FY2018 Technology Asset Inventory Assessment & Strategy

COOK COUNTY BUREAU OF TECHNOLOGY

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ASSET INVENTORY AND STRATEGY

Pursuant to Ordinance No. 16-3977, all County offices and agencies are required to submit annual software and IT hardware inventories during the Budget cycle. The ordinance requires the Bureau of Technology (BOT) and County Budget Office to summarize and assess the inventories in the context of a "strategic document" to be delivered to the Board. The following document presents BOT's IT strategy and accompanying assessment of received software and IT hardware asset inventories.

VISION

DIGITAL BY DEFAULT

Residents expect to engage with each other and with their governments online. Digital is not optional anymore. By 'digital', BOT means content or communication that is delivered through the internet whether the user is on a desktop computer, laptop, tablet, mobile phone or a digital device not yet invented. Cook County must offer the people, organizations, and businesses who interact with us online the best possible experience: one that is simple, clear and fast. Now is the time to grasp the opportunities that mobile and internet technology offer, now is the time to change the ways that residents and governments interact, generate economic opportunities, and transform service delivery.

BOT aims to transform our organization to become digital by default. This means digital is the first mode considered for carrying out a transaction, whether that be requesting a service, transferring money, implementing internal workflows and processes, or sharing data/information. County residents with limited technology skills or access must not be excluded, however. Cook County must always offer alternative means of accessing County services and information. Above all, it means an integrated approach to delivering a service or tackling a problem in the best way, using the most appropriate channels and technologies, and relying upon accurate consumer expectation data to properly tailor our services to citizen demand.

In 2017, an enormous amount of government data still resides on paper in large warehouses. In 2017, many of the County's operations have been improved by digital tools; however, the way the County performs many of these operations still follows practices and procedures designed for the age of typewriters and filing cabinets. The County has made great progress in the last seven years, but we have vast potential for further improvement. Cook County has moved from digital as an afterthought to digital as a primary concern, which was no small feat, but now we must continue the journey to digital by default.

DATA, ANALYTICS AND ARTIFICIAL INTELLIGENCE

The potential for analytics to be transformative, for both corporate and enterprise users, stems from the ability of analytics technologies to quickly and effectively mine newly available and rapidly growing sources of raw data. Coupled with the real-time capabilities provided by mobile, the always-on availability of the cloud, and the crowdsourcing power of social networks, analytics has the potential to provide savvy users with significant advantages over competitors.

Once relegated to Hollywood blockbusters, artificial intelligence (AI) has transitioned into the real world in surprisingly mundane but increasingly powerful ways, proving itself capable of performing a wide variety of tasks when paired with equally novel technologies such as machine learning, speech recognition, robotics, computer vision, and real-time translation engines.

The decision of where to deploy AI is usually as complicated as which AI tools to pursue in the first place. There are several ways to deploy AI to improve operations, efficiency and services.

AI can be used to lessen the workload of government workers. Government workers are often weighed down by repetitive, tedious tasks that erode their motivation and consume valuable hours that might be better spent on more complex problems that require their talents and attention. Some applications of AI focus on shifting workers to higher value tasks, maximizing workforce potential and reducing burnout.

AI can also be used to improve the work produced by the workforce. Focusing on processes that complement human workers, this set of AI empowered technologies enhances human skillsets by providing analytical muscle to achieve faster and more accurate results. For example, machine learning can identify patterns and inform human controllers of impending risks or suspicious trends, allowing them to act rapidly in response.

Finally, in some cases, AI may be able to replace jobs currently done by County workers. As with factories during the industrial revolution, technology is best suited for repetitive tasks that have a finite set of outcomes, supercharging them with AI tools such as handwriting or image recognition may extend the number or jobs that can be done with minimal human intervention.

The choice of which strategy or strategies to follow will depend on the situation, priorities and resources. Cost strategies could target labor to stretch lean budgets, while value strategies could focus on augmenting and relieving beleaguered workforces.

SHARED SERVICES

In the coming years, local governments that focus less on updating legacy systems and buttressing bureaucratic silos, and more on the integration of digital future infrastructure strategies, will see the greatest returns on investment. Cook County must continue to unite and merge its digital environments, focusing on shared services and collaboration among all the County's agencies and many separately elected officials within the County. New technologies will allow us to rewire the County.

