Maryland
DEPARTMENT OF INFORMATION TECHNOLOGY

Statewide Information Technology Master Plan
July 1, 2020 - June 30, 2023

Michael G. Leahy, Secretary

Table of Contents

Message from Secretary Michael G. Leahy

The Maryland Department of Information Technology's (DoIT) mission is to provide vital technology solutions that allow the Executive Branch, State Agencies and Coordinating Offices to provide Marylanders with services that enable them to live and work more safely, efficiently, and productively. The Information Technology Master Plan sets out a framework for how DoIT and its partnering agencies can work together to most efficiently and effectively use current and future technology to achieve each agency's individual goals.

I am very proud of what our department, oftentimes in conjunction with partner agencies, has done for the people of Maryland over the last few years. More recently the use of Information Technology has become key in the fight against COVID 19 and allowed the State to continue its work by allowing thousands of government employees to telework in the safety of their own homes.

Our Department's most notable accomplishments include:

Innovation
- Developing and launching multiple applications on the OneStop Portal including three that were integral to recovery during the COVID-19 Pandemic.
- Converting many state government agencies over to VoIP technology from the existing legacy technology phone systems over the past year. Currently over 3,000 VoIP phones are being used in Maryland State government.
- Building an open data site (https://coronavirus.maryland.gov) using ArcGIS Hub, which features dashboards with vital statistics regarding the COVID-19 pandemic.
- Developing, in conjunction with the Maryland Department of Health (MDH), COVID Link, a state-of-the-art data management platform, to facilitate the state's contact tracing efforts.

Efficiency
- DoIT has migrated 21 customer agency data centers into a centralized, virtualized computing environment. Through server consolidation, DoIT created efficient usage of resources and offers a first-in-class standardized network architecture leading to the elimination of 27 data centers (up from 21 data centers in 2018) which has saved the State in excess of $3.5 million in operational expenditures (a savings increase of $1.5 million from 2018) in the replacement of servers, storage and environmental equipment, including data center operational power and cooling costs.

Cybersecurity
- Governor Hogan signed Executive Order 01.01.2019.07 which created the Maryland Cyber Defense Initiative.
- The State Chief Information Security Officer and his staff created and disseminated the Maryland IT Security Manual which will serve to direct and harmonize efforts among multiple organizations working towards unified cybersecurity goals.
- DoIT, and The Governor's Office of Homeland Security have partnered with the Maryland Air National Guard to complete penetration testing of State websites supporting the response to COVID-19.
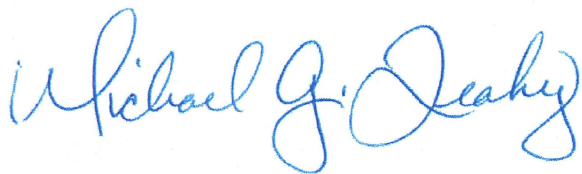
Process Improvements
- DoIT established the special request management process underneath the newly created Portfolio Office to provide agencies with a centralized entry point to request support for their IT needs. This process is part of DoIT's strategy in increasing their IT efficiency, cost effectiveness, and user experience.
- The newly-created Delivery Program Management Office (DPMO) provides direction and support related to IT Project and Program Management to successfully initiate, plan, execute, monitor, control, and close information technology projects undertaken by DoIT.
- We have established the Office of Enterprise Architecture as part of the Strategic Planning Group to provide IT architecture services within DoIT and to other State agencies.

These incredible accomplishments would not be possible without the commitment of DoIT employees. Their hard work, professionalism, and dedication drive this department to succeed on so many levels, and have aided other state agencies in achieving their goals

Now more than ever we see the importance of investing in short-term and long-term technological solutions that will align with practices statewide, while filling each agency's specific needs. DoIT has put into place four main objectives for its future progress which include: providing IT leadership for our partners, promoting IT as a strategic investment, providing a reliable, secure, and modern IT infrastructure, and creating measurable improvements in the cybersecurity posture of the State.

