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Department of Information Technology

Operating Budget Data

($ in Thousands)

	FY 16 Actual	FY 17 Working	FY 18 Allowance	FY 17-18 Change	% Change Prior Year
General Fund	$47,693	$61,415	$58,430	-$2,985	-4.9%
Adjustments	0	1,720	-67	-1,787	
Adjusted General Fund	**$47,693**	**$63,135**	**$58,364**	**-$4,771**	**-7.6%**
Special Fund	10,254	26,027	11,097	-14,930	-57.4%
Adjustments	0	0	-2	-2	
Adjusted Special Fund	**$10,254**	**$26,027**	**$11,095**	**-$14,932**	**-57.4%**
Federal Fund	579	397	0	-397	-100.0%
Adjusted Federal Fund	**$579**	**$397**	**$0**	**-$397**	**-100.0%**
Reimbursable Fund	61,455	62,518	49,848	-12,670	-20.3%
Adjusted Reimbursable Fund	**$61,455**	**$62,518**	**$49,848**	**-$12,670**	**-20.3%**
Adjusted Grand Total	**$119,981**	**$152,077**	**$119,307**	**-$32,770**	**-21.5%**

Note: Includes targeted reversions, deficiencies, and contingent reductions.

- The budget bill includes the following deficiencies: $1.3 million to replace obsolete software and hardware in agencies, $0.5 million to support Geographic Information Systems, and $1.2 million to support the new Microsoft contract.

- After adjusting for cost containment reductions, the fiscal 2018 budget decreases by $32.8 million over the fiscal 2017 working appropriation.

- Most of the increase is attributable to major information technology (IT) project funding, which deceases by $37.3 million.

Note: Numbers may not sum to total due to rounding.

For further information contact: Patrick S. Frank Phone: (410) 946-5530

Personnel Data

	FY 16 Actual	FY 17 Working	FY 18 Allowance	FY 17-18 Change
Regular Positions	154.00	251.60	251.60	0.00
Contractual FTEs	1.00	1.00	2.00	1.00
Total Personnel	**155.00**	**252.60**	**253.60**	**1.00**

Vacancy Data: Regular Positions

Turnover and Necessary Vacancies, Excluding New Positions	10.16	4.04%
Positions and Percentage Vacant as of 12/31/16	33.60	13.35%

- Although there is no increase in positions in fiscal 2018, there was a substantial increase in fiscal 2017, as the department implemented the enterprise tech support initiative. This initiative is discussed in the Issues section of this analysis.

- The Department of Information Technology (DoIT) added 1 contractual full-time equivalent, an experienced radio professional to support implementation of the new Maryland FiRST 700 megahertz system.

Analysis in Brief

Major Trends

Cybersecurity: The department has published cybersecurity performance measures. The agency will provide vulnerability assessments, penetration tests, or audits to 20 agencies each fiscal year. A cybersecurity awareness program has also been implemented and 90% of employees are participating. DoIT advises that the number of staff trained is limited by the number of licenses and that purchasing additional licenses could increase this indicator beyond 90%. **DoIT should be prepared to brief the committees on the costs and benefits associated with purchasing additional licenses.**

Oversight of Major IT Projects: DoIT oversees State agency major IT projects. Since fiscal 2009, measures established to judge project success suggest that progress is being made as more projects remain on schedule and on budget. The number of projects whose costs deviated from the baseline scope or cost declined to 15% in fiscal 2016.

Web Systems Indicators: The Internet is essential in engaging citizens and providing services. In fiscal 2013, agencies transferred regular positions and funds into the department to support web services. DoIT also contracts with a private vendor to develop web services. The department increased the number of web applications by 12% in fiscal 2015 and 9% in fiscal 2016.

State Agency Support Indicators Should Change as Department Reorganizes: The department also supports systems used by State agencies, such as telecommunications systems, wireless networks, a data network, and statewide financial and personnel systems. Surveys suggest that the service provided is perceived to be satisfactory. DoIT has implemented new software that asks individuals to rate their satisfaction after a service has been provided. As discussed in the Issues section of this analysis, the department is implementing its enterprise tech support initiative. The Department of Legislative Services' (DLS) concern is that these indicators are out-of-date. **DoIT should develop new indicators that reflect its new workload.**

Issues

Department Should Address Personnel Issues: A report shows that the State's IT professionals compensation is less than the industry average. This has led to higher employee turnover, higher agency vacancies, difficulty filling key positions, and the use of contractors in key positions. **DLS recommends that DoIT, in cooperation with the Department of Budget and Management's Office of Personnel Services and Benefits, examine the State's IT professionals compensation and compare it with the compensation offered by nearby federal, local, and private organizations. This should include an analysis of nonwage benefits. The departments should also consider partnering with higher education institutions to develop training programs for students to prepare them to be IT professionals that work for State agencies.**

Enterprise Tech Support Initiative: DoIT began migrating day-to-day IT operations in fiscal 2016. Currently, approximately 12,000 State employees are served by DoIT. **The department should be prepared to brief the budget committees on its initiative to expand the support services that it is offering to State agencies.**

The Department Is Adopting the Agile Systems Development Approach: For decades, DoIT major project oversight has used the waterfall approach. The department has begun using the Agile approach with some projects and will use only this approach beginning in fiscal 2018. **DLS supports appropriating funds to support the Agile approach. However, DLS recommends that the budget committees adopt narrative that requires DoIT to report on the progress of the new planning initiative and the projects that are being developed. This report should include a listing of all projects being developed that includes funding sources and an updated information technology project request (ITPR).**

Cybersecurity: In recent years, DoIT has provided more resources for cybersecurity. There are signs of improvement, but audit findings continue to show weaknesses. **In spite of all the training, increased resources, and improved policies, audits still reveal critical security weaknesses. The department should brief the committees on how it plans to address these weaknesses.**

Too Many Out-of-cycle IT Project Requests: To keep the legislature informed about the status of major IT projects when the legislature is not in session, DoIT has notified DLS as project planning begins or when projects move from planning to implementation. There has been a spike in the number of out-of-cycle ITPRs. **DLS recommends that DoIT work to develop a process for keeping the legislature informed about changes in major IT projects when the legislature is not in session.**

Recommended Actions

		Funds
1.	Add language to make appropriation for floor session video streaming contingent on legislation.	
2.	Reduce funding for major information technology project oversight.	$ 1,000,000
3.	Add language to reduce authorization to spend reimbursable funds related to an increase in the turnover rate.	
4.	Increase turnover rate to 6%.	315,000
5.	Adopt narrative requiring the Departments of Information Technology and Budget and Management to examine information technology personnel compensation.	

6. Adopt narrative requesting a report on the status of the Agile major information technology project development approach.

Total Reductions **$ 1,315,000**

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Department of Information Technology

Operating Budget Analysis

Program Description

Chapter 9 of 2008 created the Department of Information Technology (DoIT). The department contains the following divisions:

- ***State Chief of Information Technology (IT):*** responsible for executive direction and major IT project oversight.

- ***Security:*** responsible for developing statewide security policies, enforcing policies, and supporting State agencies' security efforts.

- ***Application Systems Management (ASM):*** responsibilities include web systems, geographic information systems (GIS), and operating statewide systems such as the Financial Management Information System (FMIS) and the new Enterprise Budget System.

- ***Infrastructure:*** responsibilities include operating networkMaryland, the State's data network, voice systems, and maintaining and supporting day-to-day IT operations for Executive Branch agencies, which is referred to as the enterprise tech support initiative.

- ***Chief of Staff:*** responsible for administrative functions such as procurement and finance.

- ***Major IT Projects:*** development of major IT projects.

- ***Radio:*** operates Maryland First Responders interoperable Radio System Team (Maryland FiRST), which is the State's 700 megahertz (MHz) radio system.

- ***Telecommunications Access of Maryland (TAM):*** provides telecommunications relay service for Maryland's hearing and speech disabled citizens. The program also provides assistance telephone equipment for financially qualifying citizens with a variety of needs.

The department administers the Major Information Technology Development Project Fund (MITDPF). This is a nonlapsing fund that supports large IT initiatives as defined in Sections 3A-301 and 3A-302 of the State Finance and Procurement Article. Major IT development projects are projects that meet one or more of the following criteria:

- the estimated total cost of development equals or exceeds $1 million;

- the project is undertaken to support a critical business function associated with the public health, education, safety, or financial well-being of the citizens of Maryland; and/or

- the Secretary of Information Technology determines that the project requires the special attention and consideration given to a major IT development project.

Performance Analysis: Managing for Results

DoIT's Managing for Results (MFR) data reflects the mission of the office, providing statewide IT oversight as well as operating/overseeing the operation of statewide information systems and networks.

1. Cybersecurity

DoIT's first MFR goal is to provide "leadership and support to State agencies in areas of cybersecurity policy, risk and vulnerability assessment, technology implementation, awareness training and incident response to raise the security posture of State government." The budget committees have expressed concerns about cybersecurity and have asked the department for MFR indicators that can better assess the State's progress. In the 2014 *Joint Chairmen's Report* (JCR), DoIT was asked to develop MFR cybersecurity indicators. As requested, the department added five performance measures. **Exhibit 1** shows the initial measures for fiscal 2015 and 2016, as well as fiscal 2017 and 2018 projections.

Exhibit 1
Cybersecurity Performance Indicators
Fiscal 2015-2018 Est.

	2015	2016	2017 Estimated	2018 Estimated
Percent of Employees Compliant with Statewide Cybersecurity Awareness Training Program	90%	90%	90%	90%
Certified Security Information Professionals Employed by State	1	1	1	12
Agencies with Data Loss Prevention Tools in Operation	n/a	n/a	n/a	5
Agencies with Vulnerability Assessment, Penetration Test, or Audit	20	20	18	18
Multi-agency Security Drills or Exercises	n/a	n/a	n/a	3

Source: Department of Information Technology

Cybersecurity professionals have noted that the average employee is often the weakest link. Employees let hackers in by inadvertently providing passwords or loading malware into a system. To prevent against this, DoIT introduced a cybersecurity awareness training program in December 2013. The program is delivered to registered Executive Branch employees and contractors with a State email account. It consists of monthly lessons on topics like passwords, working remotely, and data loss prevention. The service is provided by Security Mentor, a web-based training provider. The program was made mandatory by the previous Administration for Executive Branch employees. The training is provided at no cost to the agencies. Each year 90% of Executive Branch employees participate. DoIT advises that the number of staff trained is limited by the number of licenses and that purchasing additional licenses could increase this indicator beyond 90%. **DoIT should be prepared to brief the committees on the costs and benefits associated with purchasing additional licenses.**

Another key indicator is having a competent, well-trained, professional staff. The indicators include a measure of the number of certified security professionals employed by the State. In recent years, DoIT has had only 1 certified security professional. To get up to the goal of 12 certified professionals (DoIT indicates it most likely will fluctuate between 10 and 15), the department will first develop a core of 3 to 5 State employees. DoIT advises that 3 have been hired (2 of which are certified and the other is getting certification). This staff will be augmented through a contract with a security vendor.

The department's data loss prevention plan has three components:

- blocking undesirable or chronically vulnerable applications;
- scanning allowed applications for confidential information; and
- monitoring specific users and groups to verify that activities are consistent with policies and normal network behavior.

DoIT's enterprise tech support initiative is moving the Executive Branch agencies' day-to-day IT operations into DoIT supported services. This will simplify the department's data loss prevention efforts. This provides a more secure foundation from which to deploy security services. This consolidation also reduces the number of servers that the State will need, thus reducing the number of vulnerable points of entry. The goal for data loss prevention tools is that five agencies have them operational by fiscal 2018. Insofar as State agencies are being supported by DoIT, this indicator may become obsolete and the department may consider other data loss prevention indicators.

The department has also initiated vulnerability assessments (identifying and classifying security holes), penetration tests (acting as a malicious attacker to identify weaknesses), and security audits (systematic evaluation of security against established criteria). The department is initiating about 20 audits per year. By fiscal 2016, each agency should be assessed, tested, or audited every other year.