Governance is the key to increasing collaboration and shared services across the County. The County has maintained a monthly CIO Roundtable meeting for years, and this year added a weekly Change Advisory Board meeting to ensure that something happening in one system does not affect another elsewhere. Further expanding this kind of collaboration will help the County reach its goals in all areas.

EFFICIENCY

Operating with tight budgets means that funding for new system developments and enhancements will be limited, and we must make choices based on competing priorities. We will try to avoid the costly

process of customizing systems, which may mean redesigning business processes around the out-of-the-box features of standard software. We will mandate the reuse of proven, common application solutions.

Cook County has adopted several key IT principles and policies that facilitate shared services, consolidation, and general efficiency, including:

- **Lifecycle management**: By tracking and monitoring our technology assets, we will be able to retire legacy assets based on pre-identified technology lifecycle and identify problems for correction in device or software performance before malfunctions have time to become harmful.
- **Reuse before buy and buy before build**: We take care to identify opportunities to use existing solutions in new ways before purchasing new ones, and we will take advantage of standard commercial software, having some create custom software or building our own solutions only as a last resort.
- **Standardization**: Using the same versatile technologies in as many ways as possible allows us to minimize the variety of technologies our staff need to know how to support. Also, by increasing the size of contracts instead of the number of contracts, we can harness the buying power our size affords us to negotiate significant savings.

SECURITY

Mass digitization has redefined the way that governments think about security, especially when it comes to their electronic assets and mission-critical systems. Cook County needs to be prepared for the entire spectrum of potential threats. We will take the following steps to minimize the risks they face from cyber-attacks:

- **Build Security into Governance**: Beyond the technical considerations of cybersecurity, Cook County must further integrate cybersecurity strategies into the planning, governance and management of our operations.
- **Identify "Crown Jewels"**: By identifying key components of an organization's infrastructure and mission, better incident-response simulations, more effective security spend allocations, and a more comprehensive defense-in-depth of key systems can be established.
- **Secure Standards for Third Party**: When dealing with third-party vendors, organizations should establish what degree of exposure is incurred by interaction with those vendors to better understand the risk posed by potentially vulnerable vendors.

Underpinning these practical strategies, Cook County needs a framework of trust between IT and departmental executives to avoid the confusion around internal cybersecurity, which can expose organizations to attack.

NEAR-TERM PLAN

APPLICATION MODERNIZATION

Bringing sustainable and transformative technologies to bear on the operations of the County is the key priority for the Bureau of Technology. The alignment of modern solutions with sound returns on investments and sustainability is an important component of modernization. Through investments in new applications, Cook County will continue to transition away from paper-centric business processes and further into the digital realm.

Generally, Cook County is following a flexible modernization roadmap with the deployment of commercial/off-the-shelf software, enterprise-wide content management systems, enterprise-wide case management systems, and other cloud-based solutions. With all new applications, we evaluate adding mobile components to enable anywhere, 24/7 services. Studies have shown that the average person increasingly relies on a mobile device for internet access. Applications can no longer depend on a single interaction model. Input may come from a variety of devices.

Close integration with Geographic Information Systems and location management is not only commonplace, it's a necessary fuel to improve County services. Everything in a community has a location. GIS allows the community to bring together geographic data, visualize it, analyze it and share it to make better decisions. Community assets can be monitored and tracked. Performance can be analyzed over time, improving resource allocation and maintenance decisions. Infrastructure changes can be visualized and impacts modeled before construction begins.

INFRASTRUCTURE MODERNIZATION

The County is following long-term plans to move all systems to modern technology platforms. At the core of this effort is infrastructure. Modernization of applications requires modernization of the environment in which they live. Service continuity across multiple sites for mission-critical applications is becoming a must-have standard in data center strategies, impacting not only application design, but also network topologies, IT architectures and site location. These are long-term, expensive investments, but they are mission-critical. With this in mind, the County has adopted a Cloud-first strategy, meaning that the County considers remotely-hosted cloud solutions first when developing a new procurement plan for a particular system. For systems that will remain on-premise for the foreseeable future, BOT is focused on modernizing and consolidating the hosting environment in the new County Core Data Center.

