LOB #141:

TECHNOLOGY INFRASTRUCTURE

Purpose

The Technology Infrastructure LOB is responsible for providing and maintaining the core, underlying technology infrastructure environment supporting all Fairfax County agencies and programs for IT (applications and data), and communications capabilities. The enterprise platform technologies infrastructure defines and provisions the technical components including servers, technology platforms, devices, middleware integration software, operating systems, data storage, and interfaces, other software tools and equipment used to maintain technical operations and applications installed in the County's Enterprise Data Center and at other data galleries. 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. The mission includes enabling continuous improvements - the evaluation, designing and implementation of emerging infrastructure technologies and concepts seamlessly, enhancing functionality at the most efficient cost.

This LOB is in the DIT General Fund agency, and is the sister LOB to LOB #302 in Fund 60030, Technology Infrastructure Services. Together these LOBs comprise a single line-of business; they are not mutually exclusive in delivering the service, both are necessary and joined for a single, foundational service.

Description

The Technology Infrastructure LOB is a single program, however funded out of both the DIT General Fund, and the Technology Infrastructure Fund. It provides the electronic host and pathway to County IT resources for both the Citizens and employees. While supported out of the two funds, DIT considers this a single line of business because all components are required for the technology infrastructure to perform.

This narrative addresses the services performed from the General Fund portion of the line of business, referred to in DIT as 'Platform Technologies' with these specific discrete activities:

- Server environment engineering
- System Integration and middleware
- Enterprise-wide e-mail, business productivity and messaging systems (Microsoft)
- Database analysis and management
- PC replacement program management and desktop device configuration
- FOCUS Infrastructure management (County and FCPS)
- Mobility Center and Remote Access infrastructure

Each of these technology areas requires highly-skilled resources with specific subject matter expertise. Multi-prong resource strategy includes a combination of continuous opportunity for training County staff who are key to providing services with industry provided staff augmentation and best practices managed services from a variety of firms.

The Technology Infrastructure division and branches were established as a core part of the Department of Information Technology at its inception. Over the years, it evolved from a mainframe centric environment mostly supporting legacy corporate applications (financial/procurement/budget, payroll and e-mail systems), and some agency based business systems applications in Human Resources, Police, Fire and Rescue, land development systems, records systems, tax systems, and related data. The current virtualized server environment is an internal 'cloud' hosting over 700 applications and 500 databases supporting all County agencies.

DIT's mission is to lead the response to changing technology in order to deliver an enterprise infrastructure that is agile, scalable, dependable and compliant, while enhancing Fairfax County government cost effectiveness and efficiency. The vision is to continuously look for ways to leverage information technology to stimulate the development of an integrated environment that promotes an open, collaborative, and unifying culture throughout the County. To ensure continuous delivery of quality services in a cost-effective and resource-efficient manner, Fairfax County's technology infrastructure was 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. Today it allows for all employees to access their payroll and benefits information, e-mail, and personal/shared network storage drives with their job related files and data.

The County's IT environment builds on an enterprise architecture that includes industry standards, open systems, the web, cyber security, and tools that support a variety of needs and diverse portfolio of internal and external systems including 'cloud' offerings as appropriate. The supporting infrastructure foundation was designed to ensure the integrity of transactions, data and optimum system performance. Strategic planning, governance and program management assures inclusion in decision making and implementation of relevant products, and effective solution delivery at a fully leveraged cost.

The operational goals for areas of support which the Platform Technologies LOB in "*keeping the lights on*" are to provide a high degree of performance and resilience, and at the same time, reduce operational costs, improve utilization of IT assets.

Strategic goals include keeping pace with technology evolution that is responsive to county business requirements for all programs in a rationalized approach with emerging infrastructure technologies/concepts to foster:

- Seamless integrated systems/services
- "Greener" IT - Utility computing
- Enhanced collaboration and self-service
- Cloud computing and Web Services
- Platform consolidation
- Enhance Interoperability within agency clusters & with other jurisdictions

With the County's server consolidation and virtualization effort in FY 2011, Fairfax County's platform architecture was reduced from over 1000 servers to an average target ratio of 60:1, an on-going effort for even greater footprint and overhead and support reductions at improved performance. Listed below are the services/projects that are critical for the core technology infrastructure services being delivered to county end users.