DoIT planned to have one multi-agency security drill in fiscal 2015 and three in fiscal 2016. The Maryland Emergency Management Agency (MEMA) and the Air National Guard work with DoIT

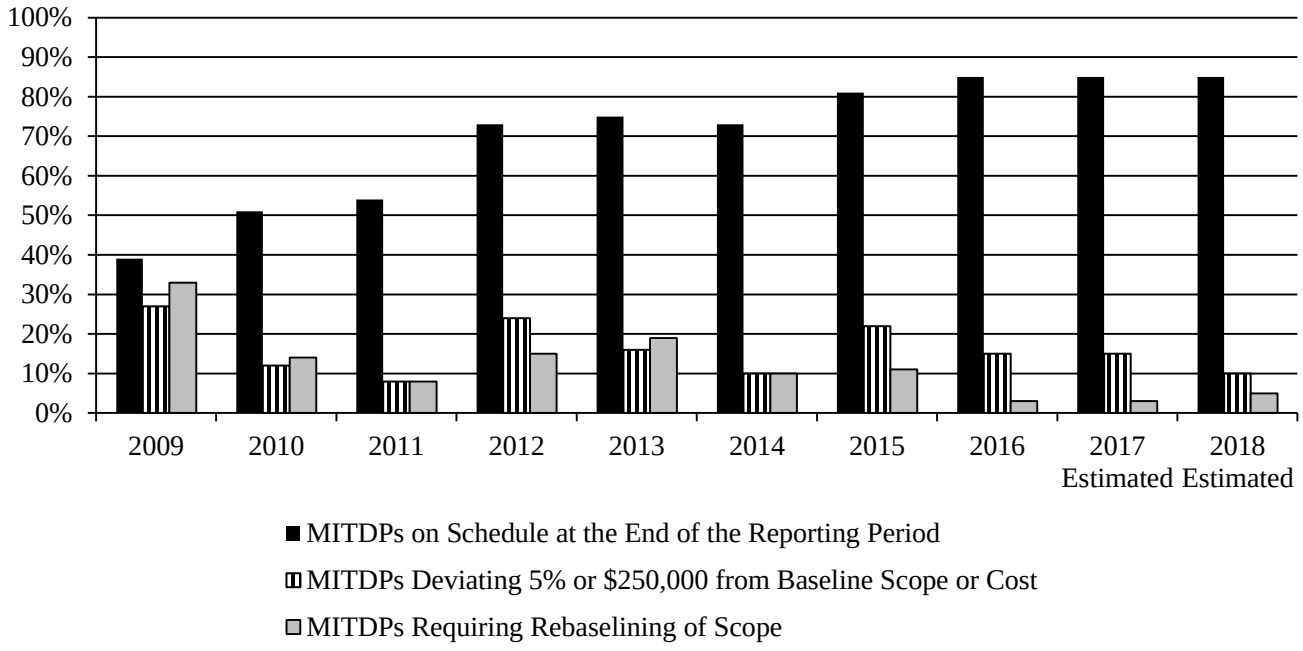
to develop drills that test responses to cybersecurity threats that impact State IT systems. There were no drills in fiscal 2015 or 2016. **The department should be prepared to brief the committees on the lack of multi-agency drills and exercises. DoIT should also discuss how it will increase the number of drills and exercises in fiscal 2017 and 2018.**

2. Oversight of Major IT Projects

The department's second MFR goal is that State agency IT systems meet State IT master plan objectives of consolidation, interoperability, and standardization. The objective is that all major IT development projects executed by Executive Branch State agencies are successful. The department has a series of output measures that examine the extent to which major IT projects remain on schedule, on scope, and on budget.

Exhibit 2 shows that the number of projects that were on schedule at the end of the fiscal year increased markedly from 39% in fiscal 2009 to 73% in fiscal 2012. Since then, the number of on schedule projects has ranged from 73% in fiscal 2014 to 85% in fiscal 2016.

Exhibit 2
Major Information Technology Project Planning Performance Measures
Fiscal 2009-2018 Est.



MITDP: Major Information Technology Development Project

Source: Department of Information Technology

Progress was also made with projects that need changes to the scope in the project's baseline. The number of projects with a rebaselined[1] scope declined from 33% in fiscal 2009 to 14% in fiscal 2010. Since fiscal 2010, this measure has ranged between 3% (fiscal 2016) and 19% (fiscal 2013). DoIT advises that this reduction was influenced by the timing of projects and replacement of program managers. Most major IT projects are toward the end of the development life cycle, while most rebaselining occurs earlier in the project life cycle. The department has also reviewed the performance of the contract project managers and replaced some that they deemed were underperforming.

Though the percentage of projects deviating from costs (either 5% or $250,000) has tended to decline, the swings are more pronounced than projects with changes in scope. In three years, fiscal 2009, 2012, and 2015, the number of projects with high levels of cost changes exceeded 20%. This declined to 15% in fiscal 2016.

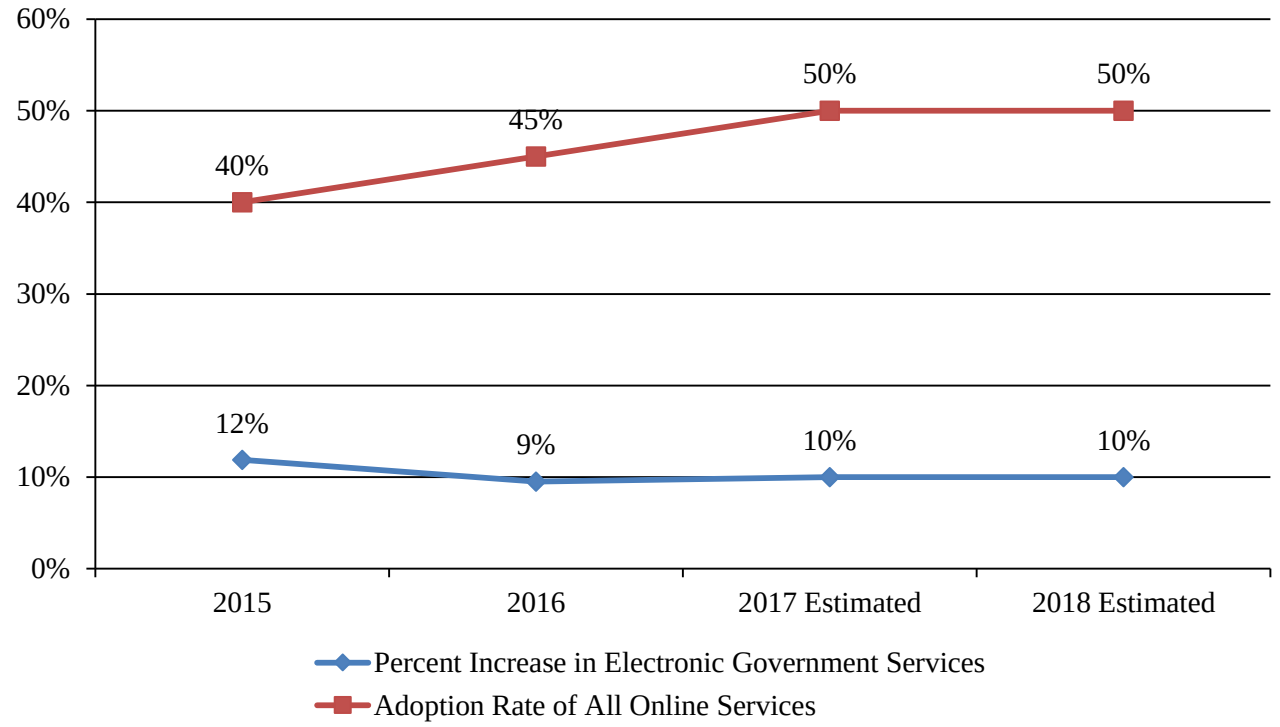
3. Web Systems Indicators

DoIT's third MFR goal is to "provide efficient and high-quality on-line services to State agencies and the public." The Internet is essential in engaging citizens and providing services. Web services are one of the strategies by which higher standards can be realized at a lower cost. As the Internet has become ubiquitous, there are growing expectations from citizens that services are to be provided online.

To measure online performance, DoIT has developed indicators relating to what extent the number of services offered is increasing and to what extent the services are being adopted, as shown in **Exhibit 3**. There are also measures of service availability and customer satisfaction. Service availability has consistently been over 99% of the time. A process for collecting customer service data is being implemented and should be ready by the end of fiscal 2017.

[1] A baseline can be prepared for the scope, schedule, or budget. It is the initial measurement that a project team manages and holds accountable. Deviation from the baseline in any of those areas is likely to result in a compensating action to get back into alignment with the baseline. For instance, if a project begins to slip from its baseline schedule, to get back on track, the project manager may need to add more resources or reduce the scope. Either of these actions could cause a baseline problem in the scope or cost areas. At that point, an effort is made to determine, according to the Project Management Plan (prepared in Phase 3, planning), how to mitigate risks that cause scope, schedule, or cost risks and then to establish a plan of action in the event that a risk becomes an issue. If circumstances make it necessary or desirable to establish a new baseline of cost, schedule, or scope, the process by which this is achieved is referred to as rebaselining.

Exhibit 3
Web Indicators
Fiscal 2015-2018 Est.



Source: Department of Information Technology, January 2017

DoIT has made efforts to expand the number of services offered on the Internet. Since fiscal 2012, the State has had a master contract with NICUSA, Inc. (NIC) to develop websites, online services, and secure payment processing applications for State agencies. NIC has been developing eGovernment applications for over a decade. The State is not charged for this service; NIC generates revenues by implementing some commercially valuable services and pooling these revenues to support other applications. NIC advises that nonrevenue generating applications account for approximately 80% of applications. Maryland State agencies have begun developing applications with NIC, such as the Department of Commerce's (Commerce) Central Business Licensing and Registration portal, the Motor Vehicle Administration's (MVA) Android Driver Practice Exam, the MEMA Maryland Prepares application, and a Notary Public Online Registration and Renewal Service for the Secretary of State. DoIT's goal is to increase services 10% annually. The data shows that actual increases have been about 10% annually, with 12% growth in fiscal 2015 and 9% growth in fiscal 2016.

DoIT also measures the adoption rate. This is the percentage of online services completed over the traditional paper process. In other words, it is measuring the extent to which online services are replacing paper services. In fiscal 2014, 40% of paper services had been replaced by online services.

This increased to 45% in fiscal 2016. The data show that the State is increasing the share of services performed online, even as new online services are introduced.

Every two years, the Center for Digital Government, the research and advisory arm of *Government Technology* magazine, evaluates state governments' ability to improve internal processes and better serve citizens. In the 2016 survey, Utah received an A grade and the top ranking. In Utah, the "public expects to be able to interact with their government using new convenient technologies." The report notes that Utah now offers over 1,100 online services. DoIT advises that the number of online services offered in Maryland at the end of fiscal 2016 totaled 188. Maryland's grade was a B. Positive comments were that Maryland is implementing a new Public Safety Communication System and has an Open Data Council. The report also noted that "Maryland has continued to make strides on its citizen-facing Web portal, establishing a Central Business Licensing and Registration operation that aims to provide a one-stop shop for new commercial entities." It notes that the time it takes to register a business or establish tax accounts has declined from weeks to days. It is a one-stop shop so that individuals also do not have to visit a number of agencies, such as the Comptroller's Office, Commerce, and the Department of Labor, Licensing, and Regulation (DLLR).

The Department of Natural Resources (DNR) has also had its AccessDNR mobile app recognized. The app services include directions to State facilities, activities and amenities by location, hunting season information by date, Maryland fish and shellfish identification, and regulations (hunting, fishing, and boating).

It is encouraging that the State is expanding the number of services that are offered online and that some are being recognized. However, missing from the measures is any indication of the quality of Maryland.gov. There are numerous factors that contribute to a good website, including accessibility, navigation, content, security, speed, accuracy, and currency (up-to-date data). Currently, the State is relying on anecdotal data, such as awards and testimonials, to evaluate the quality of online services. While this is interesting, it would be more helpful to develop some quantifiable MFR indicators. **In addition to providing resources for agency websites, the department should direct some of its MFR efforts to developing indicators that measure the quality of State websites.**

4. State Agency Support Indicators Should Change as Department Reorganizes

Until fiscal 2017, DoIT had three programs that supported systems and State agencies. The programs were Enterprise Information Systems (EIS) that operated a help desk and the local area networks in Annapolis and Baltimore; ASM that operated the FMIS, which supports the agency-based financial systems, and human resources systems, such as the new statewide personnel system; and the Networks Division that operated telephone systems, networkMaryland, and the State's wireless system. The department's MFR initiative also measured the effectiveness of these services.

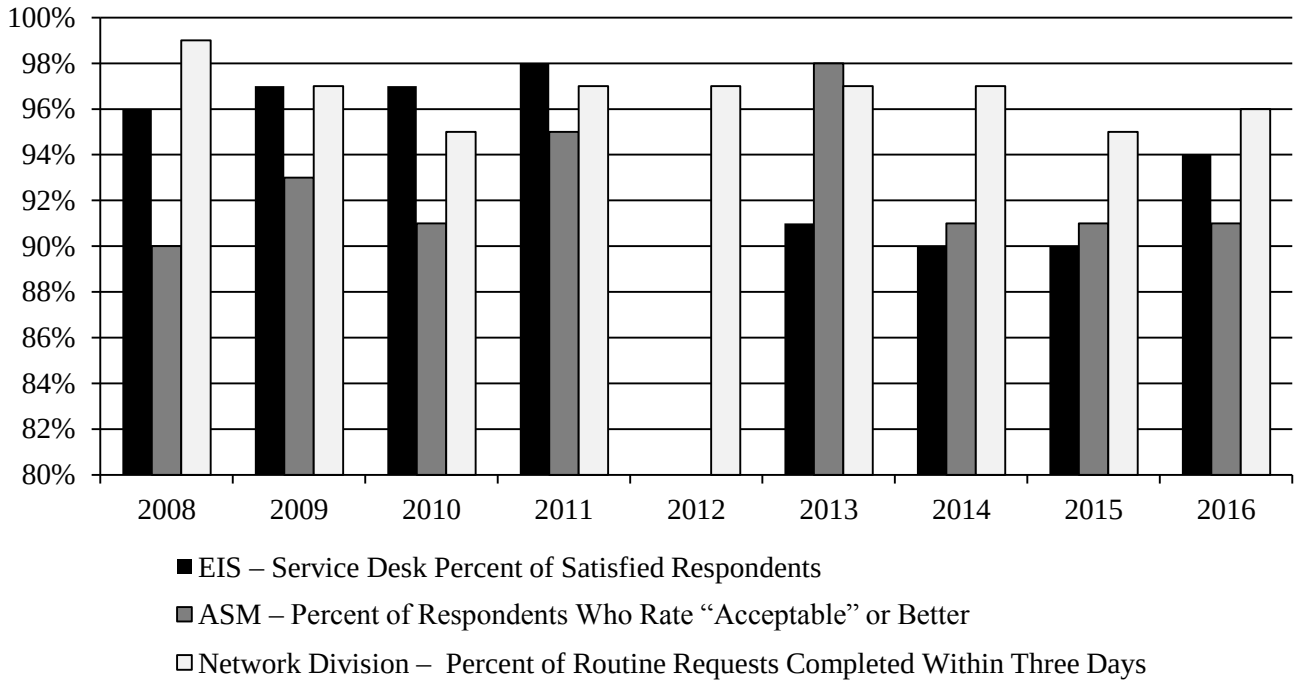
In fiscal 2017, DoIT reorganized and most of these programs' operations are now performed by ASM and the infrastructure program. ASM now also includes functions like GIS, Google services, and web services. The infrastructure program supports telephone systems, networkMaryland, and State agency IT enterprise operations. DoIT advises that it will be updating its indicators to track

performance of the new enterprise operations at State agencies. The department will continue to track the current indicators until new indicators are developed.

