Department of Information Technology

History

- 1957/1958: In about 1957, the County of Henrico's Finance Department created a Tabulating Section which later became the Department of Information Technology.
- 1958/1959: In January 1958, the first payroll and tax billing operations were processed on 8 pieces of leased tabulation equipment. The tabulation equipment was punched card unit record equipment.
- 1959/1960: During 1960, the first utility billing was processed. About 20,000 utility bills and about 170,000 tax bills were processed.
- 1960/1961: 1960 was the first year the term computer was referenced in annual reports in addition to the tabulating equipment. The school census was added to the list applications processed by the Tabulating Section. The computer was a Univac computer but the model is not known.
- 1961/1962: The Tabulating Section was described in an annual report as providing "data processing" and "machine records" services.
- 1962/1963: By 1963, the Tabulating Section was considered a model for other localities when they wished to modernize their procedures. State poll tax payments were added to the list of applications. More than 23,000 water bills per month and more than 185,000 tax bills per year were processed and printed.
- 1963/1964: In 1964, the Tabulating Section added a Univac 1004 to their computing equipment. The 1004 was the first computer that allowed the County to embrace what was then known as internal computing. A 1004 requires a "plug panel" wiring board like punched card unit record equipment but it also had 1,004 positions of internal memory that could be used to speed up the calculation process. More than 27,000 utility bills per month and more than 200,000 tax bills per year were processed and printed.
- 1965/1966: The Tabulating Section was renamed to the Data Processing Section. More than 30,000 utility bills per month and more than 200,000 tax bills per year were processed and printed.
- 1966/1967: During 1967, the Data Processing Section started a migration from using punched cards as their primary storage to a new Sperry Univac 9300 mainframe computer with tape as the primary storage. The 9300 was the County's introduction into mainframe computing. The 9300 no longer used "plug panel" wiring boards for programming. All programs used internal computing. The primary programming language had been Report Program Generator (RPG) but with the introduction of the 9300 Data Processing started using the COmmon Business-Oriented Language (COBOL) which went on to become the de facto standard language for most businesses in America for many years. More than 33,000 utility bills per month and more than 210,000 tax bills per year were processed and printed.

- 1968/1969: New applications and budget reporting came to the County using the new 9300 mainframe computer acquired in 1967. More than 34,000 utility bills per month and more than 250,000 tax bills per year were processed and printed.
- 1970/1971: The Data Processing section of Finance became a separate department known as the Division of Data Processing, or DP for short. The first Director appointed was Kenneth R. Peters who was a retired Lieutenant Colonel from the Air Force. He was known as Colonel Peters. He came to Henrico in the fall of 1969. Three new, internally developed, applications went into production during this same period. These were the Uniform Payroll, Leave Accrual and Personnel System, the Financial Management System including a Monthly Appropriations, Accounts Payable, and Cost Accounting sub-systems, and finally a Henrico School System including Pupil Scheduling, Pupil Grading, Pupil Accounting and Reporting sub-systems supporting 40 schools. A new Utility Connection Fee System developed by a consultant firm also went live during this period. More than 43,000 utility bills per month and more than 280,000 tax bills per year were processed and printed.
- 1971/1972: Data Processing upgraded to a Sperry Univac 9400 to keep up with the work load. The 9300 had 16k (16,384 positions) of memory. The new 9400 had 64k (65,536 positions) of memory and could run up to five programs concurrently. The 9300 could only run one program at a time. The 9400 introduced disk storage for the first time into the County's computing environment. The number of production run hours increased from 150 hours per month to approximately 350 hours per month. During this same period Data Processing became a "24x5" operation. This eventually grew into a "24x7" operation. A new Library System was also added and development of new Welfare and Voter Registration Systems were begun.
- 1972/1973: DP had a staff compliment of twenty-seven at the close of 1973. Henrico was the first local government in Virginia to convert to the Virginia Uniform Welfare Reporting System (VUWRS). This system was developed in collaboration among several local governments including Henrico.
- 1973/1974: The Sperry Univac 9400 was upgraded to a 9480 to allow the internal memory to be increased to 256k (262,144 positions) of memory. (30 employees)
- 1974/1975: Three remote terminals were added starting the first communications network. (32 employees)
- 1975/1976: DP saw the introduction of several additional computer terminals to allow more remote access to the mainframe computer. DP also saw a change in the guard with the retirement of Colonel Peters. Kendall Burroughs was appointed to be the new Director of the Division of Data Processing. His stay with the County was less than one year.
- 1976/1977: DP saw another change of the guard with the appointment of Brian D. Wantling in January 1977 as the new Director of the Division of Data Processing. DP moved to the new Government Center on Parham Road during October of 1977. The 9480 mainframe computer was also moved to the new facility.
- 1978/1979: A new mainframe computer was leased and installed. It was known as a Sperry Univac Series 90 90/40. A conversion from the 9480 to the 90/40 was completed in 1978. The 90/40 had 1mb (1000k or 1,024,000 positions) of memory.