I look forward to seeing the progress that the great state of Maryland can make by all agencies utilizing the strategies and realizing the goals outlined in this Information Technology Master Plan.

Sincerely,

Michael G. Leahy
Secretary & State Chief Information Officer
Maryland Department of Information Technology

About The Department of Information Technology

In 2008, the Maryland General Assembly passed legislation creating the Department of Information Technology (DoIT), as part of an effort to consolidate statewide Information Technology (IT) functions and policies into one unit of government. This statute established DoIT as a department reporting directly to the Governor. The statute also delegated various duties to DoIT, such as the development of statewide IT policy, coordination of major IT development projects, and the management and oversight of statewide IT planning efforts. See Title 3A, MD Code Ann., State Finance & Procurement Article (2013).

In addition to this governance role, DoIT manages IT and Telecommunication services within the agency itself and provides support to other units of government, including the Executive Office of the Governor, the Governor's coordinating offices, and a variety of independent agencies within the executive branch. Most importantly DoIT strives to provide the highest level of customer service to its internal and external customers and champions the State's strategic direction for IT and Telecommunications by establishing a long-range target-technology architecture, encouraging cross agency collaboration, and advocating best practices for operations and project management.

Technological resources at the agency's disposal, combined with a talented and knowledgeable team, allow DoIT to successfully identify and promulgate opportunities for State agencies to run more efficiently and less expensively. This, in turn, maximizes the State's investment in technology and telecommunication assets.

DoIT consists of various offices that are organized into three portfolios:

- **Cybersecurity Portfolio:** includes statewide information security management and governance.
- **Strategy and Governance Portfolio:** includes Major IT Development Projects (MITDP) oversight, project and program delivery, IT policy management, and statewide enterprise architecture management.
- **Operations Portfolio:** includes IT application management, infrastructure services, client delivery services and the Maryland First Responder Radio System Team (MD FiRST)--a statewide interoperable radio network.

DoIT also maintains a business relationship management office, reportable to executive leadership, that serves as a liaison between DoIT and its customers. This office primarily supports and manages exchanges of services between DoIT and other units of government that subscribe to DoIT services. This office also provides other units of government with transaction fulfillment and consultation on IT planning and process-oriented matters.

Our Mission
To provide vital technology solutions that allow the Executive Branch, State Agencies and Coordinating Offices to provide Marylanders with services that enable them to live and work more safely, efficiently and productively.

Our Vision
To lead the State in the creation and implementation of information technology solutions that improve IT infrastructure and government services and keep Maryland current within IT industry trends.

Our Values
We adhere to the Governor's values of providing excellent customer service, increasing efficiency and reducing waste, and always being mindful of the taxpayer dollar.

Our Accomplishments

OneStop Digitization of Forms and Processes - Maryland currently has over one thousand forms spread across state agency websites. Many of these are only available electronically, as a form that must be printed, completed, and returned in-person or by mail. Maryland's OneStop Portal is an innovative approach to citizen engagement as it provides a single location for locating and submitting forms, license applications, and certification applications across the State government. Built with user experience in mind, visitors benefit from intelligent search features and an intuitive, user-friendly design.

The OneStop Portal is also reducing the cost and burden for state agencies. Through the use of the OneStop Portal's powerful workflow engine, state agencies can now retire proprietary, custom license systems and fold forms and license processing operations into the tools provided by the OneStop Portal.

The DoIT Special Request Management Process - The DoIT special request management process has been established to provide agencies with a centralized entry point to request support for their IT needs. While agencies will continue to utilize the service desk and end-user support teams for day-to-day operations, the DoIT special request management process will serve as a "no wrong door" through which an agency can initiate conversations with the DoIT team to assist in increasing IT efficiency, cost effectiveness, and user experience. The DoIT special request management process is overseen by the DoIT Portfolio Officers. The Portfolio Officers serve as business relationship managers to state agencies with a focus on enhancing communication, collaboration and trust between DoIT and its customers. Portfolio Officers work closely with DoIT's service teams to ensure that IT solutions both meet or exceed agency business requirements and align with DoIT's standards, policies and procedures.