IMPROVED SERVICES AND ADOPTION OF IT GOVERNANCE

Cook County must continue formalizing and organizing its enterprise-wide IT governance structure. The goal is to ensure that IT investments generate business value and mitigate IT risks. The purpose is to ensure the effective and efficient management and delivery of goods and services aligned to enterprise strategies. In addition, Cook County is focusing on making a customer self-service strategy part of a holistic omnichannel engagement approach for customer service. This can range from application access 24/7 on various platforms to deploying productivity tools.

SOFTWARE AND HARDWARE INVENTORY ASSESSMENTS

In January 2017, BOT and the County Budget Office distributed to all County agencies and Offices a memo and accompanying example inventories illustrating compliance with the new IT asset reporting requirements. In response, BOT and Budget received IT asset inventories of varying accuracy and quality. The following sections detail BOT's assessment of these inventories.

SOFTWARE ASSET INVENTORY ASSESSMENT

The majority of software asset inventory reported was owned or managed by the Bureau of Technology. Of the Software Asset Inventory reports received, BOT identified approximately 300 unique types of software spanning the spectrum of software categories, from commercial off-the-shelf to custom development, that were not directly managed or owned by BOT. In general, the Clerk of the Circuit Court, the Clerk, and the Treasurer's software asset inventories were the most detailed and useful.

Based upon our review of asset submissions, BOT has concluded that while the County is on track with software asset management policy, there are multiple ways in which the County can improve its software asset management processes.

INVENTORY ACCURACY

The first is by improving the accuracy of software asset reporting to ensure adequate coverage of all software assets and avoid double- or under-counting by agencies. Coverage accuracy, and double counting in particular, stems from the centralization of some, but not all, software asset management within BOT. For example, some agencies reported case management systems procured and managed by BOT on the agency's behalf in their inventories, while others omitted software not under BOT management but erroneously assumed to be BOT-managed.

Other issues related to coverage accuracy are the reach of automated software tracking tools across network boundaries and the technical sophistication of asset managers housed within other departments, bureaus, and offices. These issues are understandable, given the County's partially decentralized IT department structure, and they are correctable. BOT intends to improve on these fronts by refining the scope of its automated software monitoring tools and implementing an improved software asset management coordination procedure with separately elected officials.
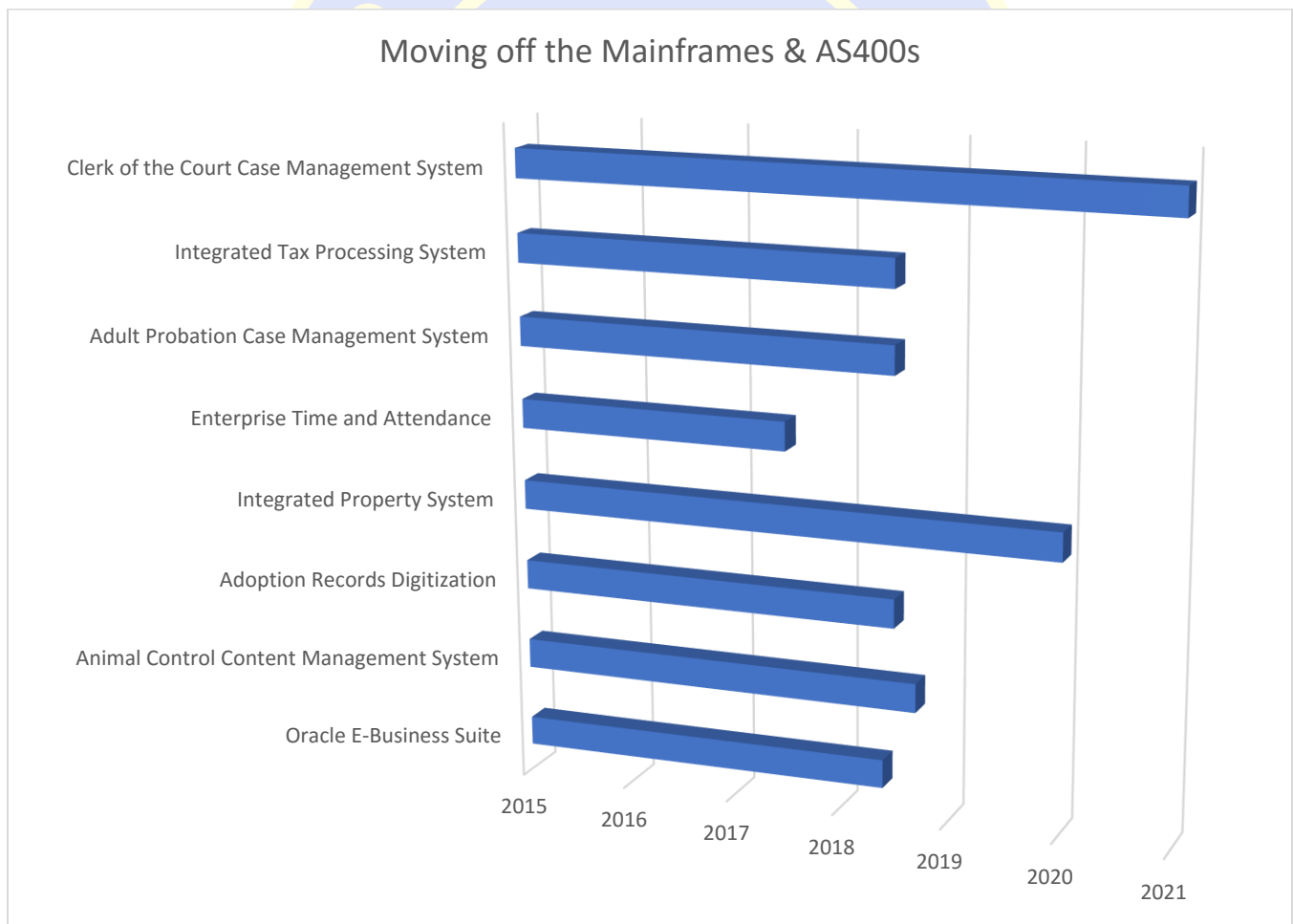
SECURITY PATCHING AND UPGRADES