Soon after the 9480 was removed DP added a second 90/40 taking the County into a multiple mainframe environment. This allowed for the separation of development and production work. They were known as the Red (production) and Blue (development) systems. A significant increase in the use of remote terminals also occurred during 1978/1979. Optical Character Recognition (OCR) technology was also added using scanner equipment from Keytronic and a Sperry Univac data entry mini-computer known as Computer Aided Data Entry (CADE) system. The initial phase of implementing a Word Processing system using Xerox 860 Word Processor equipment was also initiated in 1979. The development of a Computer Aided Dispatch (CAD) system was started in 1979. Some agencies also started using Control Program for Micro Computers (CP/M) on Sperry Univac terminals with Intel computer processors in them to run applications like WordStar for word processing and SuperCalc for spreadsheets.

- 1979/1980: The development of the Computer Aided Dispatch (CAD) system continued throughout 1980. After looking at many other localities it was determined that we should develop our system in house so that it capabilities could be tailored to the County's needs. CAD used a distributed computing model. The terminals used were connected to a controller that contained an Intel 8080 computer processor. This allowed us to store our screen formats and do the data capture and editing right in the terminal controller. This allowed the screen formats to be displayed in the blink of any eye (sub-second). The length of time to display the data entry screen formats was the largest complaint that we observed in other systems. This made Henrico among the earliest adopters of distributed computing and made our CAD system one of the best in the nation.
- 1980/1981: The first version of our CAD system went live on May 12, 1981 and provided dispatching for police. The Personal Computer (PC) was introduced by International Business Machine (IBM) with other manufacturers following suit with their own versions of IBM compatible PCs. IBM had given a new small company, Microsoft, a contract to develop the operating system for their PCs. When Bill Gates of Microsoft negotiated that deal he retained the right to sell the operating system under the Microsoft name as well. This was probably the best decision that he ever made. IBM called the operating system PC-DOS and Microsoft called it MS-DOS. The rest is history. This eventually led to Microsoft becoming the largest software company in the world and to Bill Gates becoming one of the richest men in the world. Our professional word processing environment grew significantly in 1981 with most agencies receiving Xerox 860 systems. A major new financial system, FAMIS, was implemented in 1981 in time for the preparation of the 1982 fiscal year. Our communications network surpassed 100,000 transactions in a day for the first time in 1981.
- 1981/1982: To better support our Computer Aided Dispatch (CAD) environment a third mainframe was added and was known as the Yellow system. Fire dispatching was added to our CAD application during 1982. Our first Ethernet network (Local Area Network [LAN]) was deployed for our Xerox Word Processing environment. Our first electronic messaging system was introduced. It was developed in house and was known as the Electronic Memo System.

- 1982/1983: Our terminal communications network surpassed the 200 mark and performed over 135,000 transactions per day. To accommodate growth of the computer room the Analyst/Programmer staff were relocated to the third floor of the C-South wing of the Administration building. The official organization of a new section within Data Processing was set up in 1982/1983. It was called the Information Support Center and it housed several computer resources like Personal Computers (PCs), Xerox word processing and graphics processing systems (known as a Star 8010), online terminals, a digital plotter, scanners, laser printers, etc. These resources were shared, on a scheduled basis, by all agencies. Three employees staffed and provided training on these resources. Our Fire CAD system went live on March 15, 1983.
- 1983/1984: 1984 saw a major upgrade to our mainframe computing environment. We replaced our three 90/40s with three System 80 Model 8 mainframes from Sperry Univac. During this same time period Sperry Univac changed their name to Sperry. The new computers more than doubled our computing power and storage. We were especially excited about these mainframes having 4mb (4 megabytes [million positions]) of memory. Several new major applications were implemented. These were the Personal Property and License System (PPALS), Payroll/Personnel Management Information System (MAPS), Library On-line Automation System (LIONS), Perpetual Parts Inventory System, On-line Permit Tracking System, and Jail Management Information System. The number of remote terminals surpassed 300. Over 140,000 transactions per day. Always-on disk storage exceeded 10 gigabytes (billion characters). A classroom with four PCs for teaching PC classes was added to the Information Support Center. A PC workgroup local area network (LAN) was deployed using technology from a company known as LANtastic. Installed PCs exceeded 100. These PCs contained a communications board in them that let them serve as an online terminal also.
- 1984/1985: The staff size reached 58 by 1985. Always-on disk storage grew to 12 gigabytes. The number of remote terminals surpassed 400. Over 145,000 transactions per day. This is the year where requests for on-line applications exceeded the request for batch (overnight) applications. 75 additional PCs were added to the network and file uploading and downloading to PCs was introduced. Over 150 County employees received hands-on PC training during 1985. PCs were connected to the Xerox Ethernet LAN to allow data exchange. The E911 interface in CAD went live on June 1, 1985.
- 1985/1986: The staff complement reached 59. Always-on disk storage grew to 15 gigabytes. The number of remote terminals surpassed 450. Over 180,000 transactions per day. Installed PCs exceeded 180. Over 450 County employees received hands-on PC training since the opening of the DP classroom.
- 1986/1987: The staff size reached 59. Mainframe computers were upgraded and a fourth mainframe was added. Over $3 million worth of leased equipment. It became known as the green system. The number of remote terminals surpassed 550. Over 250,000 transactions per day. Installed PCs exceeded 190. Eighty-four buildings were connected to the network. Introduction of connecting terminals and PCs to the network over twisted pair cabling instead of over the twenty-five pair cabling

previously used. This led to a major reduction in cost of connecting to the network. 338 employees received training in the Information Support Center classroom. The Information Support Center introduced a LAN based file server using technology from a company known as Novell. This network was Ethernet based. Ethernet eventually became the county standard and the de facto standard for nearly all modern networks. It was a 10mb (megabit/million bit) shared local area network. The initial Jail Management System (JMS) was implemented.