2019 Coronavirus (COVID-19) Pandemic Response - DoIT's focus as a service organization has been to provide technology support for the agencies that depend upon us for services. Many of these agencies are on the front lines of the pandemic response. While technology has increased in prominence in State government as business processes become more efficient and effective due to technological automation, IT is ultimately still an enabler that supports the services the State delivers to its citizens. DoIT's response in the initial wave of the pandemic was primarily driven by the emergency declaration made by Governor Hogan in mid-March to shift the state workforce to a telework model. DoIT's team worked to rapidly provide secure remote access capabilities that enabled state employees to perform their duties from home. In a matter of days

after the governor's emergency declaration, DoIT had mobilized improvements to traditional telephone conferencing systems and scaled technology platforms, like secure VPN, to allow for the increase in remote access.

Maryland Total Human Services Integrated Network (MD THINK) - MD THINK is an innovative, cloud based platform that allows multiple state agencies to share and manage data in one convenient place. The platform allows providers to conveniently access and manage data across multiple programs and departments. The Maryland Department of Human Services leads the MD THINK program operation, and the Maryland Department of Health, Maryland Department of Juvenile Services, Maryland Health Benefit Exchange are among the current participants in the platform. MD THINK is benefitting the citizens in a number of ways. Case workers are able to provide services to children and families with greater efficiency and effectiveness. Mobile system access extends caseworkers' daily productive work time, improving overall case management effectiveness, allowing for more face-to-face interaction with clients. MD THINK provides greater data analytics and reporting capabilities, allowing management to assess current business processes and allowing for a continuous improvement in the delivery of services and outcomes. Citizens specifically benefit from MD THINK's "no wrong door" approach that improves service delivery by reducing application processing time, thus eliminating boundaries within the eligibility determination process.

Office of Enterprise Architecture (OEA) - We have established the Office of Enterprise Architecture as part of the Strategic Planning Group to provide IT architecture services within DoIT and to other State agencies. The field of Enterprise Architecture is a recognized private sector best practice for developing scalable views of business capabilities and enabling technologies. EA practices have evolved over the past three decades to provide value to leadership, management and staff through high-level and detailed plans/designs/reports/analytics for improving processes and optimizing supporting resources using internal and external providers. OEA is led by our Chief Enterprise Architect, Dr. Scott Bernard. OEA will be able to assist portfolio managers, service managers, and project managers with the identification of viable technical solutions to business requirements using existing or new resources. OEA will also help identify IT policies, processes, and standards that support the implementations of recommended solutions.

Statewide VOIP Project - The DoIT Voice over Internet Protocol (VoIP) Service applies communication technology in conjunction with IP data networks rather than traditional public switched telephone network (PSTN). VoIP technology enables users to make and receive telephone calls with their phone (or in some cases a soft phone using an optional PC application) communicating over the same data network as the computer. VoIP is a proven and cost-effective solution as the State of Maryland migrates from traditional phone systems (PBXs) and leased phone lines to a State-owned enterprise VoIP platform offering advanced features. Over the past year DoIT has been in the process of converting many State government agencies over to VoIP technology from the existing legacy technology phone systems. Currently, over 3,000 VoIP phones are being used in Maryland State government today.

COVID Link : Maryland's Contact Tracing Application - DoIT and MDH have partnered to develop "COVID Link", a state-of-the-art data management platform, to facilitate the State's contact-tracing effort. The platform is fully operational in all 24 jurisdictions. The innovative COVID Link platform uses medical data from the Chesapeake Regional Information System for our

Patients (CRISP) and incorporates it into Salesforce, which populates the data to allow the contact tracers to ask questions of a patient who has tested positive. These questions—and follow-up questions, when necessary— allow health officials to gain crucial information to determine if more steps are needed to lower the risk of the virus spreading further.