DoIT has conducted satisfaction surveys in the past year. In addition, the department advises that it has launched a new tool. The tool is linked with service tickets and asks individuals to rate their experience. This new data should be available next year. The most recent data that is available is included in this analysis.

Exhibit 4 shows that from fiscal 2008 to 2011, at least 96% of EIS help desk respondents rated the service favorable. There was no survey in fiscal 2012, and the favorable rating dropped to 91% in fiscal 2013. The drop is attributable to a change in the survey. Beginning in fiscal 2013, the choices were expanded to include "neutral." DoIT advises that 7% of respondents chose "neutral."

Exhibit 4
Agency Support Systems Performance Indicators
Fiscal 2008-2016 Est.



ASM: Applications Systems Management
EIS: Enterprise Information Systems

Note: No EIS survey was prepared in fiscal 2012 due to resources being reassigned to Google email implementation.

Source: Department of Information Technology, January 2016

Since fiscal 2008, over 90% of ASM respondents rated their systems acceptable or better. With respect to the Networks Division, at least 95% of its routine requests for voice services have been completed within three days. Routine requests include adding, disconnecting, moving, and removing telephone lines and voice mailboxes.

As discussed in the Issues section of this analysis, the department is implementing its enterprise tech support initiative. The Department of Legislative Services' (DLS) concern is that these indicators are out-of-date. **DoIT should develop new indicators that reflect its new workload.**

Fiscal 2017 Actions

Proposed Deficiency

The budget bill includes three fiscal 2017 deficiencies for DoIT. The Secretary's Office includes $1,285,785 for prior year's expenditures for software and hardware. Through its enterprise tech support initiative, the department is providing day-to-day operational support for State agencies. The appropriation supports security and firewall software, software to integrate users, and updated hardware. A number of agencies had obsolete hardware and software that had not been updated for years. **DLS recommends approving this deficiency appropriation.**

The second deficiency totals $536,242 and supports GIS services in ASM. The State entered into an Enterprise Licensing Agreement (ELA) for GIS software with Esri in August 2010. Before the ELA, individual agencies would enter into their own agreements with Esri. DoIT recognized that the cost of just a few large agencies (the Maryland Department of Transportation (MDOT), DNR, and the Maryland Department of Planning (MDP)) was equivalent to the cost of an ELA that supports the entire State. Esri was chosen because it was a top-of-the-line product that State agencies already were using. When the Esri contract was rebid in 2015, concerns were raised that this was a sole source procurement. To provide more choices, the State has entered into agreements with multiple vendors for GIS. The State is now providing additional GIS resources. The deficiency supports a higher level of GIS support. GIS software is now a key resource for State agencies. **DLS recommends approving this deficiency appropriation.**

The final deficiency appropriation provides $1,184,000 for IT infrastructure. This supports software licensing for the Microsoft contract that was rebid toward the end of calendar 2016. With the new contract, the State no longer purchases software packages but instead pays a monthly fee for the software (which is approximately $10 per user). Under the contract, Microsoft will continuously upgrade the software through the Internet so that State agencies always have the latest version. **DLS recommends approving this deficiency appropriation.**

Cost Containment

On November 2, 2016, the Board of Public Works adopted the Administration's proposed cost containment reductions. DoIT's MITDPF fiscal 2017 appropriation was reduced by $803,000 in

general funds. For all major IT projects, the department funds project managers. Not all projects are on schedule in fiscal 2017, so the full appropriation was not necessary.

Section 20 Position Abolitions

Section 20 of the fiscal 2017 budget bill required that the Administration abolish 657 vacant regular positions. The budget was to be reduced $20 million in general funds and $5 million in special funds. **Exhibit 5** shows that 7 DoIT positions were abolished. The DoIT general fund appropriation was reduced by $75,000. The budgeted value of the positions exceeds the DoIT reduction.

Exhibit 5
Section 20 Position Abolition in the Department of Information Technology
Fiscal 2017

Program	Program[1]	Class Title	Position Count	Fiscal 2017 Salary	General Fund Amount	General Fund with Fringes
F50B0401	Secretary	Administrator IV	1.00	$53,193	$53,193	$64,312
F50B0401	Secretary	Administrator II	1.00	46,857	46,857	56,652
F50B0402	Enterprise Information System	Computer Network Specialist Manager	1.00	56,743	56,743	68,605
F50B0403	Applications System Management	IT Assistant Director II	1.00	60,543	60,543	73,199
F50B0404	Networks	Computer Network Specialist Manager	1.00	56,743	0	0
F50B0404	Networks	IT Systems Technical Specialist Supervisor	1.00	56,743	0	0
F50B0407	Web Systems	IT Assistant Director I	1.00	56,743	56,743	68,605
		Total	**7.00**	**$387,565**	**$274,079**	**$331,372**

IT: Information Technology

[1] Program at the time the positions were abolished, which was before the reorganization.

Source: Department of Budget and Management; Department of Legislative Services

Proposed Budget

The fiscal 2018 allowance proposes $119.4 million in spending. The largest fund sources are reimbursable funds ($49.8 million that is 41.8% of spending) and general funds ($58.4 million that is 48.9% of spending). **Exhibit 6** shows that the fiscal 2018 allowance is $34.1 million less than the fiscal 2017 working appropriation. A large and volatile share of the budget is funding for major IT projects that total $42.1 million in fiscal 2018. Cash flow requirements for these projects change substantially from year to year. The fiscal 2017 major IT project spending is $37.3 million less than budgeted in fiscal 2017. Costs for departmental operations increase by $3.3 million.

Exhibit 6
Proposed Budget
Department of Information Technology
($ in Thousands)

How Much It Grows:	General Fund	Special Fund	Federal Fund	Reimb. Fund	Total
Fiscal 2016 Actual	$47,693	$10,254	$579	$61,455	$119,981
Fiscal 2017 Working Appropriation	63,135	26,027	397	62,518	152,077
Fiscal 2018 Allowance	58,364	11,095	0	49,848	119,307
Fiscal 2017-2018 Amount Change	-$4,771	-$14,932	-$397	-$12,670	-$32,770
Fiscal 2017-2018 Percent Change	-7.6%	-57.4%	-100.0%	-20.3%	-21.5%

Where It Goes:	
Personnel Expenses	
Unfunded fiscal 2017 personnel costs	$4,177
Turnover adjustments	369
Other fringe benefit adjustments	-28
Pension contributions	-39
Employee and retiree health insurance	-231
Licensing and Vendor Contracts	
Consolidation software licensing in Enterprise Operations	1,512
GIS Licensing Deficiency	-536
Microsoft licensing deficiency	-1,184
Network and Equipment Costs	
Fiscal 2017 final payment for networkMaryland leases	-138
Enterprise operations equipment purchases	-213
Radio Operations	
Radio maintenance as region three radios are no longer on warranty	1,258
Reduce radio system development contract support	-354

Where It Goes:	
Department of Information Technology Major Information Technology Projects	
Central Collection Unit system modernization	-269
Statewide Personnel System	-4,509
Enterprise Budget System	-13,000
Major Information Technology Development Project Fund	
State agency major information technology projects	-19,554
Other	-31
Total	**-$32,770**

GIS: geographic information systems

Note: Numbers may not sum to total due to rounding.

A change in major IT project spending is not unusual. There have been a number of years in which this spending has increased or decreased by well over $10.0 million. Major factors contributing to the decline in fiscal 2018 include:

- delays to the Comptroller's tax system that does not receive the planned $13.2 million in funding;
- the Enterprise Budget System coming under bid so that the planned $10.9 million appropriation is not necessary;
- $8.5 million less in spending for 700 MHz radios as most equipment has been purchased; and
- reducing the statewide personnel system's appropriation by $4.5 million as the project winds down.

From fiscal 2017 to 2018, the number of regular positions at DoIT remains constant at 251.6. This masks the substantial changes that the department has undergone. From the beginning of fiscal 2016 to the end of fiscal 2017, the number of regular positions increased by 117.6, even after losing 7.0 positions through cost containment. This increase is attributable to the new enterprise tech support initiative that has DoIT taking responsibility for day-to-day IT operations in Executive Branch agencies. Positions from these agencies have been transferred into DoIT. This initiative is discussed in the Issues section of this analysis.

Across-the-board Reductions

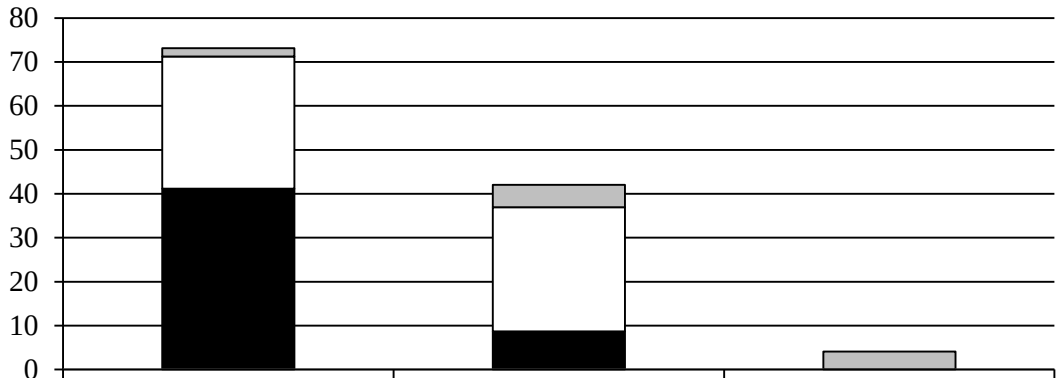
The fiscal 2018 budget bill includes a $54.5 million (all funds) across-the-board contingent reduction for a supplemental pension payment. Annual payments are mandated for fiscal 2017 through 2020 if the Unassigned General Fund balance exceeds a certain amount at the close of the

fiscal year. This agency's share of these reductions is $66,566 in general funds and $1,949 in special funds. This action is tied to a provision in the Budget Reconciliation and Financing Act of 2017.

Operations and Project Spending

DoIT activities can be divided into three distinct functions: TAM provides telecommunications relay service for Maryland's hearing and speech disabled citizens; Major IT Projects provides oversight for State agencies developing major IT projects; and Operations supports the ongoing telecommunication and IT services in State agencies. **Exhibit 7** shows that the largest share of the DoIT appropriation supports operations, which receives $73.1 million and is 61.3%, of spending. Major IT projects receive $42.1 million in total funds, which is 35.3% of spending. Another $4.1 million (3.4% of spending) supports TAM.

Exhibit 7
Spending by Purpose and Fund
Fiscal 2018
($ in Millions)



	Operations	Major IT Projects	TAM
Special Funds	$1.9	$5.1	$4.1
General Funds	30.1	28.3	0.0
Reimbursable Funds	41.2	8.7	0.0

IT: information technology
TAM: Telecommunications Access of Maryland

Note: Adjusted to reflect reductions proposed by in the Governor's budget plan.

Source: Department of Budget and Management

The DoIT fiscal 2017 working appropriation understates spending so comparing the fiscal 2018 spending to fiscal 2017 spending exaggerates the growth in fiscal 2018 spending. The department

advises that it anticipates receiving budget amendments to increase fiscal 2017 spending. The two key factors that understate fiscal 2017 spending are:

- ***Funding for positions transferred in fiscal 2017 has not yet been received by DoIT:*** The wage base for DoIT salaries totals $18.0 million. Since there are no pay increases for State employees (neither a general salary increase nor increments), the fiscal 2017 salary base is the same as in fiscal 2018. The fiscal 2017 budget includes only $15.1 million for salaries, which is $2.9 million less than is required for those positions. This amount increases to $4.2 million if fringe benefits are added. Adding a full year of these personnel costs reduces the increase in fiscal 2018 spending to approximately $140,000, which is a 0.5% increase.

- ***Ongoing Deficiencies:*** Two of the fiscal 2017 deficiencies, GIS and Microsoft licensing costs, are ongoing and are budgeted in fiscal 2018. If these costs are added to fiscal 2017, other operating costs increase by $247,000, which is a 0.5% increase.