- 1987/1988: The staff size reached 60. The number of remote terminals reached 675. Over 300,000 transactions per day. Installed PCs exceeded 250. Ninety buildings were connected to the network. The County network was connected to the State of Virginia network allowing direct access to state applications using County terminals and PCs. Henrico was one of a very few localities who could use both the State's Sperry mainframe computers and the State's IBM mainframe computers. Other localities using IBM mainframe computers could only connect to the State's IBM computers. IT began extending its Ethernet LAN to other departments using network hubs and bridges from Hewlett-Packard. The LAN remained a shared 10mb network. The initial version of a Police records management system (PMOI) was implemented.
- 1988/1989: The number of remote terminals reached 917. Over 320,000 transactions per day. Installed PCs exceeded 350. Ninety-three buildings were connected to the network. The Ethernet LAN continued to grow. Public kiosks were added to the network to help visitors. Radio based communications was added to the network infrastructure. The Information Support Center added a heavy-duty color inkjet printer to the list of shared resources. EMS was added to CAD and was implemented on June 1, 1989.
- 1990/1991: The number of remote terminals reached 1,070. Installed PCs exceeded 400. Ninety-seven buildings were connected to the network. Thirty-two applications ran on the four mainframes. Four UNIX based servers were added to the computing resources. Data Processing won three National Association of Counties awards and one City & State award for excellence and innovation in information and technology. The Ethernet LAN continued to grow. One June 1, 1991, the CAD Sperry Univac UTS400 terminals were retired and replaced with new dual screen PCs running a new Cad/PC client program. This was also developed in-house.
- 1992-1993: The number of remote terminals reached 1,125. Installed PCs exceeded 480. Ninety-eight buildings were connected to the network. Thirty-three applications ran on the four mainframes.
- 1993/1994: Three additional awards were received from the National Association of Counties. Color laser printing technology was added to the resources being offered in the Information Support Center. The county stopped purchasing proprietary terminals and went to only purchasing PCs. Remote wide area network (WAN) locations began to move to Ethernet based LANs also.
- 1994/1995: The building of an all fiber backbone was started in 1994. The focus was the three main campuses in the County, Government Center campus, Eastern Government Center campus and Woodman Road campus. A wiring closet clean up

and upgrade also started in 1994. This led to the retirement of all LANtastic and Novell networks and changed the flat shared LAN into a much more robust switched and routed network. Cisco switches and routers became the new standard for all county LANs. Previous to this period the County used telephone grade wire for connecting terminals and PCs with terminal emulators to a device known as a multiplexer. The first Internet connection was also added to the network providing Internet access to all departments connected to the county LAN/WAN environment. The new Acquisition Information Management System (AIM) went live allowing individual agencies to complete their own purchase requisitions on-line eliminating staff hours and mounds of paper work.

- 1995/1996: A new Document Imaging System went live. The system allowed administrative staff in the County Manager's office to scan documents, agendas, plans, correspondence, and other essential files into the County's computer systems, thereby eliminating the need to file, stack, and store endless amounts of paper. A new Virtual Human Resource Information System also went live allowing employees to access their own personnel files online. Some internal reorganization was also done in DP that year. The network fiber backbone was completed for the three main campuses. DP staged a web site on a Sun Netra Workstation in the Fall of 1995. A public site was available through the Richmond FreeNet that Fall also. The "Henrico Internet Project" team first met in December 1995. The County's www.co.henrico.va.us web site officially went live on January 1, 1996. Internet based e-mail went live in the Fall of 1995 using sendmail on the Sun Netra Workstation. Initially there were about 100 users. In the Spring of 1996, Internet based e-mail became available County-wide using Post.Office on a Windows NT server. The JMS system was the first system ported to Tip/ix which ran on a UNIX server.
- 1996/1997: Data Processing received a new name. It became the Department of Information Technology (IT). A new Police Mobile Data Unit project went live where each patrol car received a mounted laptop PC making information retrieval instantaneous for on-duty officers. CAD and the Police Master Operational Index (PMOI) systems went to a scheduled downtime of only once per week. Since multiple police applications were now involved the in-house name of YCAD was changed to YPSB. These names stood for yellow system CAD system to yellow system public safety systems. Planning for the Year 2000 or Y2K got under way also.
- 1997/1998: Y2K preparation continued. A new client/server Emergency 911 Computer Aided Dispatch system went live allowing the system to ascertain the nature of the caller's emergency, determine the location, and dispatch the appropriate response team and emergency vehicles. This included the replacement of the CAD/PC client application with a rewritten client application. CAD/PC was written in the "C" programming language and the new client was written using the Microsoft Visual Basic 6 (VB6) programming language. This project included placing mobile data computers (MDC's) in police vehicles. The mobile data project was about a five million dollar project. IT also took a major role in the massive Geographic Information System (GIS) acquired by the County. IT introduced

Microsoft Exchange as an additional email service in the Fall of 1998. This initial implementation allowed two people per agency to use Exchange.