Another issue is consistently addressing operating system and virtual machine patching requirements. While the Information Security Office sends out monthly vulnerability scan reports, patching and upgrade recommendations cannot always be met because of custom-development dependencies. For example, a case management system customized for the County may depend upon operating system or virtual machine versions that, according to vulnerability scans, should be upgraded or patched, but cannot be because patches and upgrades will render the custom development non-functional. In other words, patches cannot be applied in certain cases for operational reasons. These issues are often unavoidable in local government settings where unique local mandates require custom development, but can nonetheless be mitigated through adherence to an efficient software life-cycle management procedure.

BOT is actively working with Offices Under the President and the offices of the County's separately elected officials to modernize all legacy applications, particularly those that reside in AS/400 and Mainframe environments. Reducing the number of application hosting environments will reduce cost and align with the County's modernization strategic goal. All County Chief Information Officers have been briefed on the County's goal to retire the Mainframes and AS/400s by Q4 FY2020.

In addition to eliciting an inventory of legacy applications from each Office, BOT has initiated a collaborative effort whereby each Office is required to report its respective migration status on a regular basis. At the current time, all Offices show a willingness and commitment to migrate their legacy applications in accordance with the FY2020 goal, with the exception of the Clerk of the Circuit Court's Court Management System, which is scheduled to be replaced through its ongoing implementation project by Q4 2021. BOT will continue to monitor application modernization efforts and provide notice to the County Board of any issues that arise that could jeopardize the overall effort.

Moving off the Mainframes & AS400s

System	
Clerk of the Court Case Management System	
Integrated Tax Processing System	
Adult Probation Case Management System	
Enterprise Time and Attendance	
Integrated Property System	
Adoption Records Digitization	
Animal Control Content Management System	
Oracle E-Business Suite	

2015   2016   2017   2018   2019   2020   2021

HARDWARE ASSET INVENTORY ASSESSMENT

As with software asset inventories, submitted hardware inventories were of mixed quality and accuracy, with slightly higher accuracy owing to historical capital equipment reporting requirements. In general, BOT observed moderate compliance with current computing standards across all inventories.

COMPUTERS

Within the Bureau of Technology, our standards for future computer purchases dictate that each new computer should have at least:

- Sixteen gigabits of RAM
- An i5 processor
- A solid-state hard drive

We believe that by purchasing computers that meet these specifications we will not have to replace them for approximately five years. Computers that have at least eight gigabits of RAM and meet other minimum standards will remain viable for the next 12 to 24 months.