The platform features the ability to:

- Customize interview questions, call flows, and interviewer screens
- Determine call timeframes, escalation points, and follow-ups
- Manipulate real time data and view detailed metrics
- Integrate with Google API, AWS, and call center platforms
- Digitally intake contacts, support self-reporting, and customize forms

State of Maryland Information Technology Security Manual - The purpose of the Maryland IT Security Manual is to describe the security requirements with which executive departments and independent state agencies must comply to protect the confidentiality, integrity, and availability of Maryland Information Systems (MIS) and State-owned data. This document serves as the primary policy for establishing and defining the State's mandated IT security practices and requirements for all Maryland agencies. The IT security policies in this manual were established to align with the standards of the federal and state government standards and with procedures issued by the National Institute of Standards and Technology (NIST), the Centers for Medicare and Medicaid Services (CMS), Internal Revenue Service (IRS), Office of Legislative Audits (OLA), Office of Management and Budget (OMB), and the General Services Administration (GSA).

NG911 Data Standards and Policies - The Next Generation 911 (NG9-1-1) system depends on the creation, maintenance, and distribution of highly accurate geospatial data by all Public Safety Answering Point (PSAP) and requires cross-jurisdictional and regional coordination of address points and ranges, road centerlines, and PSAP polygons or boundaries. Local data must be aggregated to create statewide, then regional, and ultimately national data that supports NG911. In 2019, the Maryland Department of Information Technology, working in close coordination with the 24 local PSAP Directors and their Geographic Information Systems (GIS) staff established recommendations to successfully position GIS in serving as the foundational data component of the statewide NG911 system. These recommendations address the fundamental areas of data sharing, security, funding, staffing and outreach and must remain flexible as efforts transition from implementation to maintenance. The state continues to solicit the involvement of the GIS community in the development and maintenance of the NG911 data standards and policies to ensure the needs of the diverse aspects of the state are taken into consideration.

The Maryland Transparency Portal - In 2019, the Maryland Department of Budget and Management and the Maryland Department of Information Technology collaborated on an effort to provide transparency of the State's budget and associated programs. This partnership resulted in the launch of the Maryland Transparency Portal (https://mtp.maryland.gov). The Maryland Transparency Portal provides valuable access to information and ensures the transparency of government spending in the State of Maryland. Portal visitors are able to access and visualize: budget information, including expenditure and fund detail; vendor payment by fiscal year; grant and loans by fiscal year; agency staffing counts; direct link to each program's performance metrics (Managing for Results); and much more… The Maryland Transparency Portal was developed on the same platform as the Maryland Open Data Portal

(https://opendata.maryland.gov), resulting in a streamlined approach to interacting with the site and the underlying data. Portal visitors discover data through keywords and explore the program(s) that received funding in association with those keywords.

Operational Opioid Command Center (OOCC) Data Analysis - The data collected by state agencies holds the key to efficiently and effectively addressing some of society's most difficult situations. An example is the coordinated efforts by the Governor's Office, the Operational Opioid Command Center (OOCC) and the Maryland Department of Information Technology to rewrite the end of too many tragic stories. Through the collection of authoritative data, the OOCC reports on the change in opioid intoxication deaths, by county, comparing the change in the first quarter of subsequent years. Data analysis reveals that the county which saw the greatest drop (-51.85%) was also the only county to receive funding, from the state, to expand mobile crisis and crisis stabilization services. Does this analysis reveal that if more counties reroute funding to mobile crisis and crisis stabilization services that they will see similar drops in the numbers? This is one question, amongst many, which is only revealed as deeper layers of understanding, through the use of data driven government, let the data reveal how to make the most impact. By providing access to this data in consideration of privacy and security, data scientists are able to reveal these and other vital conclusions that will inform decisions that will ultimately put an end to this devastating epidemic.