Exhibit 8 shows that adjusting for deficiencies and salary spending shows that DoIT's fiscal 2018 budget increases by $0.4 million, or 0.5%.

Exhibit 8
Comparing Adjusted Fiscal 2017 Spending to the Fiscal 2018 Allowance
($ in Thousands)

	Fiscal 2017	Fiscal 2018	Difference	% Change
Salary and Wage Expenditures				
Budgeted Expenditures	$21,733	$26,050	$4,317	19.9%
Underfunded Fiscal 2017 Spending	4,177	0	-4,177	-100.0%
Subtotal	***$25,911***	***$26,050***	***$140***	***0.5%***
Other Operating Expenditures				
Budgeted Expenditures	$49,223	$51,190	$1,967	4.0%
Ongoing Fiscal 2017 Deficiencies	1,720	0	-1,720	-100.0%
Subtotal	***$50,944***	***$51,190***	***$247***	***0.5%***
Total Operating Expenditures	**$76,854**	**$77,240**	**$386**	**0.5%**

Source: Department of Information Technology, January 2017

The bottom line is that there is little growth in DoIT's fiscal 2018 operations spending. In fiscal 2016, DoIT enterprise shared services initiative found that many agencies had underinvested in IT software and hardware. DoIT upgraded the software and hardware, which resulted in the $1.3 million deficiency for prior year's costs. As DoIT continues to integrate agencies into its tech service, DoIT may again find obsolete software and there could be another prior year's deficiency appropriation in fiscal 2017.

Major IT Development Project Fund and Major IT Project Expenditures

Chapters 467 and 468 of 2002 created the MITDPF. The fund replaced the Information Technology Investment Fund, required all general funds appropriated for major IT projects to be held in the fund, and enhanced the oversight role of DoIT (known then as the Office of Information Technology) in approving projects from the fund.

MITDPF Funded Projects

Exhibit 9 shows fund transactions for the MITDPF for fiscal 2015 through the proposed budget in fiscal 2018. Fiscal 2018 includes a $28.3 million general fund appropriation, $3.5 million in special fund appropriations, and $0.3 million in interest earnings. In response to an audit, the allowance also includes $18,000 in resource-sharing revenues. The audit found that revenues from resource-sharing agreements were deposited into a nonbudgeted fund instead of being appropriated in the appropriate agency as special funds. Beginning in fiscal 2016, these funds are being appropriately budgeted. DoIT's revenues are generated by an agreement with the American Tower Corporation to lease space on a tower in Allegany County.

Exhibit 9
Major Information Technology Development Project Fund Data
Fiscal 2015-2018

	Fiscal 2015	Fiscal 2016	Fiscal 2017	Fiscal 2018
Opening Fund Balance	**$31,269,245**	**$32,730,531**	**$45,522,085**	**$3,287,000**
Revenues				
General Fund	$21,668,423	$28,493,336	$33,942,697	$28,302,775
Special Fund – Investment Interest	563,358	666,406	300,000	300,000
Special Fund – Appropriations	6,950,963			3,500,000
Reimbursable Fund Transfers		3,361,089		
Resource-sharing Revenues		18,000	18,000	18,000
Cost Containment	-433,368	-823,731	-803,000	
Total Available Revenues	**$60,018,621**	**$64,445,631**	**$78,979,782**	**$35,407,775**
Expenditures				
Transferred to Agencies	-$27,288,090	-$18,923,546		
Reallocation from Prior Years Expended Anticipated Transfers			-$75,692,782	-$31,571,775
Adjustments				
Project Canceled with Funds Reapplied				-$3,500,000
End-of-year Fund Balance	**$32,730,531**	**$45,522,085**	**$3,287,000**	**$336,000**

Source: Department of Information Technology; Department of Budget and Management; Department of Legislative Services

The special fund appropriations include $3.5 million from reallocated projects, as seen in **Exhibit 10**. As part of the budget process, the department regularly cancels funds if the projects are no longer needed and reappropriates that as special funds to support other projects.

Exhibit 10
Special Funds from Canceled Projects
($ in Thousands)

Project	Amount
Project Oversight	$966
DHMH Long-term Support Services Tracking System	838
SBE New Voting System Replacement Oversight	531
DSP Computer Aided Dispatch/Records Management System	365
DHR Enterprise Content Management	276
MSDE Race to the Top Oversight	269
Other Projects	178
SBE Optical Scan Voting System	78
Total	**$3,500**

DHMH: Department of Health and Mental Hygiene
DHR: Department of Human Resources
DSP: Department of State Police
MSDE: Maryland State Department of Education
SBE: State Board of Elections

Source: Department of Information Technology

Fiscal 2018 appropriations are detailed in **Exhibit 11**. The allowance includes funding for five new projects: the State Treasurer's Office's Financial Systems Modernization project, DoIT's Enterprise Solutions Planning Initiative (ESPI), DoIT's statewide Pay-to-procure System, DoIT's telephone system replacement, and the Department of Budget and Management's (DBM) Maryland General Assembly Video Streaming project.

Exhibit 11
Major Information Technology Development Project Fund
Projects Receiving New Fiscal 2018 Funding (Excluding Carryover Project Funding)

Agency	Project Name	Project Description	MITDPF Funding	Comment
Ongoing Projects				
State Board of Elections (SBE)	New Voting System Replacement Project	Replace an aging voting system that has reached the manufacturer's useful life.	$3,680,601	The project is being implemented and was used for the 2016 elections. There were long lines and equipment was not deployed (accessible ballot marking devices). SBE is reviewing process and data to determine what corrective actions can be put in place. **The Department of Legislative Services (DLS) recommends approval.**
SBE	Agency Election Management System Modernization Project	Replace legacy ballot system that was developed in 1985. Integrate the new system with the new voting system and other systems, such as voter and candidate systems. Subject matter experts and project managers should be procured early in fiscal 2017.	$774,920	The current system vendor's sole source contract expired in December 2016. The project is delayed by at least five months. Concerns are that the Information Technology (IT) Project Request timeline is rudimentary so it is unclear to what extent any planning has been completed, aging legacy systems are often difficult to replace (stakeholders may be slow to adapt), and the schedule remains tight. Due to delays, plans have been made to procure a vendor for the current system through the 2018 election. **DLS recommends approval.**
Department of Health and Mental Hygiene (DHMH)	Medicaid Management Information System (MMIS)	Update Medicaid Systems.	$2,935,547	The proposed funding is for a series of mandated changes to the existing MMIS system as well as two upgrades: a data warehouse capacity and improved case management tracking. **DLS recommends approval.**

Agency	Project Name	Project Description	MITDPF Funding	Comment
DHMH	Long-term Services and Support Tracking System	Implement a system to track long-term care services as well as develop a standardized assessment and in-home services verification tool.	$3,325,000	The appropriation supports development, integration and testing, operation and maintenance, and oversight costs. The scope has increased to include the Developmental Disabilities Administration (DDA) and testing components. The State is receiving $18.1 million in federal funds in fiscal 2018. The project is generally considered low risk and at this point most risk is associated with integrating DDA. **DLS recommends approval.**
DHMH	Statewide Electronic Health Records System	Replace a legacy Computerized Hospital Record and Information System. The current system is over 25 years old. The goal is to procure a commercial off-the-shelf (COTS) product. Reviewing available products should begin this spring.	$100,000	The current system's deficiencies include the inability to process electronic records (including doctor's care instructions), inability to access the web, need for additional software to access other hospitals' systems, and outdated operating systems. High risks include interdependencies (interfaces with numerous hospitals and agencies), organizational culture (new web system to replace long-established system), and flexibility (COTS and agency will need to adapt). The Department of Public Safety and Correctional Services (DPSCS) also needs a health records system and has been added to this project. A bid for a vendor is expected to be issued in July 2017. **DLS recommends approval.**

Agency	Project Name	Project Description	MITDPF Funding	Comment
Department of Human Resources (DHR)	Automated Financial System	Replace the fiscal system that tracks payments, maintains transaction history, generates reports, and produces data for other systems. The new system will interface with the Internet. The system is widely used by local offices.	$700,537	The project is still in the planning phase. DHR's fiscal 2018 appropriation also includes $573,165 in federal funds. The project's solution has been modified so that the Agile approach will be used. This delayed the bid for a vendor but is expected to reduce the delivery time. At a recent pre-proposal conference 33 vendors were present. The bid is under review and should be issued this year. **DLS recommends approval.**
DHR	Shared Human Services Platform	Integrate human services systems among State agencies such as the Department of Labor, Licensing, and Regulation and the Department of Juvenile Services to move out of silo-centric environments.	$6,530,010	Initial funding (totaling $13.9 million) was provided in a fiscal 2017 supplemental budget item in March 2016. These funds were restricted pending federal approval. Risks include interdependencies, organizational culture, and the large scope of this project. Federal funds totaling $65.2 million (for fiscal 2017 and 2018) are in the DHR budget. **DLS recommends that the General Assembly again adopt language restricting funds pending federal approval.**
DPSCS	Computerized Criminal History Replacement	Replace the 30-year-old Identification Index and Arrest Disposition Reporting Systems. The project is early in development with work beginning in fiscal 2016. The goal is to find a COTS product.	$1,638,000	Concerns about the current systems are that the technology is antiquated so it is difficult to recruit staff to maintain the systems and that it is becoming increasingly difficult to provide adequate criminal history and background check data to law enforcement agencies. Risks include technical (migration from an antiquated mainframe to a web-based relational database) and supportability (24/7 support is required). Planning is almost complete and a vendor is expected to come on board by the end of fiscal 2017. **DLS recommends approval.**

Agency	Project Name	Project Description	MITDPF Funding	Comment
Department of State Police (DSP)	Public Safety Communication System	Purchase radios for 700 megahertz communication system.	$1,015,055	Purchase of radios for the State Police. **DLS recommends approval.**
DSP	Automated Licensing and Registration Tracking System	Automate and streamline the process by which a citizen requests approval to purchase a firearm.	$1,050,000	The project is generally low or medium risk, the exception is organizational culture. Since this project will result in a shift from a paper to electronic process, detailed training and new procedures are expected. This is the last appropriation for development; next year's appropriation is for operations. The project is scheduled to be implemented before the end of fiscal 2017. **DLS recommends approval.**
Maryland Department of the Environment (MDE)	Permit Tracking System Modernization	Enhance permit tracking by adding a component that allows access through the Internet.	$1,490,000	MDE advises that the system is expected to use proven technology, which reduces risk. An objective is to reduce the burden on industry and enhance regulatory customer service. This is the final scheduled appropriation. **DLS recommends approval.**
Subtotal			***$23,239,670***	
New Projects				
State Treasurer's Office	Financial Systems Modernization	Replace the State Treasurer's Treasury Management System	$1,625,625	The current system will no longer be supported after December 2018. The system supports banking interface, ledgers, payables, receivables, and other functions. High risks include interdependencies with other State agencies and the hard deadline. After the system is no longer supported, it will no longer be supported for security patches or software/hardware updates. **DLS recommends approval.**

Agency	Project Name	Project Description	MITDPF Funding	Comment
Department of Information Technology (DoIT)	Enterprise Solutions Planning Initiative	Provide overhead for the migration to Agile systems development and a new Enterprise Planning Solution Initiative.	$2,242,480 [1]	This supports transitioning major IT project development from waterfall to Agile development. This is discussed in more detail in the Issues section of this analysis. **DLS recommends approval.**
DoIT	Statewide Pay-to-procure System	Enhance the procurement system to streamline processes, improve cost control, and enhance transparency.	$495,000	The project enhances the procurement system consistent with legislative and executive objectives. The project is generally low risk, with the highest being support from several control agencies. Total costs are $742,500. **DLS recommends approval.**
DoIT	Statewide Voice over Internet Protocol (VoIP) Migration	Migrate the State's telephone system into VoIP.	$3,000,000 [1]	The State's telephone system uses older Time Division Multiplexing technology. This project upgrades it to the new VoIP technology. Hardware, such as private branch exchange (PBX) equipment, and software will be replaced. Most PBXs are at the end of manufacturer support. **DLS recommends approval.**
DBM	Video Streaming of Legislative Sessions	Offer video streaming to the Maryland General Assembly's (MGA) Senate and House of Delegates floor sessions.	$1,200,000	This project is consistent with legislation requiring MGA to live stream floor sessions. **DLS recommends that the funds be contingent on SB 253/HB 438, which requires that the floor sessions are streamed.**
Subtotal			***$8,563,105***	
Total Fiscal 2018 Allowance			**$31,802,775**	
Fund Sources				
General Funds			$28,302,775	
Special Funds			$3,500,000	

MITDPF: Major Information Technology Development Project Fund

[1] Supported with special funds.