Asset inventories demonstrate that Cook County agencies and offices have a variety of desktop and laptop computers. Currently, these assets aren't centrally managed. Agencies are able to purchase a wide variety of computers through reseller contracts, and many agencies manage their own hardware replacement lifecycles. Similar to the software asset reports, some hardware reports did not contain enough accurate detail to perform meaningful evaluations. Of the inventories received, the Clerk of the Circuit Court, the County Clerk and the Treasurer produced the most useful data. To resolve inventory problems, BOT is planning to hire an IT Asset Manager in FY2018. This individual would be responsible for tagging and tracking software and hardware across the County.
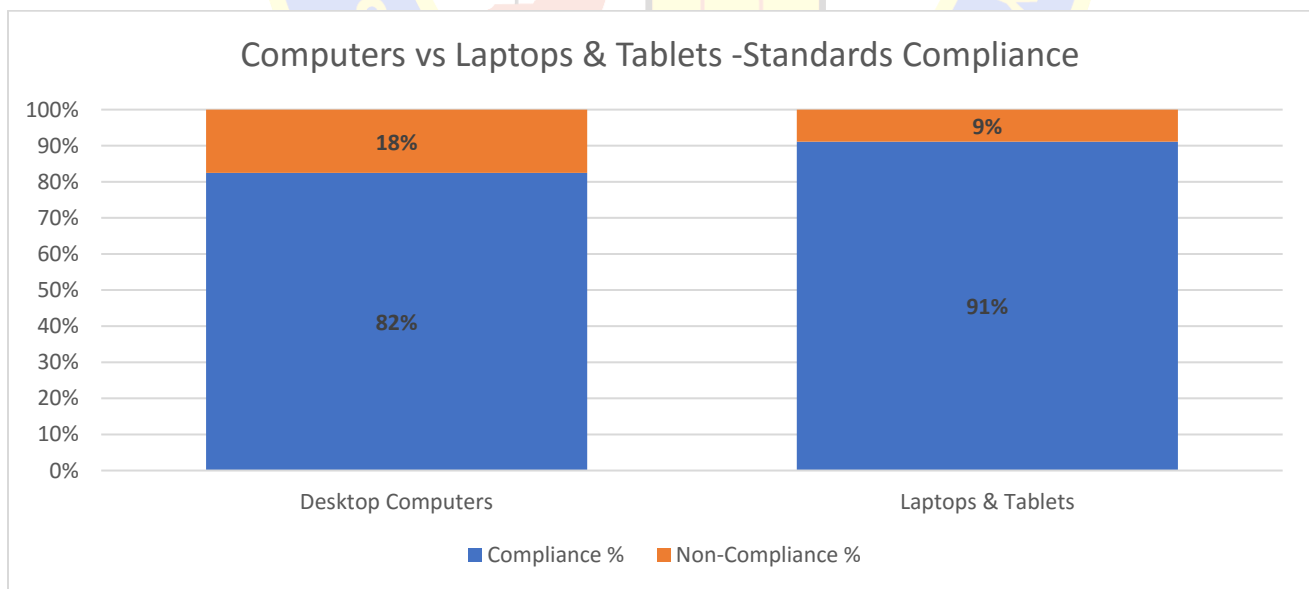
*This graph is based on the data received, which was incomplete for some offices.
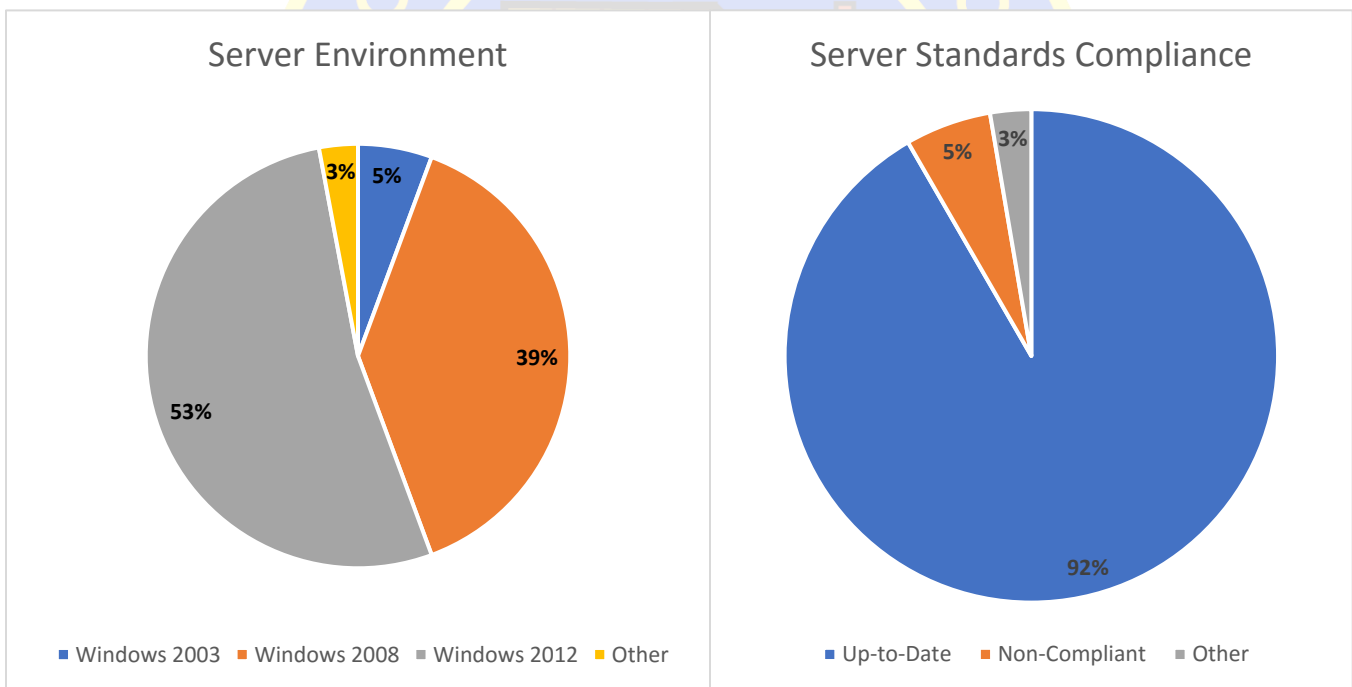
SERVERS