- 1999/2000: In the Spring of 1999 the use of Exchange for email services was expanded for agencies that could fund their own licenses. A quote from the Annual Report: "New Year's Eve 1999, the hustle and bustle at the Information Technology (IT) Department looked like anything but a county holiday. As the clock inched closer to midnight, activity increased. Midnight came, and went. No mayhem. No blackouts. No spontaneous combustion. All was well. It was the best compliment the staff in IT could have hoped for – that all of the preparation, the anticipation, the long hours, the lines of code, the contingency plans, checks and balances, test runs – it all worked. To the naysayer, the "Y2K hoo-ha" was all for naught. But for the real people behind the real potential problems, a non-event meant a job well done." 1999 also saw the completion and implementation of a countywide Local Area Network (LAN)/Wide Area Network (WAN). Gone were all of the vendor proprietary network environments.
- 2000/2001: DARWIN -- a Data Warehouse of police historical data went live. The full implementation of a document management system known as Filenet was accomplished with the Manager's Office and Police being the first groups to take advantage of the elimination many paper documents. The purchased product known as Tidemark also went live for our Community Development departments.
- 2000/2001: People who were interested in getting up-to-the-minute traffic information in Henrico County needed only to click on the County web site to be in the know. IT also interconnected the three main campuses, Government Center, Eastern Government Center and Woodman, with high speed, gigabit (billions of bits), networking services from Verizon. This allowed employees and all three campuses to enjoy the same response time.
- 2001/2002: IT had a changing of the guard. Steven M. Lewis was appointed to succeed Brian D. Wantling who retired after 26 years of service.
- 2002/2003: IT completed a multi-year process of migrating the County from proprietary mainframe computers to open standards state-of-the-art rack mounted servers. During the upgrade IT also increased the County's Internet speed capabilities (bandwidth) by a factor of 15 times faster. Centralized virus and spam email protection was also introduced into the network. As of 2002/2003, IT's network consisted of more than 100 buildings and 3500 workstations supporting 33 major applications. CAD was among the applications that were migrated to a UNIX platform in 2002. As part of the move to a new server, the scheduled down time was reduced to about ten minutes per week. In 2003, IT had to migrate off of Post.Office for email services because the company sold out and no longer supported email. More than half of the email users migrated to a new email service known as CommuniGate Pro. The remaining users migrated to Exchange for email services.
- 2004/2005: The Oracle e-Business Suite's Financial System was implemented during this time period. A new Field Interview Reports System for Police was also completed and went live saving many hours previously spent on paper work. The migration to Exchange for email services was completed in April 2004.

- 2005/2006: The County generated and handled about seven terabytes (that's seven trillion characters) of data as of 2005. All of that information needed a place to stay. Previously, many County agencies managed a lot of their own data storage requirements using agency servers and PCs. This carried the risk of losing data. IT started the installation of a new storage array from EMC Corporation and between 15 and 20 new servers to create a large central repository. In most cases, agency servers were eliminated and IT accepted the responsibility of backing up and managing the information needs on behalf of the agencies. IT added a lot of network redundancy in 2005/2006 providing multiple connections to wiring closets to make the network more resilient and reduce the risk of network outages. During the summer of 2005, IT received funding to migrate all remaining email users to Microsoft Exchange. The CAD system was migrated from UNIX to Linux during April of 2006.
- 2006/2007: Several new systems were introduced in 2006/2007. The new "Wwatch" System manages all criminal warrants issued in Henrico as well as warrants from other jurisdictions requiring service on county residents. There are between 6000 and 7000 criminal warrants on file at any given time. The new "Debt SetOff" System gives Finance, Public Utilities, Recreation and Parks and other participating agencies the ability to automatically submit and track difficult-to-collect debts with the Virginia Department of Taxation. The automated process allowed the County to "get-in-line" rapidly with the state agency, which captures tax refunds and other money owed to localities on a first-come, first-served basis. IT also added a second Internet connection to help employees who use the Internet in their day-to-day operations. This added much needed bandwidth since the first line was at a 70 to 80% utilization.
- 2007/2008: IT implemented a new custom in-house developed Computer Aided Dispatch (CAD) system known as CAD24x7. CAD24x7 provides a cutting-edge command and control system for the county's E-911 dispatch center. It tracks calls, analyzes their location, determines the closest available Police, Fire or EMS units and recommends which units to send. It records data such as response time and incident resolutions to further speed the handling of emergency calls. CAD24x7 requires no down time, operating over multiple servers on the county's enterprise network for greater redundancy and resilience. The system was made more resilient by locating additional servers in the Communications and Training Center where the E911 Center is housed. This allows CAD to operate even if there is an outage in the IT data center. The mobile data terminals have grown in number until now there are over 500 police cars and over 60 Fire response vehicles that have them mounted in the vehicles and run on a "24x7" basis. A new legislation tracking system was also introduced to help County officials better track and discuss pending bills. The new system combines a blog function with e-mail, creating a running dialogue on legislation that allows users to view each other's comments and ideas. Users can also view a bill in its entirety. The Communications section of General Services was relocated and became part of the Information Technology team. This brought responsibility for about 81 phone systems supporting about 5000 telephones to IT. Four of the 81 phone systems are large private branch exchange (PBX) systems. These hosts about 4000 of the 5000 phones. The remaining phones systems are

small key systems that primarily support remote sites like individual fire stations, Recreation and Park facilities, etc.