Current IT Outlay In Maryland

The administration of Governor Larry Hogan has made a concerted effort to maintain and improve the IT fiscal management of the State government. DoIT has contributed to this effort through acquisition, consolidation, and delivery of technology products and services with a goal to reduce duplication, enhance financial management practices, and improve operational efficiency. Higher spending on running the business of government stands in the way of programs that depend upon new or modernized IT systems remains a major impediment to achieving value. This is due to increasing operations and maintenance costs, which crowds out investments in new initiatives that change and improve the State's posture.

> ### _Technology Business Management (TBM)_
> _TBM is a framework instituted by technology leaders that incorporates elements of value management and financial management. It has been adopted by the private and public sectors, and is particularly useful in organizations with multiple operating units. Founded on transparency of costs, consumption, and performance, TBM gives technology leaders and their business partners the facts they need to collaborate on business aligned decisions. Those decisions span supply and demand to enable the financial and performance tradeoffs that are necessary to optimize operational spending, called "run-the-business spending" within the TBM framework, and accelerate business change. The framework is backed by a community of CIOs, CTOs, and other business leaders on the Technology Business Management Council. One important benefit of TBM is that it provides a common framework on which to benchmark performance for comparison to other States' Key Performance Indicators (KPIs). TBM has been instituted by the federal government, multiple state governments, and a broad range of private institutions._

Agencies must be able to manage and demonstrate value for the money spent on what they deliver. TBM, and new changes in DoIT's funding stream, which make virtually all DoIT funding attached to service provision reimbursable, assists the State in accomplishing this by providing spending transparency at both the DoIT and other State agencies.

Transparency provides many benefits, and is a powerful tool for applying the economic forces of supply and demand to IT. Cost transparency helps IT leaders optimize cost and business demand. Operational transparency, or revealing one's operating processes to units that receive services from DoIT, can lead to improved satisfaction and speed of service. Transparency empowers IT leaders and their stakeholders to make decisions, backed up with defensible data.

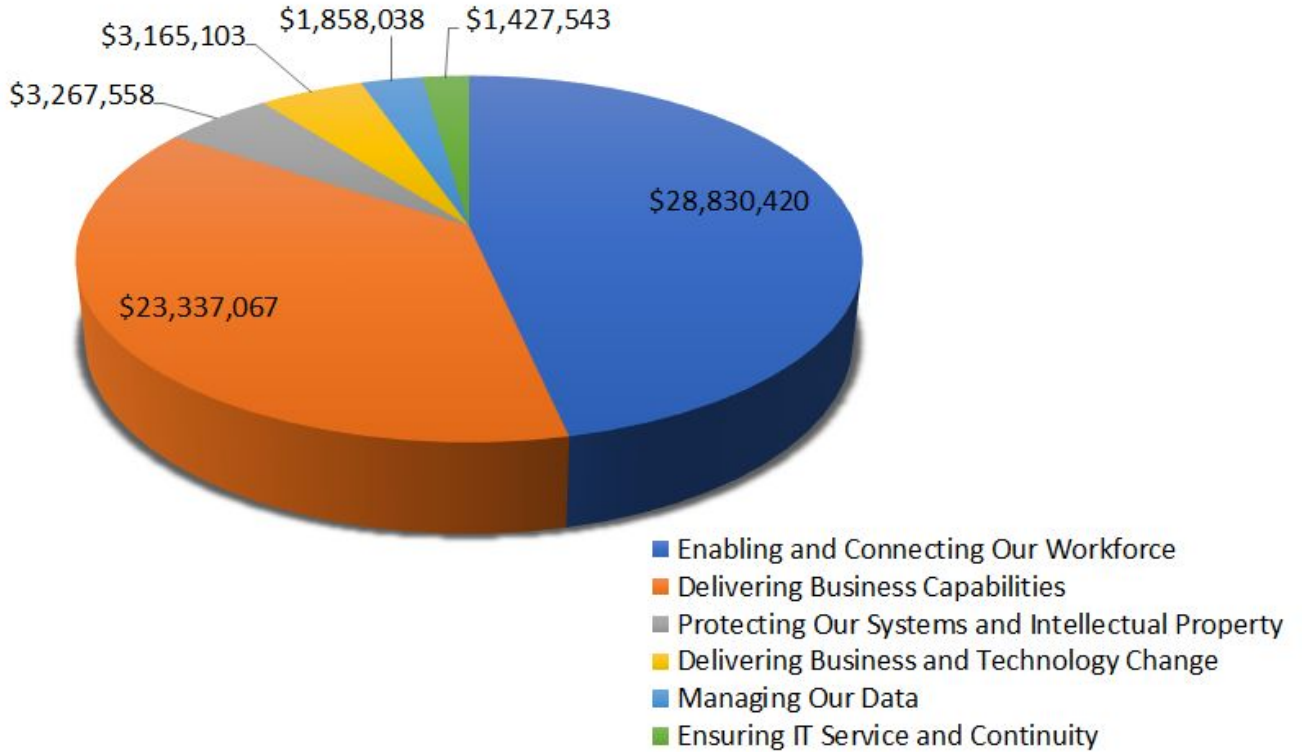Other benefits of a TBM implementation at the State include:

- **Optimization:** Ability to continuously improve the unit costs of technologies and services, while keeping cost and quality in proper balance.
- **Rationalization:** Better focus on the time and resources of the services, applications, technologies, and vendors that drive the most value.
- **Innovation:** Mission and IT partnership ensures maximum value from technology investments.
- **Transformation:** Provide mission partners with agility to pivot more quickly to leverage innovation and capitalize on new opportunities.

Starting in FY2020 DoIT fully transitioned to a TBM-based cost allocation model for DoIT shared IT services. In collaboration with DBM, a financial schedule for the services DoIT provides was developed, which allows agencies to be aware of their IT costs. This approach provides agencies with full transparency into the costs associated with each service they are being provided. It provides a shared decision-making model for technology and business leaders. By implementing TBM as the basis for the shared services model DoIT more effectively manages costs, consumption, and performance of services offered by DoIT, provides better transparency, and ensures accountability at multiple levels of government.

DoIT's service catalog includes all of the IT service offerings provided such as security, applications, systems management, and infrastructure. Agencies are able to view the service catalog on DoIT's website to determine the services required. DoIT has also established a standard Memorandum of Understanding (MOU) for each agency receiving services from DoIT, which lays out the responsibilities and expectations of each agency.

The following graphs illustrate spending tied to overall statewide expenses to operate the services in the DoIT service catalog, and the costs expended to advance FY2020 key performance measures. These charts, when compared to traditional IT budgets, demonstrate DoIT's ability to provide advanced capabilities while achieving maximum financial efficiency through shared services. The following section, "Maryland's Statewide IT Environment" adds perspective by illustrating the breadth and depth of DoIT's service provision, and when combined this data helps to illustrate total value delivered.

Outlay Aligned to FY2020 Performance Measures

$1,858,038 — $1,427,543

$3,165,103

$3,267,558

$28,830,420

$23,337,067

- ■ Enabling and Connecting Our Workforce
- ■ Delivering Business Capabilities
- ■ Protecting Our Systems and Intellectual Property
- ■ Delivering Business and Technology Change
- ■ Managing Our Data
- ■ Ensuring IT Service and Continuity