Within our data centers, the servers managed by the Bureau of Technology are just over 90 percent up-to-date. Just over five percent of BOTs servers are running Windows 2003 infrastructure; however, but these will be decommissioned by the second quarter of FY2018. Slightly less than 39 percent of our servers are running a Windows 2008 environment, and these will be upgraded during the first quarter of FY2019.

Moving forward, BOT will begin rolling out the infrastructure for hyperconverged technology in the first quarter of FY2018. Hyper-converged infrastructure is a fully software-defined IT infrastructure that virtualizes all of the elements of conventional 'hardware-defined' systems.

The inventory included some but not all servers owned by each agency. Some servers currently in use in other offices predate even the 2003 machines BOT is decommissioning in FY2018. We have recommended that these be upgraded as soon as possible.
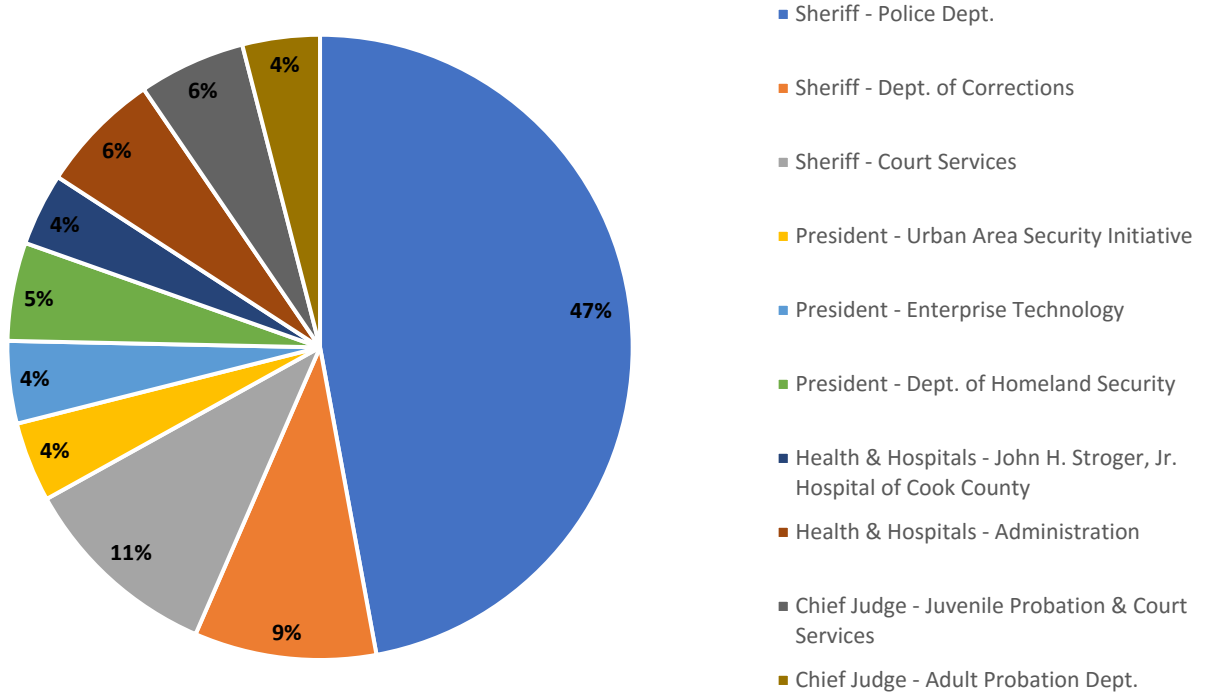
The charts below represent only BOT managed servers. The incomplete data from other inventories is not included to prevent confusion.