- 2008/2009: Another in-house developed police application that went live is known as the Police Reporting and Information Management Enterprise (PRIME) system. PRIME provides an officer access from a single launch point to a range of records, including incident crime reports, warrants, arrests, drug logs and field interviews reports. A considerable effort was made to reduce phone communications cost. Nearly one million dollars was saved in this time period by getting rid of taxes that the county was not obligated to pay, cleaning up other billing issues, eliminating unused or unneeded leased communications lines and converting other lines to less expensive services. The EMC disk storage array was replaced with a storage array from Network Appliance (NetApp).
- 2009/2010: A major issue raised its head in 2009. Nortel, the county's phone system vendor went bankrupt and was bought by a firm named Avaya. Avaya announced that it intends to discontinue every phone system and phone that the county uses. Our current environment will be supported through November of 2015. This triggered an intensive research project of trying to determine the best solution the county should adopt for it voice based communications. Even though a specific vendor or solution has not been chosen, IT has determined that our next voice communications systems should be converged with our data network allowing one network to support voice, data and video. This environment will require a network equipment refresh of our aging network equipment. IT made significant strides in reducing administrative overhead as part of the county's green effort through the use of virtual servers. Previously, individual county applications ran on their own server, often using a minimum amount of the server's computing power but nevertheless requiring a full amount of electricity to operate and cool the servers. Two-hundred and sixty (260) servers filled racks in IT's data center. Currently we have reduced that number to 160 physical servers and 100 virtual servers. These 100 virtual servers live and run on 7 physical servers. We have come a long way from our former environment of 4 mainframe and about 6 smaller Windows and UNIX servers. Five new applications also went live in this time period. The effort to reduce phone communications cost continued in this time period and led to saving the county and public schools an additional $500,000.
- 2010/2011: IT saw another changing of the guard in early 2011. After the retirement of Steven Lewis, Tom Owdom, who was the Assistant Director, was appointed IT's new Director. A major network equipment refresh is scheduled to begin this year in preparation to support a converged network capable of carrying voice, data and video traffic. Research continues on a replacement phone system. That project is planned to follow the network equipment refresh. A new 911 center phone system was selected in 2010 after an RFP process and is currently being installed. A GPS based unit tracking capability was added to the mobile data system for Police and Fire and interactive maps displaying the current locations of the units were produced
- 2011/2012: The Department of Information Technology added an Assistant Director as George Bains came onboard. He has 23 years of IT and local government experience. Also during the fiscal year, Information Technology completed its data

center revitalization of the County's central network switches which increased its overall speed from 1 to 10 gbs. This effort will be expanded in the next fiscal year to upgrade the technology from the data center out through the communication closets to the desktops. The few remaining "legacy" systems should be replaced by July 2012. This includes the Department of Finance Billing Systems and the Police Incident and Crime Reporting System. IT implemented a new E-911 Emergency Telephone System during the year. This system was installed on-time and under budget. It provides Henrico's E-911 Dispatch Center with a state of the art system. IT assisted the GIS office to implement a high-availability GIS server architecture during the past fiscal year. This provides near non-stop GIS services for both internal and external applications. This architecture now supports 24x7 access for Public Safety applications including GPS unit mapping and GPS closest-unit response recommendations for the E-911 center. The GIS office also implemented the County's first citizen accessible interactive mapping website during the past fiscal year. Also during FY2011-12, the County's Geographic Information Systems (GIS) Office, which had been a part of the Department of Public Works was moved into IT as the goals of the GIS Office are more closely aligned with IT.

- 2012/2013: The Department of Information Technology continued to expand its virtual server environment. Currently IT has approximately 114 virtual servers running on 7 physical servers. The County has 144 physical servers. The goal of Information Technology is to continue to virtualize servers where practical. One of the strong features of the VMWare virtual technology is the ability to easily replicate data at an off-site location and quickly restore data to an operational center once the damaged or destroyed hardware has been replaced. Also during this year, Information Technology has been upgrading the County's main campuses data infrastructure from the main data center to the communication closets. This upgrade includes new fiber where needed and a complete refresh of data switch hardware. When complete data speeds LAN-wide will increase from 1gb to 10gb to the data closet and 100mb to 1gb to the desktop. This refresh positions the County to take advantage of new technologies and allow transmission of voice, data, and video over the same infrastructure. During FY2012-13, Henrico IT has consolidated the Public Library's Data Centers into the main IT Data Center. This process should result in infrastructure cost savings as well as unified staffing. Public Library transferred two positions to Information Technology to assist in the overall County support of the Data Center and the County's network. Two positions, formerly in Real Estate Assessment, were moved to Information Technology's GIS Office expanding the capacity of the GIS Office to handle GIS needs for real estate and Finance as well as increase the resource capacity of the GIS Office to respond to the varying County GIS needs. In addition, one position from Human Resources was moved to Information Technology in order to assist in the Oracle E-Business area. One vacant position within IT was eliminated as a result of redistributing responsibilities of the position to the remaining staff in order to create better efficiencies. The few remaining "legacy mainframe" systems were also replaced this year. This includes the Department of Finance Billing Systems and the Police Incident and Crime Reporting System. One major project facing the County during this year was the upgrade of the Oracle e-Business Suite to release 12. The

upgrade, scheduled for November 2012 increases the functionality of the software. The County upgraded the enterprise Oracle e-Business Suite to release 12 this project occurred on-time with minimal consultant assistance.