- **Enterprise-wide User Support**
  - Mobility and Collaboration
  - Remote Access
  - Mobile Device Management (MDM)
  - USB Mobile Devices
  - Business Productivity Solutions- Office 365

- Unified Communications – Skype for Business
- Secure File Sharing
- Anti-Virus, Malware, and Web Security
- Content Management

- **Servers and Desktops**
  - Virtual Machines (VMs)
  - Server Operating System (OS)
  - PC Operating System Upgrades
  - Web Browser Upgrades
  - PDF/forms solution

- **Databases**
  - SQL Databases
  - Oracle Databases

- **Enterprise Support Services and Applications**
  - Enterprise Secure Solutions
  - User Management Solution
  - Active Directory Federation Services
  - Configuration Management
  - Virtualization
  - System/Application Performance Management

Benefits

The centralized Technology Infrastructure service has delivered significant important benefits as envisioned by the Board of Supervisors in their establishment of the Department of Information Technology (DIT) in 1997, namely - consolidated, shared use IT resources to achieve optimum performance with reduced overall cost in County IT.

Infrastructure projects have been and continue to be centered on the following strategies for an overall benefit in use of IT:

- Automation of Processes for increased productivity of County business operations
- Standardization of IT
- Consolidation and Simplification of IT to increase efficiencies and reduce the total cost of ownership (TCO) of IT
- Mobility to enable users to perform County business from anywhere reliably and securely
- Leverage Energy Efficient Computing
- Moving to Shared Services and Other Consolidation
- Adopting Self-Service resulting in increased business productivity and user satisfaction
- Ensure Visibility, Security, and Accountability
- Building a Culture of Agility

- Keeping systems available, operational, and secure

County end-users are able to perform their day-to-day tasks using a best in class IT infrastructure, equipment, software, and services that are up-to-date and secure, and the equipment is protected against failure by extended warranties-enhancing employee productivity.

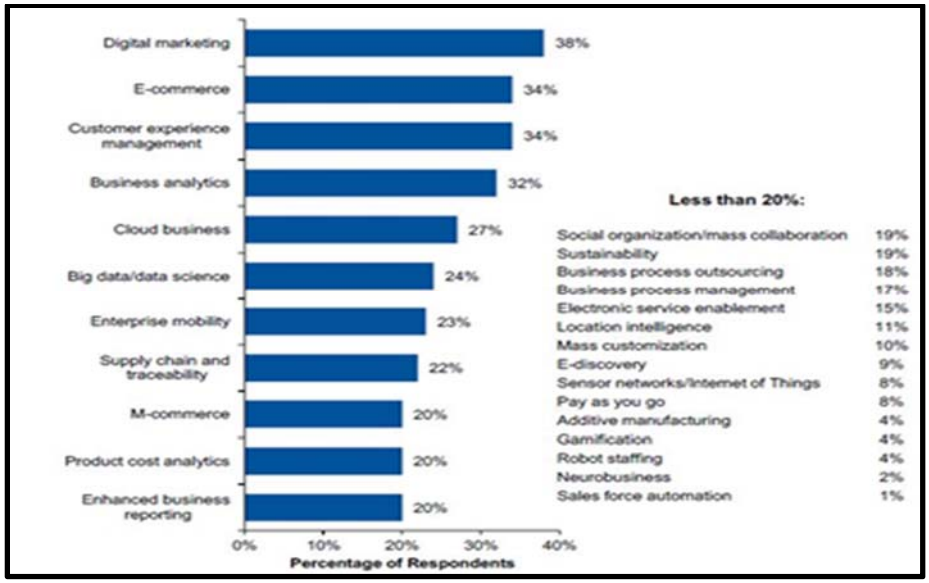
Mandates

While not mandated, this central core service is essential, supporting County mandated services and programs.

Trends and Challenges

Many organizations have spent decades trying to push "IT costs" down in the mistaken belief that IT is somehow an entity unto itself, as opposed to an intrinsic part of almost every enterprise activity. Organizations which are focused on reducing IT costs as opposed to maximizing enterprise performance will have difficulty seizing digital opportunities. It is being seen that many organizations, both government and commercial, are operating with absolute caps on IT spending in the enterprise. The first risk associated with such caps is that if the enterprise grows, IT resources will be focused increasingly on run-the-business activities, meaning that investment in new enterprise capabilities will be starved. The second risk is that demand for new capabilities in most enterprises doesn't go away simply because IT's budget is capped, so the spending doesn't recede; it migrates to other areas of the budget, where decisions are often made by individuals with little to no prior experience with information security, scalability, or life cycle management. IT spending decisions made without IT management is less likely to be organized and funded according to enterprise priorities, and even less likely to be designed and built to support efficient operations at scale.