Server Environment: Windows 2003 5%, Windows 2008 39%, Windows 2012 53%, Other 3%

Server Standards Compliance: Up-to-Date 92%, Non-Compliant 5%, Other 3%
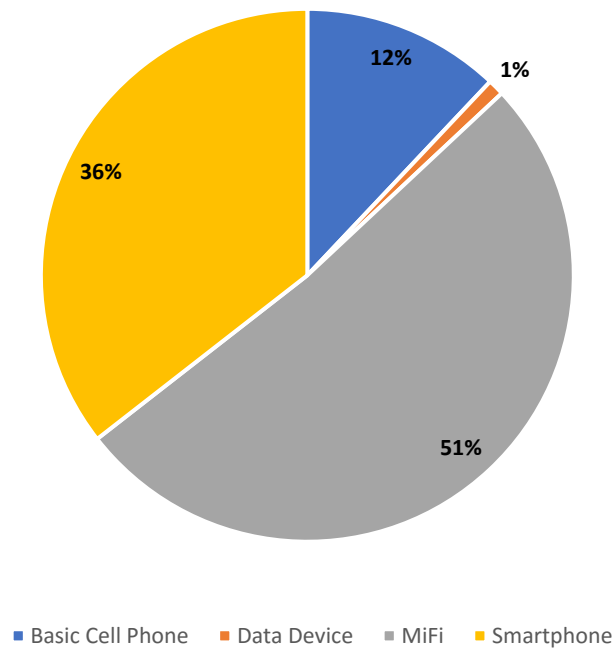
MOBILE DEVICES

Under specific circumstances, some Cook County employees may be required to carry a County-issued mobile device. The charts below were compiled from data maintained by the BOT's Telecommunications Department. No telecommunications data was gathered as part of the FY2018 IT Asset Inventory.

Top Ten Mobile Device Users

- Sheriff - Police Dept.
- Sheriff - Dept. of Corrections
- Sheriff - Court Services
- President - Urban Area Security Initiative
- President - Enterprise Technology
- President - Dept. of Homeland Security
- Health & Hospitals - John H. Stroger, Jr. Hospital of Cook County
- Health & Hospitals - Administration
- Chief Judge - Juvenile Probation & Court Services
- Chief Judge - Adult Probation Dept.