Source: Department of Legislative Services; Department of Information Technology; Department of Budget and Management

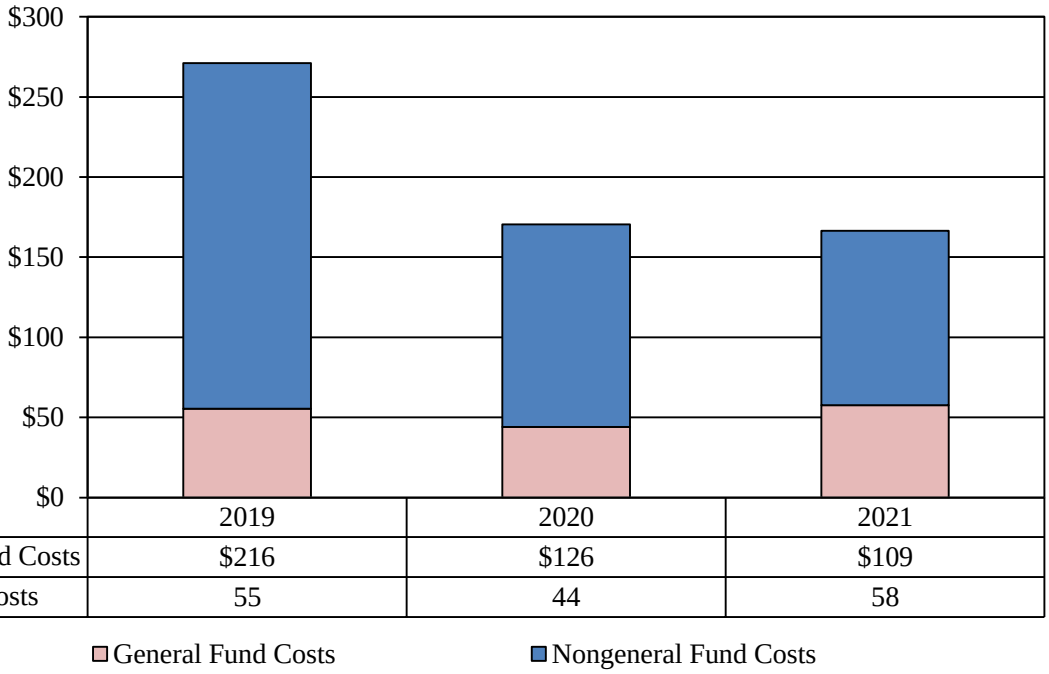
MITDPF Out-year Commitments

Major IT projects require substantial financial commitments and require years to complete. The department has developed the System Development Life Cycle (SDLC) methodology to guide the planning process. This process produces documents that support the planning process and estimate out-year costs. In the Budget Highlights of the Governor's budget books, the department provides a list of all projects that have received appropriations. Costs are based on the current projects that are being planned. As new projects are approved, out-year costs could increase.

Exhibit 12 shows the expected out-year costs of projects that are in the SDLC. In fiscal 2019, $271.0 million in total appropriations and $55.0 million in general fund appropriations are expected. These costs include the following projects with substantial commitments in fiscal 2019:

- The Department of Human Resources (DHR) expects costs for the Shared Human Service Platform to total $73.9 million, including $17.8 million in general funds;
- DLLR's Unemployment Insurance modernization estimates $24.1 million in federal fund costs;
- The State Lottery and Gaming Control Agency expects to spend $24.0 million on its Central Monitoring and Control System;
- The Maryland Transit Administration's Business Unified System Architecture project estimates $18.4 million in special fund appropriations;
- The Integrated Tax System expects $22.0 million in total costs and $13.2 million in general fund costs;
- Long-term Support and Services Tracking requires $10.6 million total costs and $2.1 million in general funds;
- MVA's Enterprise Management System is expecting $9.0 million in special fund expenditures;
- The Statewide Personnel System anticipates $6.5 million in total fund costs and $5.3 million in general fund costs; and
- The Voting System Replacement Project anticipates $5.4 million in total costs, of which $2.7 million is general fund costs.

Exhibit 12
Major Information Technology Development Project Fund
Projected Out-year Expenditures
Fiscal 2019-2021
($ in Millions)



	2019	2020	2021
Nongeneral Fund Costs	$216	$126	$109
General Fund Costs	55	44	58

Note: This excludes transportation and higher education projects.

Source: Department of Budget and Management; Department of Information Technology; Department of Legislative Services

Issues

1. Department Should Address Personnel Issues

DoIT relies on its workforce to provide major IT project development oversight, support cybersecurity improvements, operate voice and data networks, administer web standards and procedures, operate statewide human resources and financial systems, provide GIS support, manage day-to-day IT operations for more than 20 agencies and 10,000 employees, and other functions.

State IT Personnel Compensation Is Often Below Market

In past years, the budget committees have expressed concerns about IT staffing in State agencies. The committees required that DoIT develop strategies concerning the use of contractors and submit a report in the fiscal 2014 JCR. In the report, DoIT also compared State personnel compensation to the market. This report represents the most recent attempt to compare State compensation to market compensation. Since the State has not regularly provided general salary increases or increments, it is unlikely that State salaries have become appreciably closer to industry salaries since 2013. For example, since 2013, the State has offered a general salary increase and increments on time just once, in fiscal 2015. The State offered a general salary increase and late increments in fiscal 2014. In two fiscal years, fiscal 2016 and 2018, the State offered neither a general salary increase nor increments.

With respect to State salaries, the report concluded that "State salaries are often below market." **Exhibit 13** shows that some positions earned as little as half the industry rate.

Exhibit 13
Comparing State Salaries to Industry Averages

State Position	State Mid-point Salary	Industry Equivalent	Median Salary	State Salary as a Percent of Industry Salary
IT Programmer	$44,796	IT Developer	$89,280	50%
IT Director	75,148	IT Manager	118,010	64%

IT: information technology

Source: Department of Information Technology, *Strategy for the Use of Contractors and State Personnel*, 2013

In addition to comparing salaries, the report also compared other aspects of State employment to common marketplace practices. Observations include:

- ***State Classifications Are Obsolete:*** In many cases, there are no IT classifications equivalent to today's IT skills. Many are obsolete or nonexistent. This poses challenges when advertising for jobs since State classification titles do not often come up in keyword searches used by applicants;

- ***State Benefits Often Do Not Match Private-sector Compensation Packages:*** In many job classifications, State benefits are attractive and can make up for lower pay. However, many employers offer attractive packages with other perks, such as telecommuting, free cafeterias, and onsite physicians;

- ***Job Security Does Not Enhance the State's Ability to Recruit:*** Often, job security is not a key factor in attracting and retaining talent. Flexibility, work-life balance, salary, and professional growth are more important;

- ***The State Offers Limited Opportunities for Training and Professional Growth:*** Most IT firms offer continuous training, and the State offers little; and

- ***The State Does Not Offer a Portfolio of the Most Current Technologies:*** Many of the technologies used in Maryland are outdated. There are applications that are over 20 years old and many of the skills needed are not the skills that IT professionals coming out of school have.

The State's personnel system appears to be poorly calibrated to attract IT positions. Although the report did not recommend developing a separate salary scale for IT staff, the State may want to consider this as it moves to the enterprise model, in which more IT services are provided by DoIT.

Another concern is that IT is an area in which there is a lot of competition. The State competes with the federal government and counties in the Baltimore-Washington corridor, both of which tend to pay more than the State. There are also many private employers that offer competitive compensation packages.

In response to concerns raised by the budget committees in the fiscal 2014 JCR, the department prepared a strategy for the use of contractors and personnel. With respect to personnel, DoIT had the following recommendations:

- critical IT positions must be filled on a timely basis;

- rapid change in the IT landscape requires flexible and incremental adjustments to personnel requirements; and

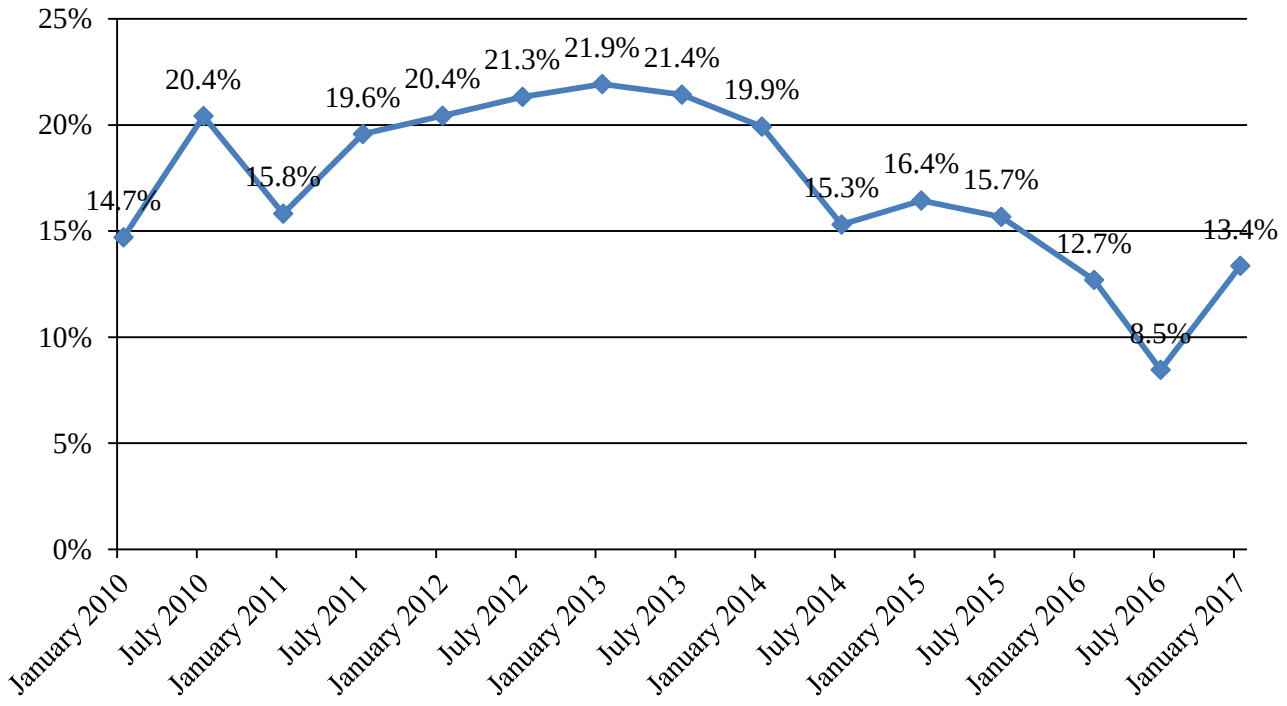
- certain State IT positions should be market competitive.

Although the data presented in the report was limited, it confirmed perceptions that State compensation is less than industry compensation. The remaining sections of this analysis examine the effect of lower IT compensation on State agency operations.

High Vacancies

One effect that low State compensation has on DoIT's budget is high turnover and vacancy rates. **Exhibit 14** shows that vacancy rates have come down somewhat since 2012 and 2013, when they exceeded 20%, but that they are still quite high. Although there is a dip in July 2016, the vacancy rate is among the highest for agencies with over 100 employees. In January 2017, only three agencies with more than 100 employees have higher vacancy rates than DoIT; the Department of Health and Mental Hygiene's (DHMH) Family Health Administration and MDP have a 13.7% vacancy rate, while the Department of Public Safety and Correctional Services' (DPSCS) Office of the Secretary, which houses the department's IT staff, has a rate of 14.7%.

Exhibit 14
Department of Information Technology Vacancy Rates
January 2010-2017



Source: Department of Budget and Management

Difficulty Filling Key Positions

DoIT also struggles to fill key positions. For example, the department has had an MFR goal to increase its staff of certified IT security professionals since fiscal 2015. Initially, the goal was to have 5 professionals in fiscal 2015 and 10 in fiscal 2016. The agency reports that only 1 certified professional was on staff in each fiscal year. The department currently has 2 certified professionals trained and 1 that is being trained. As mentioned earlier in the report, there is a plan in place to hire more certified professionals and support the rest with contract employees.

Use of Contractors to Fill Key Positions

Because of the difficulty that the State has in filling key IT positions, the State relies on contract employees. As previously mentioned, IT security will be relying on contractors to meet its employment goals. DoIT also advises that other positions in its organization are private contractors, because the State does not offer a competitive compensation package. For example, the State's compensation package is insufficient to hire an enterprise architect with experience with a large organization like the State of Maryland.

Other agencies are also replacing IT staff with private contractors. In a recent audit of the Maryland State Department of Education (MSDE), the auditors noted that MSDE improperly used an interagency agreement with Towson University to staff its Chief Information Officer (CIO) position. Total payments were approximately $771,000 over 26 months, including $164,000 for administrative fees. This is equivalent to an annual compensation package totaling approximately $356,000.

Another example is in DPSCS, whose IT personnel had been reduced substantially in its Information Technology and Communications Division (ITCD). In fiscal 2002, DPSCS had 192 IT-related positions, and this number was reduced by more than half in fiscal 2017, to 81. A November 2015 audit report of the DPSCS Office of the Secretary and Other Units indicated that DPSCS augmented its staff beyond its budgeted positions through an interagency agreement with a State university. This agreement enabled the hiring of university employees as contractual IT workers with similar roles and responsibilities to regular ITCD personnel. The fiscal 2015 agreement created an additional 30 contractual IT positions at a cost of $3.4 million, of which $162,000 was paid for indirect costs. These contractual employees held positions that were integrated into the ITCD organizational and management structure, including an Assistant Director and a Chief Networking Officer.

There clearly are situations in which contractors are appropriate. Major IT project development projects use project managers who are contractors. An advantage of contractors is that it is fairly straightforward to change contractors as the types of projects change and different skill sets are required. Terminating underperforming contractors is also easier than replacing underperforming employees.