The opportunity is for Fairfax County to recognize that participation in digital business continues to require investment and that identifying the best investment opportunities and moving quickly offers long-term strategic advantages to the County.



GARTNER: Most Important Technology-Enabled Capability Investments over next 5 years

With explosive growth in IT technologies, there is a constant need to enhance the County's infrastructure and expand offerings, which enable scalability, mobility, increased collaboration, and elasticity to keep up with the changes. Incorporating mobility and cloud based computing services, automation, and self-service has become essential. The expectation of a high performance infrastructure with minimal downtime increases the need for both staff and budget resources.

- Mobile technology is here to stay and the County needs to keep "mobile first" when considering any infrastructure or technology needs.
- IT evolves quickly, life cycles of equipment can be as low as 18 months.
- The constant need to consume more information stretches the ability to keep up with the bandwidth and performance tools needed for an acceptable user experience.
- Service contracts can become costly as the need for 24x7 reliability comes into play, with the expectation now of zero downtime.
- Modern Building Automation Systems to support HVAC, Lighting controls, Access controls, and Internet Protocol (IP) based surveillance camera systems continue to grow rapidly in both new construction and remodels as the County strives for energy efficiency.
- The internet of everything. Almost all new devices of any kind require either wired or wireless network connectivity to function. Each employee now may have numerous IP based devices to complete their job, thus straining the Enterprise network resources.

Challenges

Challenges and opportunities are fueled by expectations from the County's highly digital constituents and business community to interact and conduct business with the County utilizing contemporary technology and web-based capabilities that enhance information, communication, and transactions in a variety of formats, and enable transparency, access, engagement and open government. An environment of rapid change and the need for responsiveness together with finite resources, highlights the importance of thoughtfully considered deployment of IT trends, that embrace supportable standards and agile IT enabled services, solid investment strategy and governance.

The County's IT capabilities must (as is the case with any large sized county which requires citizen-driven engagement and citizen services) be contemporary, flexible, scalable, secure, and environmentally conscious with the ability to respond to new goals, dynamically changing service and operational requirements by various agencies and the public. The major challenge is to continually evaluate the dynamically changing IT industry and carefully choose options that have an appreciable lifecycle, are sustainable and allow for agility while managing costs.

Resources

Category	FY 2014 Actual	FY 2015 Actual	FY 2016 Adopted
LOB #141: Technology Infrastructure			
FUNDING			
Expenditures:			
Compensation	$2,204,003	$2,638,303	$3,479,251
Operating Expenses	2,162,323	2,782,358	2,529,058
Total Expenditures	$4,366,326	$5,420,661	$6,008,309
General Fund Revenue	$0	$0	$0
Net Cost/(Savings) to General Fund	$4,366,326	$5,420,661	$6,008,309
POSITIONS			
Authorized Positions/Full-Time Equivalents (FTEs)			
Positions:			
Regular	35 / 35	35 / 35	35 / 35
Total Positions	35 / 35	35 / 35	35 / 35