Device Type

- Basic Cell Phone
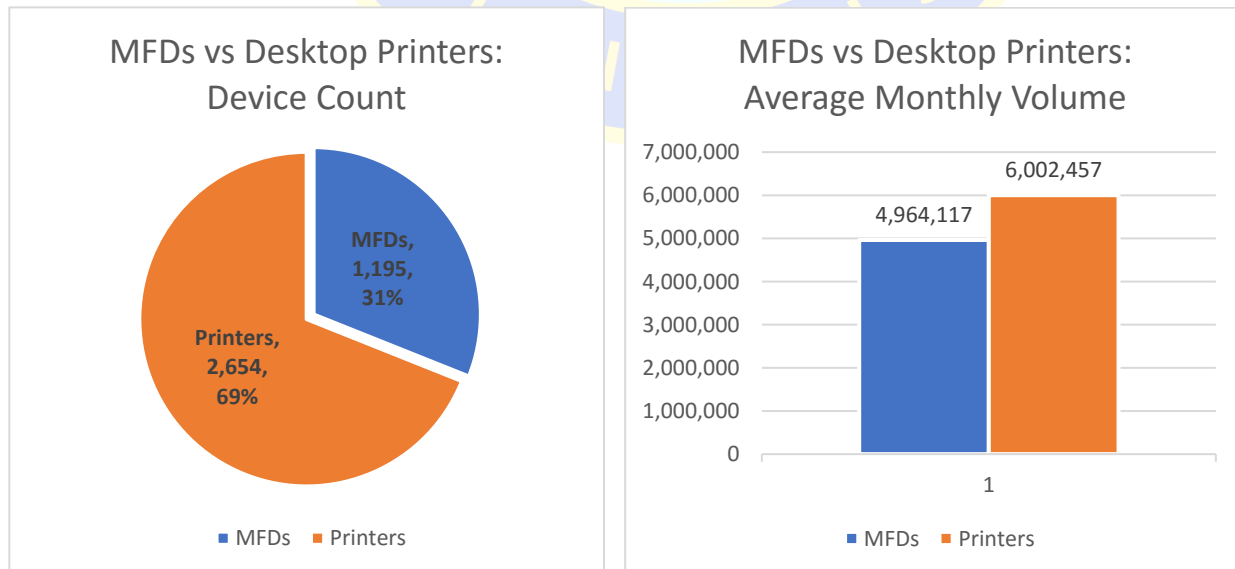- Data Device
- MiFi
- Smartphone

PRINTERS

BOT standards for printers dictate that employees move away from more expensive-to-use desktop personal printers and instead use shared, efficient multifunctional devices. Other standards include Americans with Disabilities Act (ADA) compliant screens and the ability to password protect your print jobs for private printing. BOT's standard machines will also report monthly usage statistics, which we can use to be sure the particular type of device assigned is appropriate for the average workload of the office where it resides.

MFDs	Total	Total AMV	Mono AMV	Color AMV	BW Devices	Color Devices
Konica-Minolta	387	2,372,290	2,302,291	69,369	335	22
Toshiba	808	2,591,827	2,530,622	61,205	390	19
Total	**1195**	**4,964,117**	**4,833,543**	**130,574**	**725**	**41**

- **MFDs**: Multifunctional (print/scan/copy/fax/etc.) Devices
- **AMV**: Average Monthly Volume in printing

Desktop Printers	Total AMV	Mono AMV	Color AMV	BW Devices	Color Devices
HP	4,921,725	4,738,872	182,853	1,636	372
Dell	482,301	405,455	76,846	232	23
Lexmark	425,152	425,031	121	208	1
Xerox	173,279	170,413	2,866	169	13
Total	**6,002,457**	**5,739,771**	**262,686**	**2,245**	**409**

*The two tables above represent Countywide activity detected through the County network. This was not collected as part of the Asset Inventory. Devices and activities disconnected from the County network were not included. The same applies to the charts below.

MFDs vs Desktop Printers: Device Count

MFDs, 1,195, 31%
Printers, 2,654, 69%

■ MFDs ■ Printers

MFDs vs Desktop Printers: Average Monthly Volume

4,964,117
6,002,457

■ MFDs ■ Printers

To efficiently manage IT assets, County agencies and offices must work with BOT to improve the quality and accuracy of IT asset inventories and ensure that proper software and hardware lifecycle, patching, and management standards are maintained. For its part, BOT has published a Software Asset Management policy and deployed software and hardware monitoring tools to improve Countywide IT asset management. BOT additionally intends to hire an IT Asset Manager in the near future to assist in the implementation of an efficient Countywide IT Asset management regime.

It is important to conclude by noting that efficient IT asset management does not stop with the using and/or procuring agencies. Many of the steps required to improve Countywide IT asset management — software patching, lifecycle planning, and hardware refreshes — require a predictable budget cycle that tracks industry trends in maintenance and development costs.