower cost options for casual users of their own devices for enterprise applications such as e-mail and calendaring, and a more robust solution for employees whose daily work is mobile in nature and conduct transactions crossing internal business systems and secure data. AirWatch Enterprise Mobility Management (EMM) enables balance for overall security, flexibility, device support and cost containment needs. Due to dynamic change in the marketplace in end-user devices, the strategy focus is shifted from the device to the data

"Big Data"

Given the interdependencies and shared business drivers of the cross agency applications and information, DIT resources were leveraged during FY 2012 to maximize benefit-received opportunities for the primary land use audience - citizens, the land development industry, and County agencies. DIT's "Big Data" initiative focused on the consolidation of structured and unstructured land use data from several disparate land use systems in a GIS & web based data warehouse/ business intelligence product. The consolidated data provides land use customers with property development history profiles, and "free style" search capabilities of past, present and future land use activities that drive economic growth. A plethora of data from Oracle and SQL databases, GIS, the WEB, and documents that included building permits, site development plans, code enforcement investigations, and inspections, were centralized in the data warehouse to provide agencies with a single point of reference to streamline government services, and to meet Board of Supervisor Land Information Accessibility goals.

Citizen/industry accessibility options to the GIS based warehouse and transaction-specific systems include, smart phone resident applications that allow citizens to apply for permits, schedule inspections, report alleged land use code violations, and assess prospective property procurements for compliance with County codes. The Department of Code Compliance and other agency staff can access the warehouse from the field (via VPN & wireless technologies) to enhance "mobile office" capabilities with a streamlined business architecture that includes real time customer property inspection, and construction assessment updates that contribute to sustaining safe and healthy neighborhoods.

FY 2016 - FY 2017 data initiatives include digital dash boards for agencies' Senior Management to assess agency operational efficiency, and augmenting the warehouse with land use infrastructure metrics.

The initiatives will also involve a pilot program to allow selected industry participants to electronically submit commercial development rezoning plans to the County via the web. Staff will evaluate the relative benefits and costs of the pilot before deciding next steps (i.e. expansion to other plan types and/or the entire industry). The County will continue evaluation and forward planning for the next generation, web-based integrated government permitting, inspections technology for a strategic project that would include capabilities to further enhance cross-agencies' processes and expanded business needs, as well as more contemporary technical architecture and viable SaaS offerings. This strategy includes GIS and WEB capabilities and reporting through data analytics tools such as (current) Business Objects, SAS, and MarkLogic, thus an overall integrated approach, and continues to evolve with more sophisticated data analytics products on the market, fueling the opportunity for streamlined business processes, service delivery, transparency and citizen engagement.

2.6 Integrative Human Services Model and Information Technology

The field of health and human services (HS) is rapidly evolving. Changes to demographics, economies, practices, and technologies are creating a demand and an opportunity for a new model of human services. Individuals and families served by the HS system often have multiple needs addressed by multiple programs and services. For instance, an older adult, experiencing aging and health limitations, wanting to remain in their home may need at least five services that span four agencies – medication management, nutrition guidance and meals on wheels, home based services, senior housing, transportation support, and adult day health care.

With this in mind, the County has been engaged in efforts over the course of the last year to create a conceptual foundation, a business model, which ties together the work of various health, housing and human services agencies in efforts to achieve specific outcomes related to the health and well-being of the County's clients and community. A holistic approach to addressing needs along the spectrum of crisis to self-sufficiency to sustainability, as well as strong communication, coordination and collaboration components are key factors in successfully meeting their needs. As a piece of this work, information technology (IT) will be an important tool to help paint a better picture of clients' needs and to help in more comprehensively addressing various social determinants which, if unaddressed, prevent the County from truly impacting individual health outcomes and the goals of the collective system of services.

HS leadership recognizes that the system needs to update its approach to service delivery. There is an imperative and an opportunity to move forward with a new model, a model that strives for integrated delivery of human services. A model based around a shared vision that focuses on people and their strengths and needs, rather than individual programs. A model that also increases the County's ability to assess program performance, identify long-term trends, and create efficiencies. This requires shared planning, robust data, and information exchange in order to shape policies and future actions focused on improved outcomes and shared accountability. The health and human services integration initiative has the ultimate goal of delivering person-centered services to County residents and improving the health status of County residents. Envisioned is a health and human services system in which the cross-sectoral exchange of data facilitates opportunities for individuals and families to be safe, be healthy and realize their potential.