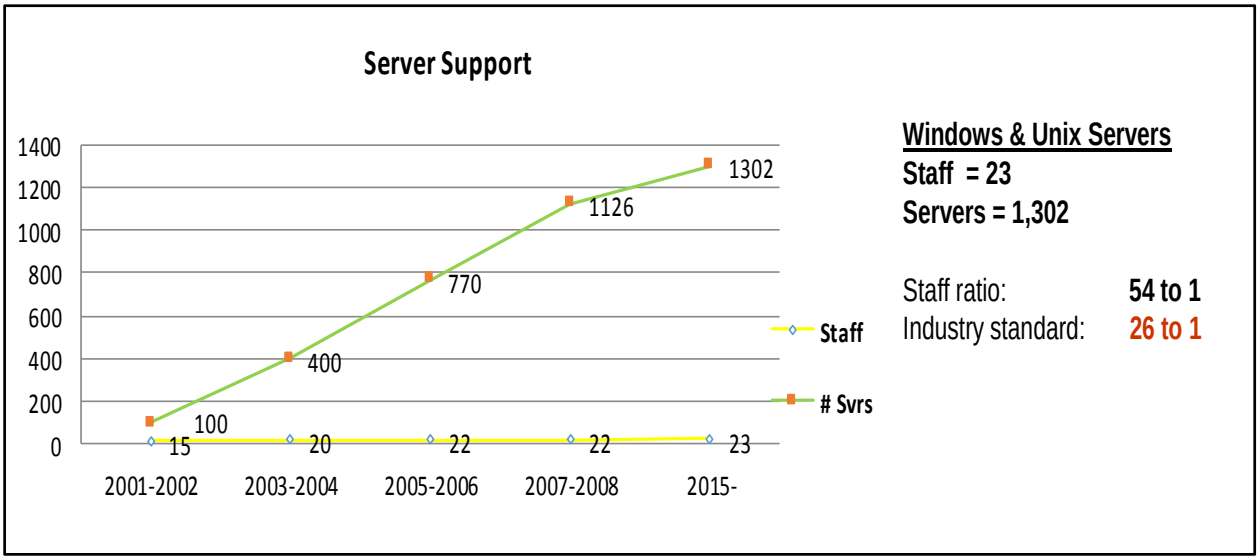
Metrics

Metric Indicator	FY 2013 Actual	FY 2014 Actual	FY 2015 Actual	FY 2016 Estimate	FY 2017 Estimate
Number of Physical Servers	694	138	70	65	60
Number of Virtual Servers	592	988	1,066	1,200	1,300

In the ever-escalating world of technology, Fairfax County has continued to maintain its effectiveness in lowering its total cost of infrastructure operations of IT on an on-going basis by doing more with less. A part of this is consolidating the number of physical servers required to house County IT systems and applications. In 2008, DIT managed 1,100+ physical servers. Costs of managing physical servers include hardware costs, software costs, data center rack space, power and cooling, as well as personnel to manage the installation, maintenance, and troubleshooting physical hardware.

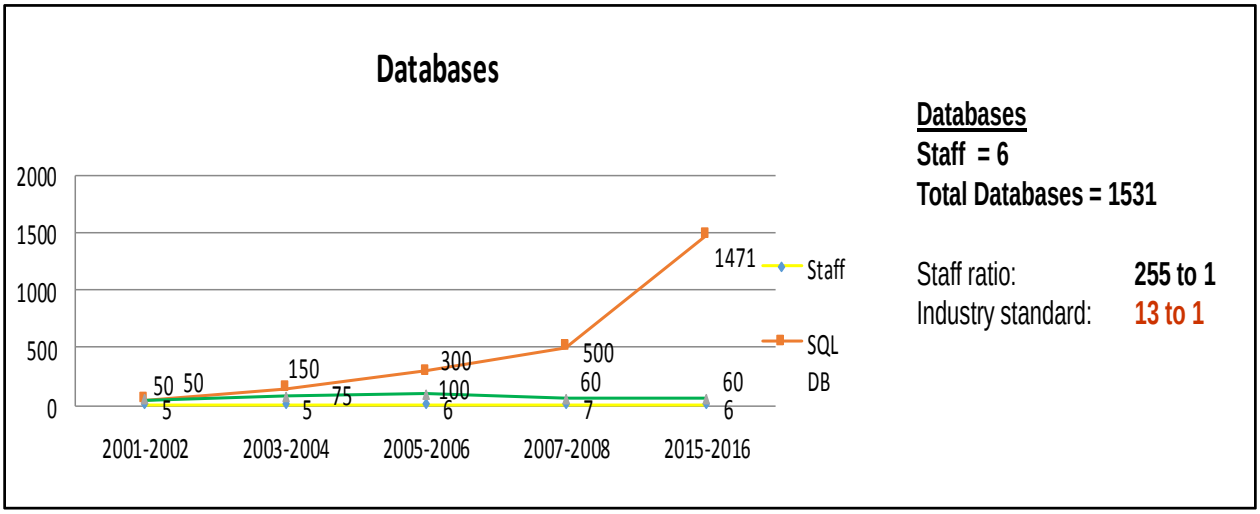
The County has standardized its infrastructure on a virtualized platform, and consolidated over 1100+ servers to a virtual environment which has reduced the County's overall cost of IT. The total number of physical servers used today is 70. The number of physical servers is continuing to decrease, and the number of virtual servers is increasing.