But there are certain key functions in which the incumbent should be an employee of the State. Leadership and higher level IT positions that are responsible for and related to overall IT strategy, policy-setting, budgeting and fiscal outcomes, business process engineering and analysis, visioning and mentoring, contract management, and other positions of trust should be State provided. State

employees should occupy positions that require considerable or in-depth knowledge of how the State or a particular agency operates. Contractual staff can supplement these efforts. The difficulty with filling many of these positions is the inability to attract and retain qualified staff.

DLS's concern about the use of contractors is that the decision to hire an IT contractor is often made because the State's compensation package is insufficient to hire competent staff. Instead of thinking through the advantages and disadvantages of hiring contractors, the State hires a contractor to fill a position in need but cannot adequately compensate.

Review of IT Positions Recommended

The State should review IT personnel policies to determine if changes can be made to bring IT personnel policies more in line with industry policies. The State should examine IT compensation to determine if any adjustments can be made to make State service more attractive. This should include:

- reviewing nonwage benefits, which includes reevaluating State classifications;
- modifying benefits for IT professionals, allowing for more work-life balance and flexibility;
- offering more opportunities for training and professional growth; and
- offering a portfolio of more current technologies.

The State should also consider partnering with nearby higher education institutions to train more IT professionals. This could involve community colleges and nearby universities as well as training offered by federal institutions. The State could offer scholarship help or tuition reimbursement for students that agree to work for the State for a number of years, similar to workforce scholarship programs that the State offers for nurses, for example.

DLS recommends that DoIT, in cooperation with DBM's Office of Personnel Services and Benefits, examine State IT professional compensation and compare it with the compensation offered by nearby federal, local, and private organizations. This should include an analysis of nonwage benefits. The departments should also consider partnering with higher education institutions to develop training programs for students to prepare them to be IT professionals that work for State agencies.

2. Enterprise Tech Support Initiative

In fiscal 2016, DoIT implemented its enterprise tech support initiative. The goal of the initiative is that DoIT support day-to-day agency IT operations for Executive Branch agencies. The kinds of services that DoIT will support include Internet connections, application software, security, help desk, servers, and hardware. DoIT advises that it will be keeping staff near the agencies that it supports so

that someone does not need to be dispatched every time there is a problem. The DoIT expectation is that this will reduce costs and improve services.

In order to provide agency tech support, DoIT needs to increase its staff by transferring agency personnel into the DoIT budget. Though much of the staff will still be located in the same facilities as the agencies that it serves, the transferred staff will be DoIT personnel. DoIT will also transfer or appoint deputy CIOs that will be responsible for one or more agencies. The department currently has two deputy CIOs; one who supports DBM, the Department of General Services, and the Governor's Office; and one who supports the Maryland Department of Agriculture and MEMA.

DoIT is developing service level obligations (SLO) that define the level of service that an agency will receive. Although not yet complete, DoIT advises that SLOs will offer a number of different service levels or tiers that are appropriate for different kinds of agencies. For example, some agencies have employees that do not require much IT support, such as correctional officers. The agencies will be able to select minimal support, such as phone service only. Other agencies' personnel are clerical and require personal computers. These agencies could select a tier that supports these commodity IT services. DoIT also offers specialized software packages, such as GIS. Agencies could select this level of service.

The initiative also changes how DoIT is funded. DoIT advises that it will develop a per position fee structure for the different tiers in the SLO. The funds for IT tech support will no longer be budgeted in the agencies but will be budgeted in DoIT's budget. For agencies that are primarily supported by general funds, such as the Governor's Office, the general funds will be budgeted in DoIT's budget. A number of agencies receive large shares of special and federal funds, such as DNR. DoIT will receive reimbursable funds from these agencies.

Personnel Changes

Implementing the enterprise tech support initiative has increased DoIT's staff complement. **Exhibit 15** shows that the number of DoIT positions increased from 134 at the beginning of fiscal 2016 to almost 252 by middle of fiscal 2017.

Exhibit 15
Agency Information Technology Support Consolidation Schedule

Positions during Fiscal 2016	134.00
Positions Transferred during Fiscal 2016	20.60
Fiscal 2016 End-of-year Position Count	154.60
Section 20 Abolitions	-7.00
Fiscal 2017 Transfers into DoIT	104.00
Fiscal 2017 Mid-year Position Count	251.60

DoIT: Department of Information Technology

Source: Department of Budget and Management

The additional positions were transferred into DoIT from other State agencies. **Exhibit 16** shows that 124.6 positions have been transferred to DoIT, exclusive of positions abolished under Section 20 of the fiscal 2017 budget bill. DBM estimates that the salary and fringe benefit cost for these positions is $9.9 million in fiscal 2018.

Exhibit 16
Enterprise Tech Support Initiative Position Transfers

Agency	Number
Fiscal 2016 Transfers	
Secretary of State	1.0
Interagency Committee on Public School Construction	1.0
Department of Aging	2.0
Department of Health and Mental Hygiene	4.6
Department of Human Resources	2.0
Department of Public Safety and Correctional Services	4.0
Department of Planning	1.0
Higher Education Commission	1.0
Department of Juvenile Services	2.0
Maryland State Police	1.0
Maryland Department of the Environment	1.0
Subtotal	***20.6***
Fiscal 2017 Transfers	
Executive Boards	1.0
Department of Planning	4.0
Military Department	2.0
Department of Assessments and Taxation	5.0
Department of Natural Resources	11.0
Department of Agriculture	6.0
Department of Labor, Licensing, and Regulation	16.0
State Department of Education	16.0
Department of Housing and Community Development	5.0
Department of Commerce	6.0
Department of the Environment	18.0
Department of Juvenile Services	14.0
Subtotal	***104.0***
Total	**124.6***

* Does not reflect the abolition of 7.0 positions per Section 20 of the fiscal 2017 budget bill.

Source: Department of Budget and Management

As of January 2017, the department is providing tech support for over 10,000 employees. **Exhibit 17** shows that some, like the State Prosecutor, have few employees while others, like DLLR, have over 1,000.

Exhibit 17
Agencies Supported by the Enterprise Tech Support Initiative

Agency	Number of Employees
Juvenile Services	2,040
Natural Resources	1,655
Labor, Licensing, and Regulation	1,611
Environment	969
Education	839
Higher Education Commission	653
Assessments and Taxation	602
Agriculture	526
Budget and Management	447
General Services	439
Housing and Community Development	429
Military	425
Information Technology	296
Commerce	263
Executive Office of the Governor	185
Planning	149
Governor's Coordinating Offices	130
Maryland Emergency Management Agency	81
Aging	63
Energy Administration	52
Disability	37
Secretary of State	36
Veteran's Affairs	34
Longitudinal Data Systems Center	13
Commission on Civil Rights	12
State Prosecutor	12
Total	**11,998**

Note: Includes contract employees.

Source: Department of Information Technology

What's Next?

As this initiative moves forward, these issues will need to be addressed.

- ***Is It Optimal to Migrate the IT Operations of All Large Departments into DoIT?*** There are still agencies that have not been migrated into DoIT. The largest are MDOT, DHMH, DHR, DPSCS, and the Department of State Police. In the case of MDOT, it has a CIO and is managing its own IT resources. In smaller agencies economies of scale can be realized to generate savings and efficiencies. Large departments, like MDOT, may not benefit from the enterprise tech support initiative. On the other hand, some large departments may be struggling and could benefit. DoIT should evaluate each of these agencies individually.

- ***Will All the Smaller Agencies Participate?*** There are a number of smaller State agencies, like the State Archives and Maryland Insurance Administration, which are not included in this initiative. Will they be included?

- ***How Will Service Quality Be Measured?*** Through its service desk, DoIT now automatically sends those served a satisfaction rating survey. The department should also develop measures for these new day-to-day support services that it will be providing and should report these measures with its MFR data provided in the budget. The concern is that service quality could be deteriorating, but the legislature would be unaware because there are no reliable measures. How will DoIT measure the quality of the services it provides? **DoIT should develop MFR indicators that measure service quality.**

- ***Will High Vacancies Cause Problems?*** DoIT has had vacancy rates in excess of 15% in recent years. In January 2017, the vacancy rate is 13%. How will the department keep vacancies down to maintain services?

- ***What Will This Cost and What Will Be Saved?*** DoIT anticipates that it will receive a mix of general funds appropriated in its budget and reimbursable funds from other agencies. The department also anticipates that savings will be realized. DoIT advises that 55 regular positions have been abolished in fiscal 2017 and that the total value of those positions is $3.5 million, which is approximately $65,000 per position. **The department should continue to monitor this and prepare a comprehensive report on costs and savings.**

- ***When Will DoIT Report*?** In the fiscal 2017 budget bill, $500,000 of the appropriation for the Secretary is contingent on DoIT providing a report that discusses cost, savings, and quality for this initiative. The budget committees have not yet received this report.

The department should be prepared to brief the budget committees on its initiative to expand the support services that it is offering to State agencies.

3. The Department Is Adopting the Agile Systems Development Approach

The fiscal 2018 allowance includes $2.2 million to fund the ESPI. This initiative changes the focus of the State major IT project development program by moving to an Agile development approach. The new planning initiative will also increase the focus on building multi-agency systems that can easily be repurposed so that other agencies can use similar systems.

Agile vs. Waterfall Project Development

Since the Office of Information Technology (DoIT's predecessor) assumed responsibility for major IT project development oversight, the agency used the waterfall approach to project management. This approach begins with thoroughly planning all aspects of a project. At the end of the planning period, a functional review document is prepared. This document has detailed specifications that can be used in a request for proposal when bidding the project. The vendor then implements the project based on these specifications. It is not unusual for a project to take two years to plan and three years to implement. **Appendix 8** show the 10 phases of the waterfall approach.

By contrast, the Agile[2] approach does not complete planning prior to beginning to build the software. Instead, the Agile approach develops a high-level plan instead of a detailed plan of all requirements. Projects are divided into a number of tracks. These are usually implemented simultaneously. Each track is broken down so that there are a number of sequential parts to build. The parts are planned and then built over a two-week period called a sprint. This is tested and another part is planned. After a series of sprints, there is a program increment (a usable component). This approach uses the plan-do-check-act approach, which is a repetitive four-stage model for continuous improvement in business process management that is repeated until the project is done.

The key to Agile is that it involves iterations. Small teams work together with stakeholders to define quick prototypes, proof of concepts, or other visual means to describe the problem to be solved. The team defines the requirements for the iteration, develops the code, defines and runs integrated testing scripts, and users test the result.

An advantage to the Agile approach is that components are received much sooner and the system can be implemented much sooner. While early components may be basic and of limited value, the ability to test them and make changes if they are not working as hoped allows the implementing agency the ability to make corrections much earlier than the waterfall approach.

DoIT cites research from a 2015 report[3] that compared the success and failure rates for waterfall and Agile projects. The report notes that 11% of waterfall projects are considered a success, while 39% of Agile projects are considered a success. Failures make up 29% of waterfall projects compared to 9% of Agile projects. Since this is only one study, the results should not be considered conclusive. But if this data is indicative of the success rates of the two approaches, it suggests that the Agile approach

[2] Specifically, DoIT is using the Scaled Agile Framework (SAFe).

[3] The report can be found on this website: https://www.infoq.com/articles/standish-chaos-2015.

is more effective and that even the Agile approach has less than half of its projects ending in unquestioned success.

The State has already begun building Agile projects. The following projects use the Agile approach:

- DBM's Enterprise Budget System;
- DHR's Automated Financial System;
- DLLR's Unemployment Insurance Modernization;
- Department of Housing and Community Development's Single Family and Financial Management System; and
- Maryland Department of Education's Permit Tracking Modernization System.

Summary of the Enterprise Solutions Planning Initiative

To provide resources for Agile systems development, the MITDPF includes $2.2 million. Specifically, this provides funding for Agile project managers, business and financial analysts, enterprise architects, and subject matter experts to support the planning and design efforts for Agile projects. These costs are offset by eliminating all resources for planning information technology project requests (ITPR) for projects in fiscal 2018. Consequently, all projects begun in fiscal 2018 will be Agile projects.

Agile is a new approach and the legislature will want to understand major IT project spending and benefits. DoIT should continue to provide clear information about the major IT projects that are being developed and funded in the MITDP fund. DoIT has prepared a draft ITPR. The report should include the format for the new Agile ITPR that identifies the following:

- benefits associated with projects;
- anticipated long-term development costs;
- expected maintenance costs when the system is complete;
- anticipated schedules and timelines;
- identified solutions;
- a process for dispute resolution if more than one agency is involved;

- program increments, which are usable parts of the software that are built;
- program increment scheduling and planning sessions; and
- systems requirements.

The Agile approach has been used in the private sector for a while and is now becoming more common in government. The State has had mixed results with the waterfall approach. It is reasonable to try a new approach to see if better results can be achieved. **DLS supports appropriating funds to support the Agile approach. However, DLS recommends that the budget committees adopt narrative that requires DoIT to report on the progress of the new planning initiative and the projects that are being developed. This report should include a listing of all projects being developed that includes funding sources and an updated ITPR.**

4. Cybersecurity

Cybersecurity is a major concern for the State. The media is routinely reporting cybersecurity breaches, and many incidents are unreported. In recent years, the State has made efforts to identify weaknesses and make improvements. These include scrutinizing practices in audits and requesting improved performance measures. Cybersecurity is also the first MFR goal for the department.