Currently, there are over 20 different client intake and program data systems spanning eight human services agencies. Very few of the agencies data systems share information and many of the information sharing processes remain fragmented which creates increased challenges for clients navigating the system and for staff coordinating services.

The County's HS leadership staff have created the foundation for a business model which ties together the work of our various health, housing, and human services agencies. As part of this effort, IT is critical to helping the County better understand, and provide for, the needs of its residents. This endeavor began moving forward with the development of the Fairfax County Human Services IT Governance Board (HSITGB) in 2014. In its work, the HSITGB convenes County executive staff, information technology senior leadership, and human service department heads to identify and examine technology trends, programs, practices and

operational requirements affecting human services programs. It establishes strategic direction, policy and priorities for technology initiatives and investments across the Human Service agencies and related partner organizations, promotes an enterprise-level approach and collaboration, and state, inter-jurisdictional, and Federal interoperability opportunities. The HSITGB focuses on how the delivery of a consistent level of human services to the citizens of Fairfax County can be influenced and improved by deployment of specific information technologies. The HSITGB seeks to break information silos through the use of technology and coordinated agency practices to more efficiently and effectively provide human services system wide.

In 2015, the HSITGB approved a 5 Year IT Strategic Plan, and the framework for a more detailed IT Roadmap that will outline the prioritized, deliberately sequenced series of initiatives that will enable the County to build out the proposed IT foundation.

IT will serve as an enabler of the reengineered, optimized, client-centered processes. The goals and principles for IT support of the integrative HS business model include:

- Increase data sharing capabilities among human services, public safety, and other key partnering agencies to view clients holistically, tailor services to their specific needs and identify at-risk persons in a timely fashion.
- Create an integrated view of client information across human services programs and a central point to access data from relevant human services systems.
- Remove waste and redundancy in the client experience (e.g., eliminate the need for clients to submit basic eligibility information numerous times).
- Improve planning capabilities within human services agencies and across the system.
- Increase visibility into, and accountability for, client outcomes, cost of service and other key program performance and success indicators.
- Implement common approaches and standards across agencies for critical areas such as IT security and data confidentiality in keeping with Federal, State and County laws and regulations as well as with Integrative Model goals.
- Bridge service “silos” while increasing administrative flexibility.

Acknowledging that this is a complex venture, the goal is not to build one IT system. Instead, the aim is to be strategic about County IT investments, planning, and commitment to IT resources. The County is also trying to be strategic about information sharing and how that is accomplished to achieve the outcomes desired for HS clients.

Through the effective use of information technology, the County has the opportunity to:

- Develop a comprehensive view of clients and their needs.
- Deliver a scalable set of properly coordinated services.
- Improve service quality with accurate and timely data.
- Deploy and maintain cost-effective IT assets and services.

Establishing the foundation for how information technology will be used across the human services system is the first step towards a multi-year effort enabling the programmatic innovation envisioned for the system.

2.7 Land Use System Modernization

New Strategic Initiative

The departments supporting Fairfax County's land planning and development processes have initiated a major strategic assessment to improve the speed, consistency, and predictability of the development review processes, and improved access to data and reporting. The County plans to advance economic development and competitiveness, enhance business processes, provide better customer service, and achieve increased reliability in plan review and approval, permitting, and inspection outcomes. This overall strategy encompasses Fairfax County services, business, public engagement, economic development and technology goals; this initiative is a catalyst for innovation in public service.