- 2013/2014: The Department of Information Technology continues to enhance our infrastructure as the DBA Team has made significant progress in moving the County's SQL Server databases to IT's virtual server environment allowing increased performance at a lower hardware cost. The goal of Information Technology is to continue to virtualize servers where practical. IT finished upgrading the County's data network infrastructure at all WAN sites. This upgrade included new routing and switching gear, as well as a complete overhaul of the IP addressing schema. This will better prepare the County for VoIP and other deployments. Also upgraded during the past fiscal year were the redundant Internet connections, which were both increased to 200 Mb each. As a part of the Internet bandwidth upgrade, the Internet-edge routers and firewalls were also replaced. This will not only allow the County to accommodate this Internet bandwidth increase, but will also allow for more flexibility in Internet bandwidth increases in the future. Complete removal of ATM circuits was completed over the past fiscal year by migrating those connections to various other connections, including microwave, TLS, and DSL. This migration resulted in significant cost savings. IT continues to review various disaster recovery scenarios and associated technologies. These include on-site, off-site and cloud related scenarios in an effort to better protect the County's systems from disaster. The team working on Police systems finished three new systems, this included an incident and crime reporting system, arrest/booking system, and evidence tracking system. All of these systems are integrated with Police Officers' mobile computers and have significantly improved data accuracy and timely entry. Three smaller systems developed and implemented this year are a customized Case Tracking System for the County Attorney's office, an expense tracking system (FEDS) to be used county-wide for FEMA events as well as for when the County or individual departments want to track expenses for major non-FEMA events such as storms or snow removal, and a new inmate medical delivery system for the Sheriff's Office. The Cad 24x7 system received numerous enhancements during the past year. Foremost among these were software changes implemented to support a new Emergency Fire Dispatch protocol (EFD), which allows for a variety of response levels for structure fire calls based upon the hazard classification of the property involved and the circumstances of the particular call so that the units recommended for a Fire call will automatically be right-sized depending upon the hazard classification assigned to the address by the Geographic Information System. Other changes included a new mobile map for Police and Fire; an enhanced unit recommendations feature that includes the capability to automatically recommend specialty teams such as the Technical Rescue Team; a revised Emergency Medical Dispatch protocol, which provides an integrated triage process for each EMS call; and an enhanced notifications system, that will be implemented in the first quarter of 2014 and use email and text messages to advise other County departments when they are needed to respond to CAD related incidents. In response to the DPU Work Order Management System Project, the GIS Office has spent substantial time restructuring the GIS server infrastructure and GIS databases to best meet the

needs of the WMS project while still supporting an optimal environment for the County-wide enterprise GIS.

- 2014/2015: The Department of Information Technology continues to expand its virtual server environment. Currently IT has approximately 214 virtual servers running on seventeen physical servers. The County has 149 physical servers. In keeping with IT's movement toward the use of VMWare, the Database Team has virtualized approximately 90% of the 183 SQL Server databases. Forty of these databases are running in the AlwaysOn SQL Server high availability environment, which allows them to run with virtually no outage. There are also plans to move at least two of the sixteen Oracle database instances to VMWare. Other Oracle database instances will be moved as the physical servers are retired due to maintenance contracts. The goal of IT is to continue to virtualize servers where practical. IT also continues to look at alternative storage and backup technologies. This review includes both on premise and cloud solutions changes in this overall strategy should occur before the end of FY2014-15. Also this year, IT be looking at replacement of the current tape backup system. The goal is to have a new system in place during FY2014-15. The Police Team made significant enhancements to all browser-based inquiry systems by adding functionality and updating to the latest version of Microsoft.Net. Staff converted all reports to SQL Server Report Services saving a significant maintenance cost. Another significant migration was from SQL Server 2005 to SQL Server 2012. There are now over twenty different Police databases running on this latest version of SQL Server. The new Web Team made progress in standardizing the County's web site and set forth plans for a complete redesign of the site and the site's management. A working group of staff from various Departments has begun plans to change the site from a difficult to use Department-centric site to an easily navigated services centric site. IT envisions the County site becoming a portal for most citizen services and a means to increase the volume and quality of information citizens require. IT continued development work in Oracle Application Express, replacing legacy departmental Access Database systems, including two systems for DPW with mobile wireless laptop connectivity and GIS integration: the Standing Water and Mosquito Tracking system (SWIS) and the MS4 Infrastructure Inventory Management System (STRM). Additional Apex development included the BIDS system for managing Boards and Commissions appointments. The GIS Office implemented a new Henrico County web map for both public and internal use. Accessible from the County's home page, this map is intended to work on desktop, tablets and smart phones. The GIS Office also collaborated with DPW and IT to provide a Standing Water Initiative mobile application that allows DPW users to survey, edit, and record both GIS and tabular data in the field. This replaces an antiquated paper form system that has been in use for years. IT worked with the Sheriff's Office to implement a new medical services delivery system called HealthSecure. IT also implemented a new public facing website for the Sheriff's Office which provides a portal for viewing information about current inmates of the Henrico County Jail system.