Budget Committees Express Intent to Improve Cybersecurity Indicators

In the 2014 JCR, DoIT was asked to develop MFR cybersecurity indicators. In its MFR submission, the department has added the goal that it "provide leadership and support to state agencies in the areas of cybersecurity policy, risk and vulnerability assessment, technology implementation, awareness training and incident response." As requested, the department also added five performance measures.

Maryland General Assembly Establishes the Maryland Cybersecurity Council

Chapter 358 of 2015 establishes the Maryland Cybersecurity Council. This council was the successor to the now defunct Maryland Commission on Cybersecurity Innovation and Excellence. The council must consist of several executive department secretaries and directors (or their designees), as well as representatives appointed by the Attorney General from businesses and companies around the State. In addition to the required members of the council, the President of the Senate and the Speaker of the House of Delegates may each appoint two legislative members to serve on the council. Finally, the Attorney General must also invite, as appropriate, specified directors and secretaries of federal security agencies to serve on the council. The council must be chaired by the Attorney General or the Attorney General's designee. A member of the council may not receive compensation as a member of the council but is entitled to reimbursement for standard travel expenses. The University of Maryland University College provides staff for the council.

The Maryland Cybersecurity Council works with the National Institute of Standards and Technology[4] (NIST), as well as other federal agencies, private-sector businesses, and private cybersecurity experts to:

- identify critical infrastructure not covered by federal law or Executive Order 13636, review and conduct risk assessments to determine which local infrastructure sectors are at the greatest risk of cyber attacks and need the most enhanced cybersecurity measures;

- use federal guidance to identify categories of critical infrastructure as critical cyber infrastructure if cyber damage or unauthorized cyber access to the infrastructure could result in catastrophic consequences;

- assist infrastructure entities that are not covered by the executive order in complying with federal cybersecurity guidelines;

- assist private-sector cybersecurity businesses in adopting, adapting, and implementing the NIST cybersecurity framework of standards and practices;

- examine inconsistencies between State and federal laws regarding cybersecurity; recommend a comprehensive State strategic plan to ensure a coordinated and adaptable response to and recovery from cybersecurity attacks; and

- recommend any legislative changes considered necessary by the council to address cybersecurity issues.

The department should be prepared to brief the committee on its role in the Maryland Cybersecurity Council.

Department's Efforts to Enhance Its Cybersecurity Program

The department also recognizes the importance of enhanced cybersecurity efforts. In its fiscal 2016 strategic plan, DoIT lists cybersecurity as its first strategic goal. The department has adopted performance measures and developed strategies. A performance measure is to double the number of firewalls through the use of Security-as-a-Service contracts. DoIT has also developed the following strategies:

- establish a cybersecurity office;

- restructure the agency chief information model so that DoIT has authority over strategic direction of IT implementations;

[4] NIST is an agency within the U.S. Department of Commerce that supports scientific research.

- establish risk-based policies and procedures that prioritize controls, assess risks, track mitigation, and adapt to changing threats;
- establish enterprise visibility into statewide IT assets, systems, capabilities, and data;
- establish enterprise risk and security assessments, incident response, and reporting capabilities; and
- collaborate with industry leaders and partner with commercial vendors to deliver products and services.

Recent Audit Findings

The Office of Legislative Audits reviews agencies' cybersecurity practices in its audits. **Exhibit 18** lists the number of findings in each type of finding and the number of agencies with findings. Though there was improvement in 2016, the conclusion remains that there is room to improve.

Exhibit 18
Number of Audit Instances
Audits Released in 2015 and 2016

Type of Audit Finding	Number of Findings 2015	Number of Findings 2016
Personal Identifiable Information	8	8
Log/Monitor Security Events	7	4
Firewall	5	4
Intrusion Detection Prevention System Problems	4	4
Virtual Private Network Access Problems	1	0
Improper Server Placement	0	1
Windows XP Still Used	1	0
Users Had Unnecessary Administrative Rights on Their Local Computers	6	4
Software Not Updated	5	5
Service Organization Controls Review Was Not Performed or Obtained	2	0
Password Controls	4	2
Unnecessary User/File Access	10	2
Excessive Network Level Access	2	6
Backup Files Problems	1	1
Disaster Recovery Plan	1	2
Anti-malware	5	8
Data Loss Prevention	1	0
Available Software Security Not Used	0	1
Total	**63**	**52**
Number of Audits with Findings	16	14

Source: Office of Legislative Audits

In spite of all the training, increased resources, and improved policies, audits still reveal critical security weaknesses. The department should brief the committees on how it plans to address these weaknesses.

5. Too Many Out-of-cycle IT Project Requests

To keep the legislature informed about the status of major IT projects, DoIT has notified DLS as project planning begins or when projects move from planning to implementation when the legislature is not in session. These are referred to as out-of-cycle ITPRs. In the recent interim, there has been a spike in the number of out-of-cycle ITPRs. As DoIT moves to the Agile approach to major IT project development, this process may become obsolete and another process may need to be developed. **It is recommended that DLS and DoIT work together to develop a process for keeping the legislature informed about changes in major IT projects when the legislature is not in session.**

Recommended Actions

1. Add the following language to the general fund appropriation:

   Further provided that $1,200,000 of this appropriation made for the purpose of video streaming Maryland General Assembly floor sessions is contingent on the enactment of SB 253 or HB 438 authorizing video streaming of Maryland General Assembly floor sessions.

   Explanation: This makes the appropriation for video streaming equipment contingent on legislation authorizing video streaming.

		Amount Reduction	
2.	Reduce funding for major information technology (IT) project oversight. The fiscal 2018 allowance includes $1,783,170 for major IT project oversight. Each year, the major IT project fund ends the year with a large fund balance, because all the funds appropriated were not spent. For example, fiscal 2016 ended with a $45.5 million fund balance, fiscal 2015 ended with a $32.7 million fund balance, and fiscal 2014 ended with a $31.3 million fund balance. Furthermore, oversight funds were reduced $803,000 in fiscal 2017 cost containment, and $966,388 in oversight costs were canceled and redirected toward new projects in fiscal 2018. The department is authorized to move funds between projects if necessary to fund project oversight costs incurred in fiscal 2018.	$ 1,000,000	GF

3. Add the following language:

   Authorization to expend reimbursable funds is reduced by $135,000.

   Explanation: Currently, 13% of positions are vacant. The department has consistently had high vacancy rates that exceeded 20% at times. Increasing the turnover rate to 6% reduces spending by $450,000, which is $306,000 in general funds, $9,000 in special funds, and $135,000 in reimbursable funds. This reduction may be distributed across the department by budget amendment.

		Amount Reduction	
4.	Increase turnover rate to 6%. Currently, 13% of positions are vacant. The department has consistently had high vacancy rates that exceeded 20% at times. Increasing the turnover rate to 6% reduces spending by $450,000, which is $306,000 in general funds, $9,000 in special funds, and $135,000 in reimbursable funds. This reduction may be distributed across the department by budget amendment.	306,000 9,000	GF SF

5. Adopt the following narrative:

Review of Information Technology (IT) Personnel Compensation: The State should review IT personnel policies to determine if changes can be made to bring IT personnel policies more in line with industry policies. This should include an examination of IT compensation to determine if any adjustments can be made to make State service more attractive. This should also include reviewing nonwage benefits, which include reevaluating State classifications, modifying benefits for IT professionals, allowing for more work-life balance and flexibility, offering more opportunities for training and professional growth, and offering a portfolio of more current technologies.

The State should also consider partnering with nearby higher education institutions to train more IT professionals. This could involve community colleges and nearby universities as well as training offered by federal institutions. The State could offer scholarship help or tuition reimbursement for students that agree to work for the State for a number of years.

Information Request	Authors	Due Date
Review of IT personnel compensation	Department of Information Technology Department of Budget and Management	December 1, 2017

6. Adopt the following narrative:

Status of the Agile Major Information Technology (IT) Project Development Approach: Agile is a new approach, and the legislature will want to understand major IT project spending and benefits. The Department of Information Technology (DoIT) should continue to provide clear information about the major IT projects that are being developed and funded in the Major Information Technology Development Project Fund. DoIT has prepared a draft Information Technology Project Request (ITPR). The report should include the format for the new Agile ITPR.

Information Request	Author	Due Date
Status of the Agile major IT project development approach	DoIT	January 1, 2018

Total Reductions	**$ 1,315,000**
Total General Fund Reductions	**$ 1,306,000**
Total Special Fund Reductions	**$ 9,000**

Appendix 1
Current and Prior Year Budgets
Department of Information Technology
($ in Thousands)

	General Fund	Special Fund	Federal Fund	Reimb. Fund	Total
Fiscal 2016					
Legislative Appropriation	$47,507	$10,981	$632	$57,392	$116,512
Deficiency Appropriation	0	0	0	0	0
Budget Amendments	186	1,904	0	6,795	8,885
Reversions and Cancellations	0	-2,631	-53	-2,731	-5,415
Actual Expenditures	**$47,693**	**$10,254**	**$579**	**$61,455**	**$119,981**
Fiscal 2017					
Legislative Appropriation	$55,962	$26,022	$397	$62,518	$144,899
Cost Containment	-803	0	0	0	-803
Budget Amendments	6,256	5	0	0	6,261
Working Appropriation	**$61,415**	**$26,027**	**$397**	**$62,518**	**$150,357**

Note: Does not include targeted reversions, deficiencies, and contingent reductions. Numbers may not sum to total due to rounding.

Fiscal 2016

Spending in fiscal 2016 totaled $120.0 million. This is $3.5 million more than appropriated by the General Assembly in the fiscal 2016 budget bill. Budget amendments added $8.9 million to the Department of Information Technology budget and $5.4 million was canceled. Specific budget amendments include:

- $1,164,502 in special funds to provide networkMaryland services to counties;
- $731,368 in special funds from the Dedicated Purpose Account for security upgrades in State agencies that replace obsolete hardware;
- $152,000 ($144,000 in general funds and $8,000 in special funds) to restore the fiscal 2015 general salary increase; and
- $42,447 in general funds for telecommunications costs.

The most significant cancellations include approximately:

- $1,845,000 in special funds for State police radio equipment;
- $710,000 in special funds supporting Telecommunications Access of Maryland, a large share of which is for telecommunications contracts;
- $990,000 in reimbursable funds supporting the Networks Division's networkMaryland and related private branch exchange equipment and operations;
- $801,000 in reimbursable funds in the Secretary's Office primarily for software services;
- $706,000 in reimbursable funds for major information technology (IT) project oversight; and
- $223,000 in unspent enterprise reimbursable funds.

Fiscal 2017

The fiscal 2017 working appropriation totals $150.4 million, which is $5.5 million more than the legislative appropriation. Cost containment reduced major IT project development oversight spending by $803,000, while budget amendments added another $6.3 million to spending. Budget amendments include:

- $6,081,869 in general funds to support statewide enterprise operations; and
- $179,278 ($174,480 in general funds and $4,798 in special funds) to provide employee increments.

Appendix 2
Audit Findings

Audit Period for Last Audit:	February 9, 2012 – June 30, 2015
Issue Date:	September 2016
Number of Findings:	7
Number of Repeat Findings:	2
% of Repeat Findings:	29%

Findings relating to major information technology (IT) development projects:

Finding 1: **The Department of Information Technology (DoIT) lacked sufficient documentation supporting its review of annual major IT projects status reports and system development documents. Documentation related to quarterly reviews was also inadequate. The auditors reviewed five projects, requiring 20 quarterly reviews. For 3 reviews, there was no documentation, and for 10 reviews, attendance sheets were maintained but there was no documentation of what was discussed or if any significant corrective action was necessary. DoIT concurs and will put procedures in place to maintain documentation about these meetings.**

Finding 2: DoIT had not established a process to evaluate project managers hired to oversee major IT projects, developed specific documentation and reporting requirements, and established a process to ensure an adequate number of project managers are assigned. DoIT concurs. The department notes that it is planning to transition from the current waterfall project development approach to an Agile project development approach. DoIT agrees to incorporate measures to evaluate project managers, develop reporting requirements, and ensure adequate project management staff.

Finding 3: DoIT had not established comprehensive policies for project changes to scope, schedule, or costs (referred to as rebaselining) and Independent Verification and Validation (IV&V) assessments. A project can be rebaselined for valid reasons, such as changes in funding or correcting inaccuracies, but can also be used to mask cost overruns and schedule delays. The auditor recommends that DoIT develop guidelines based on the Project Management Institute's *Project Management Body of Knowledge* (PMBOK). IV&Vs is a third-party review that can determine if a system is being built using best practices (verification) and if the completed system will provide the needed functionality to satisfy the business purpose (validation). The auditor recommends that DoIT develop guidelines consistent with PMBOK. DoIT concurs and notes that it will also develop guidelines for its Agile process.