Executive sponsorship for the initiative and governance for associated projects is the Deputy County Executives for Land Development and Information Technology, and a senior executive steering committee comprised of the Chief Technology Officer, IT Program Directors for Solutions and for Land Development and GIS Competency Centers DIT, plus the five major land use agencies to provide leadership and strategic direction for the project including goals, timeframes and priorities. Key leadership for the business scope and process improvement opportunities and goals is being provided by the Department of Planning and Zoning (DPZ) and the Department of Public Works and Environmental Services – Land Development Services (DPWES-LDS). Other core stakeholder departments include Fire and Rescue – Fire Prevention (FRD), the Health Department – Environmental Health (HD), and the Department of Code Compliance (DCC). During 2015-2016 Fairfax County is conducting an independent assessment of current procedures and processes, benchmarking the County against other best practices, identifying opportunities for improvement, obtaining input from the development community, and developing recommendations to improve services and operational execution; and an in depth market scan for solutions

The Department of Information Technology provides the technological leadership and works closely with the core departments above to modernize and replace most of the legacy systems and supporting system silos that supporting the land planning and development, and, inspections and code compliance processes.

Current Systems

Fairfax County's land use agencies have relied on the Land Development System (LDS), and the Fairfax County Inspections Database On-line (FIDO) system and an assortment of independent sub-systems and interfaces to support Fairfax County residential and commercial development activities since 1996 and 2003, respectively. Both systems are based on old land use services business process models that are being replaced with the strategic assessment above. In addition, the systems operate on obsolete technology architectures that are no longer supported by the original vendor. In addition, numerous 'shadow systems' with custom interfaces have been developed to meet evolving business requirements over the past two decades.

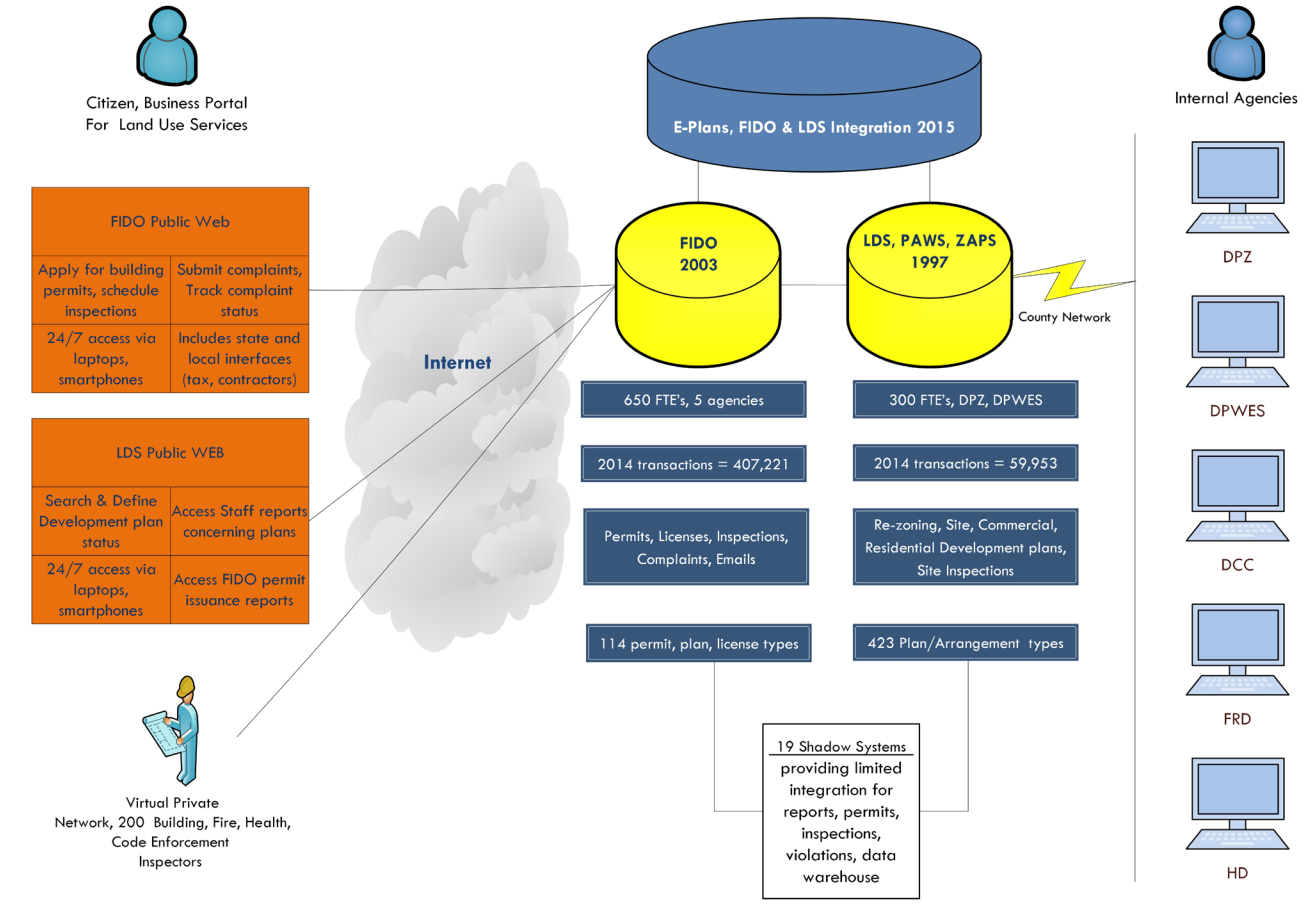
The Land Use Systems Modernization project will replace and consolidate these aging systems with a modern technology platform that is driven by re-engineered, streamlined and integrated business processes across the five major land use stakeholder agencies. This project will work in tandem with the new DPWES and