  Information Technology has started two enterprise projects in FY2014-15. The first is Microsoft Office 365 this product moves the County's email and collaborative infrastructure into Microsoft's cloud environment. Also, the County has contracted to

introduce a Voice over IP (VoIP) telecommunications system. This system will replace the County's legacy phone system. This will result in additional savings by reducing the cost of incoming phone lines via a conversion to SIP trunking and an associated reduction in phone number and long distance costs. While large savings have already been achieved, IT continues to review telecommunications costs. The Oracle databases for Oracle HRMS/Financials, Social Services, Finance applications, and mobile development were moved to the newly acquired Oracle database appliance (ODA). This migration resulted in significant performance improvement in the Oracle HRMS and Financials processes. IT continues to look into creating a disaster recovery database appliance ODA housed at the County Training Center (CTC). The Department has also achieved their Oracle database consolidation goals. During the next year the focus would be to replace their aging application server hardware with either Oracle Database appliance guest virtual machines or a separate hardware virtualized VMWare instance. IT is in the process of upgrading the County's data network infrastructure in the primary data center located in the IT Department offices and a new secondary data center at the E911 Center. This upgrade includes new routing and switching gear for both the main distribution networks and the server networks. The backbone connection speeds went from 10gb to 40 gb. This will better prepare the County for VoIP, virtual server infrastructure enhancements, and also will provide full redundancy to all network closets in the Western Government Center (WGC) and CTC campuses distributed to both locations. Also, included in the campus redundancy project was the addition of a much higher capacity fiber-optic cable placed between the WGC and CTC campus with backbone speeds from 10gb to 40gb. Effectively, the addition of the fiber-optic cabling has allowed the IT to logically couple the main data center network and the CTC data center network into one comprehensive network, while maintaining physically separate locations for the data center equipment. In collaboration with Police, IT implemented the innovative TEMPO dashboard which provides a browser based menu for all Police reporting applications and a set of user subscription based situational and historical awareness applications. The subscription based applications allow Officers to: view maps and tabular data of crime, arrests, warrants, calls for service and other data which can be mapped that meets their specific needs; view photographs of interest published by the Crime Analysis Unit and others of persons, place and property; read and comment on daily briefs published by various units; read and contribute to forums on specific topics ranging from crime in a patrol zone to current gang activities; view a full range of metrics on the units of work an officer has performed as measured by reports completed, arrests made, calls sent to, assigned investigations, warrants served and obtained, etc. As part of the Web Team's goal to make the County's website easier to use, the website moved from the difficult www.co.henrico.va.us URL to an easier to use Henrico.us URL. The Web Team has also been working closely with agencies around the County to fine tune plans on the migration to a service-oriented website. Some enhancements already implemented include custom pages for presentation of parks, and improvements on using the site on a wide range of devices. Upcoming products include an emergency alert system integrated into the County's site and a calendar to improve presenting event information to citizens. IT continued

development work in Oracle Application Express (APEX), replacing legacy departmental Access Database systems and manual operations with six new systems for DPW, the County Manager's Office, and General Services. These include: the MS/4 facility Management System (STRM), the Storm Water Management System (SWM), Boards and Commissions System (BIDS), Henrico-Owned Parcel System (HOPS), Utility Payment system (GSUT), and the Security Incident Reports System (SIRS). Additional APEX development includes four new systems: the Fire Drill and Inspection system for MH/DS, Septic Pump Out system for DPW, Budget System for Finance, and an Evidence Tracking System for Circuit Court. IT supports over thirty APEX applications covering twelve different agencies. The Cad24x7 system received numerous enhancements during the past year. Foremost among these were the replacement of the commercial map with an in-house custom developed 9-1-1 map and provides a more tailor-made map which seamlessly integrates with the Cad24x7 dispatching system. Also the new ASAP alarm interface was implemented which allows approved commercial alarm companies to electronically submit alarm calls to the Cad24x7 system. Now thousands of alarm calls will be automatically received via the ASAP interface each year relieving the dispatchers from having to answer and enter those calls into the system and making the County's emergency response to those calls for service faster. The GIS Office has upgraded the County's ArcGIS platform providing enhancements to GIS desktop and server capabilities. County agencies now have access to several cloud-based GIS solutions, as the GIS Office has implemented both ArcGIS Online for Henrico County and pictometry oblique aerial photography. Additionally, plans have been finalized for bi-annual aerial photography and base-mapping updates for the next several years. GIS continues to support diverse project areas including DPW's MS4 Apex application, DPU's Cityworks implementation, and has taken over GIS responsibilities for Community Revitalization.