Findings relating to IT security and control:

Finding 4: DoIT, the Department of Budget and Management, and the Governor's Office networks were not properly secured. While contractors working remotely had access

appropriately restricted, the auditor noted that contractors working onsite did not have similar controls. DoIT disagreed and noted that contractors working with State-owned devices should not be restricted more than any other State-owned device. DoIT did not fully utilize advanced security features, such as the ability to allow or deny traffic based on the application traversing the network. Network-based intrusion detection prevention systems and host-based intrusion protection systems were not optimized to ensure that encrypted traffic with malicious code may not be detected or dropped. DoIT concurs. The department agrees to complete a risk analysis and implement decryption and inspection on encrypted traffic.

Finding 5: Computers maintained by DoIT's desktop services were not properly secured with current malware protection. Malware protection software was not updated in all cases. The auditor also found that DoIT had not updated some software with significant known vulnerabilities. An excessive amount of workstations had been assigned administrative rights, which raises the concern that any malware infecting these computers would have administrative rights. DoIT concurs and is addressing the concerns by employing a centralized anti-malware platform, reducing administrative rights, and scanning servers and workstations to verify software and hardware are up to date.

Finding relating to statewide procurement contracts:

Finding 6: **DoIT did not properly instruct agencies procuring services from DoIT's statewide contract to secure competitive bids received electronically. DoIT's guidance required a password for financial bids but not the technical proposals. DoIT noted that it interpreted the last audit's requirement to provide a password for bids to refer to a "statement of price" and assumed that this refers to the financial proposal alone. DoIT is revising its policies to include a password for the technical proposal. The auditor noted that DoIT's guidance regarding the opening of bids does not require that two State employees be present. DoIT agreed that two State employees should be present and notes that the regulations require that two State employees are present and has agreed to modify its procedures.**

Finding relating to the Universal Services Trust Fund:

Finding 7: DoIT did not recommend an appropriate reduction to the Universal Services Trust Fund, which supports the Maryland Accessible Telecommunications program. The auditor notes that the end of fiscal 2014 balance was sufficient to fund multiple years even if no fee is charged. DoIT did not reduce the fee because of concerns that the Federal Communications Commission could end State subsidies and require the states to fully fund this program. This is no longer a significant concern and the fee has been reduced from $0.11 to $0.05 per subscriber account per month.

*Bold denotes item repeated in full or part from preceding audit report.

Appendix 3
Major Information Technology Projects
Department of Information Technology
Enterprise Solutions Planning Initiative

Project Status	Implementation.			**New/Ongoing Project:**	New.			
Project Description:	Provide funding for Agile approach to major information technology (IT) projects. Specifically, this provides funding for Agile project managers, business and financial analysts, enterprise architects, and subject matter experts to support the planning and design efforts for Agile projects. These costs are offset by eliminating all resources for planning information technology project requests for projects in fiscal 2018. Consequently, all projects begun in fiscal 2018 will be Agile projects.							
Project Business Goals:	Develop major IT projects more quickly and reduce costs.							
Estimated Total Project Cost:	$11,212,400			**Estimated Planning Project Cost:**	$11,212,400			
Project Start Date:	July 2018			**Projected Completion Date:**	Ongoing planning support.			
Schedule Status:	N/A							
Cost Status:	N/A							
Scope Status:	N/A							
Project Management Oversight Status:	N/A							
Identifiable Risks:	N/A							
Additional Comments:	This is discussed in Issue 3.							
Fiscal Year Funding ($ in Thousands)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Balance to Complete**	**Total**
Personnel Services	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Professional and Outside Services	0.0	2,242.5	2,242.5	2,242.5	2,242.5	2,242.5	0.0	11,212.4
Other Expenditures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Funding	**$0.0**	**$2,242.5**	**$2,242.5**	**$2,242.5**	**$2,242.5**	**$2,242.5**	**$0.0**	**$11,212.4**

Appendix 4
Major Information Technology Projects
Department of Information Technology
Statewide Pay-to-procure System

Project Status	Implementation.	**New/Ongoing Project:**	New.
Project Description:	Enhance the current procurement system to provide sourcing, receiving, vendor registration and management, solicitation, quotes, accounts payable, government to business punch-outs, and requisitioning.		
Project Business Goals:	Provide a one-stop shop for State end-users and suppliers. Have users gain broader visibility into their organizations budget spending, allowing them to make data-driven procurement decisions.		
Estimated Total Project Cost:	$495,000	**Estimated Planning Project Cost:**	$443,950
Project Start Date:	October 2016	**Projected Completion Date:**	April 2017
Schedule Status:	Upgrades are currently being made and project should be completed before the end of fiscal 2017.		
Cost Status:	No change.		
Scope Status:	No change.		
Project Management Oversight Status:	Because the Department of Information Technology is the implementing and oversight agency, the project poses unique challenges. To address this, independent project managers are procured.		
Identifiable Risks:	Highest risk is that the project will need support from multiple control agencies to be successful.		
Additional Comments:	None.		

Fiscal Year Funding ($ in Thousands)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Balance to Complete**	**Total**
Personnel Services	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Professional and Outside Services	0.0	495.0	247.5	0.0	0.0	0.0	0.0	742.5
Other Expenditures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Funding	**$0.0**	**$495.0**	**$247.5**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$742.5**

Appendix 5
Major Information Technology Projects
Department of Information Technology
Statewide Voice over Internet Protocol Migration

Project Status	Planning.	**New/Ongoing Project:**	New.
Project Description:	The State's telephone system uses older Time Division Multiplexing technology. This project upgrades it to the new voice over Internet protocol technology. Hardware, such as private branch exchange (PBX) equipment, and software will be replaced. Most PBXs are at the end of manufacturer support. This project replaces the current system and upgrades the technology to keep it current with improving technologies.		
Project Business Goals:	Goals include upgrading the State's telephone system to provide better service such as video and web conferencing, allowing for easier integration of call center applications, and avoiding increasing maintenance costs.		
Estimated Total Project Cost:	$63,501,500	**Estimated Planning Project Cost:**	$355,500
Project Start Date:	September 2016	**Projected Completion Date:**	Unknown.
Schedule Status:	Planning is scheduled to be completed before the end of fiscal 2017. In fiscal 2018, the department will begin to replace the 30 PBXs and software.		
Cost Status:	No change.		
Scope Status:	No change.		
Project Management Oversight Status:	Because the Department of Information Technology is the implementing and oversight agency, the project poses unique challenges. To address this, independent project managers are procured.		
Identifiable Risks:	Finding due to high cost of replacement and interdependencies between equipment and new software.		
Additional Comments:	None.		

Fiscal Year Funding ($ in Thousands)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Balance to Complete**	**Total**
Personnel Services	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Professional and Outside Services	0.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	48,501.5	63,501.5
Other Expenditures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Funding	**$0.0**	**$3,000.0**	**$3,000.0**	**$3,000.0**	**$3,000.0**	**$3,000.0**	**$0.0**	**$63,501.5**

Appendix 6
Object/Fund Difference Report
Department of Information Technology

Object/Fund	FY 16 Actual	FY 17 Working Appropriation	FY 18 Allowance	FY 17 - FY 18 Amount Change	Percent Change
Positions					
01 Regular	154.00	251.60	251.60	0.00	0%
02 Contractual	1.00	1.00	2.00	1.00	100.0%
Total Positions	**155.00**	**252.60**	**253.60**	**1.00**	**0.4%**
Objects					
01 Salaries and Wages	$ 13,751,846	$ 21,733,274	$ 26,050,260	$ 4,316,986	19.9%
02 Technical and Spec. Fees	60,371	48,123	116,135	68,012	141.3%
03 Communication	9,102,944	8,861,698	8,701,234	-160,464	-1.8%
04 Travel	100,628	88,176	79,376	-8,800	-10.0%
06 Fuel and Utilities	15,305	211,000	201,000	-10,000	-4.7%
07 Motor Vehicles	4,532	4,785	4,590	-195	-4.1%
08 Contractual Services	83,335,216	108,109,390	81,720,374	-26,389,016	-24.4%
09 Supplies and Materials	71,815	108,908	96,100	-12,808	-11.8%
10 Equipment – Replacement	11,622,528	10,303,564	1,460,520	-8,843,044	-85.8%
11 Equipment – Additional	1,456,056	400,000	400,000	0	0%
13 Fixed Charges	459,536	488,076	545,806	57,730	11.8%
14 Land and Structures	488	0	0	0	0.0%
Total Objects	**$ 119,981,265**	**$ 150,356,994**	**$ 119,375,395**	**-$ 30,981,599**	**-20.6%**
Funds					
01 General Fund	$ 47,693,409	$ 61,415,140	$ 58,430,456	-$ 2,984,684	-4.9%
03 Special Fund	10,253,635	26,026,717	11,096,633	-14,930,084	-57.4%
05 Federal Fund	578,805	397,075	0	-397,075	-100.0%
09 Reimbursable Fund	61,455,416	62,518,062	49,848,306	-12,669,756	-20.3%
Total Funds	**$ 119,981,265**	**$ 150,356,994**	**$ 119,375,395**	**-$ 30,981,599**	**-20.6%**

Note: Does not include targeted reversions, deficiencies, and contingent reductions.

Appendix 7
Fiscal Summary
Department of Information Technology

Program/Unit	FY 16 Actual	FY 17 Wrk Approp	FY 18 Allowance	Change	FY 17 - FY 18 % Change
01 Major IT Development Project Fund	$ 27,669,605	$ 51,356,825	$ 31,802,775	-$ 19,554,050	-38.1%
01 State Chief of Information Technology	10,876,638	7,522,991	7,379,478	-143,513	-1.9%
02 Security	8,066,900	3,999,321	4,023,155	23,834	0.6%
03 Application Systems Management	8,499,218	18,005,062	18,717,100	712,038	4.0%
04 Infrastructure	25,687,150	28,107,361	32,519,345	4,411,984	15.7%
05 Chief of Staff	5,792,541	2,573,604	2,901,520	327,916	12.7%
06 Major IT Development Projects	26,160,846	28,043,632	10,265,740	-17,777,892	-63.4%
07 Radio	2,954,067	6,707,609	7,669,657	962,048	14.3%
09 Telecommunications Access of Maryland	4,274,300	4,040,589	4,096,625	56,036	1.4%
Total Expenditures	**$ 119,981,265**	**$ 150,356,994**	**$ 119,375,395**	**-$ 30,981,599**	**-20.6%**
General Fund	$ 47,693,409	$ 61,415,140	$ 58,430,456	-$ 2,984,684	-4.9%
Special Fund	10,253,635	26,026,717	11,096,633	-14,930,084	-57.4%
Federal Fund	578,805	397,075	0	-397,075	-100.0%
Total Appropriations	**$ 58,525,849**	**$ 87,838,932**	**$ 69,527,089**	**-$ 18,311,843**	**-20.8%**
Reimbursable Fund	$ 61,455,416	$ 62,518,062	$ 49,848,306	-$ 12,669,756	-20.3%
Total Funds	**$ 119,981,265**	**$ 150,356,994**	**$ 119,375,395**	**-$ 30,981,599**	**-20.6%**

IT: information technology

Note: Does not include targeted reversions, deficiencies, and contingent reductions.

Appendix 8
Systems Development Life-cycle Phases

Phase	Description
Project Planning Request	
Initiation	Management determines that a system may be necessary. Significant assumptions and constraints are identified. A project team is formed. A Concept Proposal identifies the needs and opportunities to improve business functions. The Information Technology Project Request, which is the formal budget request, is prepared.
System Concept Development	This phase begins when the Concept Proposal has been formally approved by the agency Chief Information Officer. The project team analyzes needs, risks, and alternatives. The System Boundary Document (that limits the scope) and Risk Management Plan are prepared. The agency decides to proceed into the next life-cycle phase, continue additional conceptual phase activities, or terminate.
Planning	The Project Management Plan (PMP) is developed in this phase. (The plan documents the project scope, tasks, schedule, resources, and interrelationships with other projects. The plan includes an acquisition planning section to show how all government human resources, contractor support services, hardware, software, and telecommunications capabilities are acquired during the life of the project.) The internal management, engineering, business management, and contract management processes that will be used by the project office for all subsequent life-cycle phases are also determined in the phase.
Requirements Analysis	This phase begins when the PMP is approved. The key product developed in this phase is the Functional Requirements Document (FRD). This is a user-oriented document that includes business process descriptions, a logical model that describes the fundamental processes and data needs, an analysis of business activities and data, an analysis to define the interaction between the business activities and business data, and a detailed analysis of the current technical architecture, application software, and data to ensure that limitations or unique requirements have not been overlooked. A Test and Evaluation Master Plan is also prepared. **The baseline is typically prepared at the end of this phase.**
Project Implementation Request	
Design	The objective of the Design Phase is to transform the detailed, defined requirements into complete, detailed specifications for the system to guide the work of the Development Phase. Tasks include beginning the maintenance manual, user manual, training manual, and contingency plan. Ideally, the project's tasks are divided into two-week segments.
Development	The programming of the system occurs in this phase. Although much of the activity in this phase addresses the computer programs that make up the system, this phase also puts in place the hardware, software, and communications equipment.

Phase	Description
Integration and Test	The objective of this phase is to determine if the developed system satisfies the requirements defined in the FRD. This includes system, security, and acceptance testing.
Implementation	The system is installed and made operational.
Operation and Maintenance	The system is in use. As problems are detected, needs occur, or software is upgraded, the system is updated.
Disposition	This is implemented to either eliminate a large part of a system or, in most cases, close down a system and end the life-cycle process.

Source: Department of Information Technology, January 2017