DPZ Electronic Plan Submission Project (E-Plans) to modernize and enhance the County's land use business architecture and its underlying technologies.

Since 1996, LDS and its subsystems have supported commercial and residential plan review and approval activities at DPWES and DPZ for dozens of plan and application types. Subsystems include ZAPS (zoning applications), PAWS (plans and waivers), and LDSNet (porting the original application to operate on the Internet and FairfaxNet intranet). All zoning and site and building plans and applications are reviewed at the five core agencies to help ensure compliance with the Zoning Ordinance, the state building code, and the state and local fire and health codes.

Internal agency staff reviews and other plan status information are available for public access 24 x 7 via LDSNet's web portal which includes magisterial district-specific plan aggregates, and DPWES building permit issuance reports.

FIDO - LDS



The FIDO system supports the issuance of building permits, licenses, and field inspections for DPWES-LDS, DPZ, HD, FRD and DCC. FIDO's web portal also provides the public with 24 x 7 public access to a variety of land use services and information such as online building permit applications, inspection scheduling, and land use code complaint submissions.

FIDO and LDS have been expanded to interface with the new DPWES and DPZ E-Plans systems that provide digital plan submission, review and approval capabilities for the land development industry. The new E-Plans systems completed their pilot phase in 2015, and DIT will continue to expand E-Plans capabilities as part of the Land Use System Modernization initiative.

Looking Forward

Although the FIDO and LDS systems have provided a stable and functional technology platform for County land use agencies, they are very old, have obsolete technical architectures, and can no longer be modified to accommodate the rapidly increasing changes in land planning and development business processes. All together, these are no longer technologically sustainable, and new technology offers numerous additional capabilities and the ability for todays required innovation and the ability to meet the county's changing demands.

The project is to replace the old systems with an integrated enterprise platform that will:

- Modernize the land use technology system to enhance customer service and improve operational execution, as identified in the ongoing Land Use and Development Services Strategic Assessment
- Support a service delivery model focused on customer outcomes and more consistent, transparent service delivery to streamline plan, permit and inspection timeframes and outcomes
- Replace and consolidate the county's aging land use systems with a modern technology platform that meets business and customer needs, is maintainable and robust, and is adaptable to changing business needs.

In addition to replacing LDS and FIDO, the new system will also replace over a dozen shadow systems that have been developed over the years to meet business requirements for new capability. Initial review of the modernized platforms offered by new vendors have shown very robust and feature-rich product offerings that will help the County achieve the recommended improvements in the Strategic Assessment. Pre-planning and assessment of current state for the initiative started in FY 2016. The System Modernization project will begin in FY 2017 and is expected to be completed in three years. The timeframe is dependent on a final deliverable from the Land Use and Development Service Strategic Assessment. The Future Vision deliverable will define the project goals for organization, business process integration and technology. It will provide critical input to the definition of requirements, business use cases, and the service delivery model for the system modernization project.