It is a common misconception that the less number of physical servers requires a lesser number of IT support personnel for the management, maintenance, and day to day operations of the infrastructure. This is not the case. While DIT has increased efficiencies in managing the environment itself, the growth overall in technology assets, applications and new technology to be supported continues to grow, requiring specialized skills. DIT effectively transitions staff to these new needs. For example, while the technologies created (server virtualization) allow one physical server to be partitioned into multiple virtual server machines, the skills, resources, and time required for the management of the infrastructure is either the same, if not more, than it was in the past.



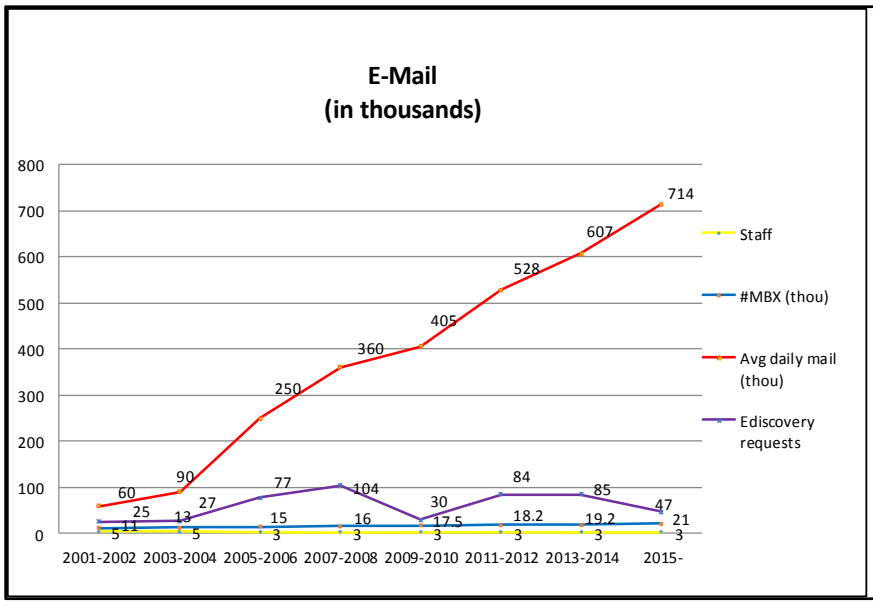
Windows & Unix Servers
Staff = 23
Servers = 1,302

Staff ratio: **54 to 1**
Industry standard: **26 to 1**



Databases
Staff = 6
Total Databases = 1531

Staff ratio: **255 to 1**
Industry standard: **13 to 1**

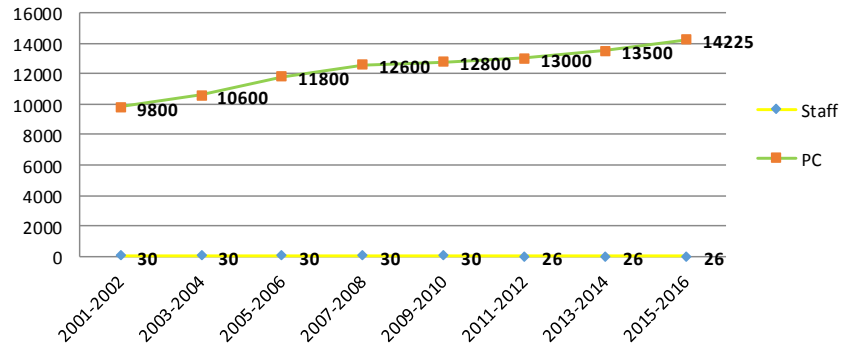


E-mail traffic:

21,000	**mailboxes**
714,000	**per day**
3,570,000	**per week**

Staff ratio: **7,000 to 1**
Industry standard: **500 to 1**

Searches (e-discovery & FOIA)



PCs 14,225

Staff = 26 (across 5 regions)
Staff ratio: **547 to 1**
Industry standard: **300 to 1**