- 2015/2016: During FY2015-16, the Department of Information Technology will continue to expand its virtual server environment. Currently IT has approximately 350 virtual servers running on 21 physical servers. The County has 136 physical servers. In keeping with IT's movement toward the use of VMware, the Database Team has moved 83 percent of over 294 databases to Microsoft Sql Server 2014. This version will be supported by Microsoft for at least the next five years. All Police reporting systems, Computer Aided Dispatch, the Sheriff's Office Medical Service, Libraries, and Circuit Court Land Record databases are now running in a high availability architecture at multiple facilities. This architecture allows one facility to suffer a catastrophic anomaly but permits the databases to continue to operate. Disaster recovery databases have been created on the standby Oracle Database Appliance running at the County Training Center (CTC). IT will be able to recover their production databases on the new site in case of disaster on their primary site. Servers serving the Oracle Applications frontend were migrated to the virtualized VMware environment. Work will be performed on the Oracle Application's Internet security replacing an older environment with a newer technology and migrate from myhenrico.org to employees.henrico.us. During the next half of 2016 the department will be working on the implementation of newly acquired Oracle Internet

Expenses module for online employee expense reporting. IT is in the process of moving all of the County's phones from the legacy PBX to a new Voice Over Internet Protocol (VoIP) platform. At this point, the rollout is roughly 75% complete, with an anticipated completion in the Spring of 2016. Included with the VoIP rollout is a conversion of the voice circuits from legacy copper-based PRI circuits to new fiber-optic SIP trunks. Information Technology also added buried fiber-optic cabling on the WGC campus to add the 8600, 8602, 8604 Staples Mill Road buildings to the overall campus network. Currently, this provides these buildings 10Gbps of throughput to the County's backbone network with $0 in monthly recurring costs. In collaboration with Police, IT enhanced the TEMPO dashboard to include individual officer statistics based on the number of reports generated by report type. This allows an officer to verify the submitted reports are correctly categorized and complete. A new application was written to maintain a database of individuals banned from properties throughout the county and ensure Letters of Authority are readily available. Previously the lists of individuals were maintained in numerous spreadsheets and not available for integrated real-time querying. Currently over 2,000 individuals are banned from 40 apartment communities and 15 businesses throughout Henrico county. The Web Team continues to restructure and redesign the website to make it easier to use for our end users. Several projects were launched to better organize content such as Services and Capital Projects. Department pages were reviewed and reorganized to remove content from silos and to better present content in functional areas. These update pages automatically pull in structured data (projects, events, services) to provide visual consistency through the site. The reorganization project is nearly complete, and the redesign of the website is currently in the works. An employee portal (employees.henrico.us) was developed in conjunction with HR to better organize HR content. The Web team has been working heavily to implement SharePoint in the County, working with several departments and internally to train users and gather feedback. IT built five new in-house Oracle Application Express (APEX) systems for four different agencies. These include the Facilities Inspections and Drill System for Mental Health & Developmental Services, Septic Pump-out/Inspection Program system for Public Works, Budget Development system for Finance, MS4 Municipal Management Area Tracking system for Public Works and a Time Tracking system for Circuit Court. New APEX projects are in the works for four different agencies including the Training and Compliance system for Public Utilities, Media Tracking system for Information Technology, Card Access Request Tracking system for General Services and a Time Tracking system for the Commonwealth Attorney's Office. The APEX team also provided support for tracking Police costs during the 2015 UCI World Championships. IT supports over forty APEX applications used by every agency in the County. The IT Community Development & Services team upgraded Accela Tidemark Advantage to the latest version, ensuring the stability of this enterprise system. The upgrade included installation of the client software on more than 300 computers, migration to a new Oracle database, new virtual servers, development of a new Paymentus IVR application, and upgrade of the Selectron InspecTrack system. The Cad24x7 system received numerous enhancements during this year. Specific customizations were made to the system to accommodate processes

related to the UCI bike races. These included the implementation of a dynamic roadway barrier system which allowed for street blockages to be managed via a web map. This enabled the system to more easily take roadway closures into account in determining the closest units to a call for service. During the UCI races the County roadway network had upwards of 180 active roadway barriers at various points in time. These would activate/deactivate according to date time criteria allowing for a very dynamic expression within the system. Also, a new duplicate call check feature was implemented to assist dispatchers to more easily identify duplicate calls for a single incident. Also the new ASAP alarm interface expanded during the past year to include alarms from EDT, Inc. which basically doubled the number of alarm calls the system accepts electronically. The GIS Office has upgraded the County's ArcGIS platform providing enhancements to GIS desktop and server capabilities. County agencies now have access to several cloud-based GIS solutions, as the GIS Office has implemented both ArcGIS Online for Henrico County and pictometry oblique aerial photography. The GIS office has worked hand in hand with the web team to enable a web map in support of a new capital projects web page. It is hoped that this will serve as a template for future projects. The GIS Office worked hand in hand with Fire and others from IT to assist running the command center at the UCI races. An ArcGIS Online site was central to the management of the Public Safety presence at both the UCI races and the NASCAR races. Support for the Division of Fire included significant IT presence for both the UCI and NASCAR races. Also, IT is participating in two RFP development projects with DOF. The first is for a replacement records management solution for both NIFRS and PPCR reporting; the second is for another Fire Alerting system.