Outlay Aligned To Resource Towers - Fiscal Year 2020

$1,858,038 — $1,639,206 — $1,048,086

$3,267,558

$4,284,820

$379,458

$20,578,145

$16,753,808

$12,076,612

- ■ Application
- ■ Network
- ■ End User
- ■ Compute
- ■ Security & Compliance
- ■ Storage
- ■ Platform
- ■ IT Management
- ■ Data Center
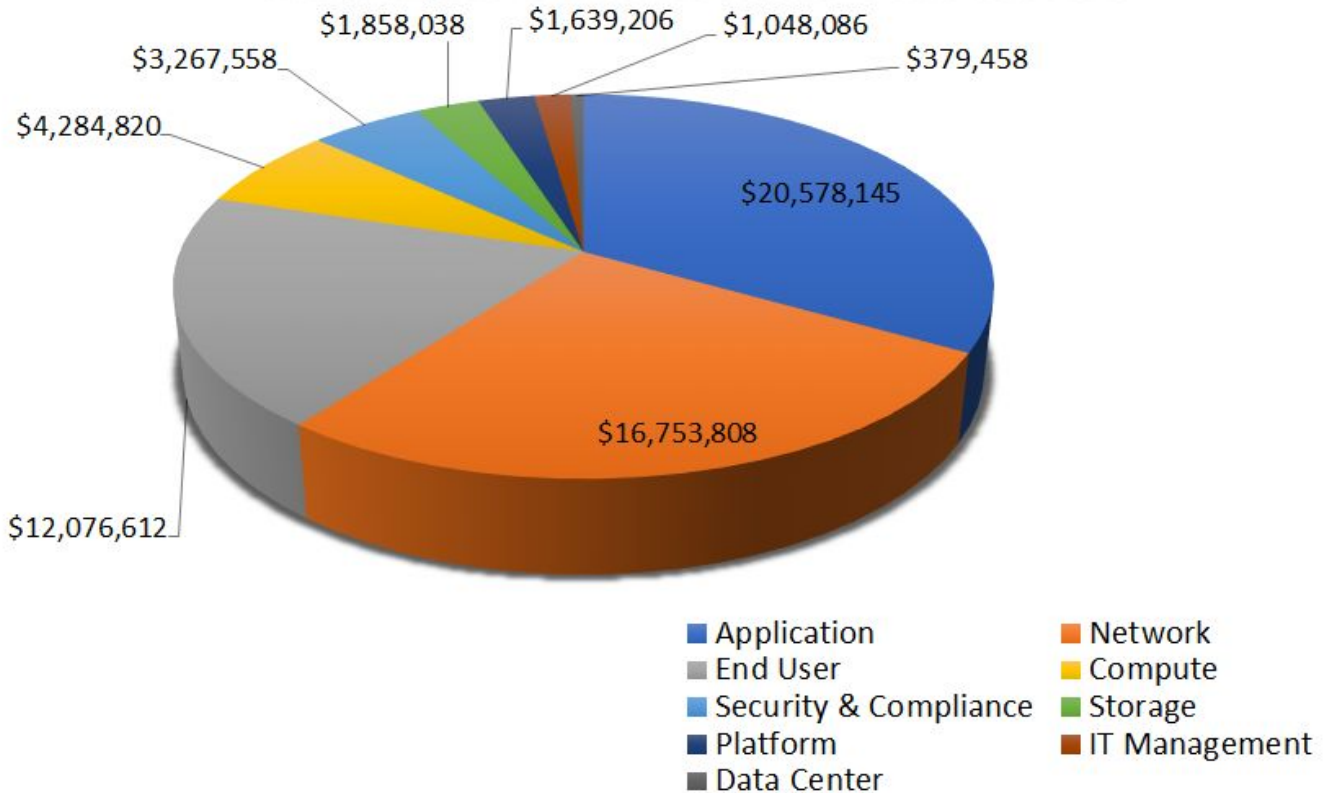
Note: The above charts represent a subset of DoIT's overall budget which may be found online in the Maryland Manual.

Maryland's Statewide IT Environment

Cloud Services	
Governmental units served	33
Yearly hours host cluster available for use	8,760
Total number of active servers	1,219
Total RAM consumption	26 Terabytes
Total CPU consumption	5,615 CPUs
Total storage consumption	3.5 Petabytes
Network attached storage consumption	192 Terabytes
Backup storage consumption	545 Terabytes

Public Safety Communications System	
Number of primary system users	25,798
Number of interoperable system users	43,513
Number of RF sites	134
Number of push-to-talk instantiations	28,583,078
Number of interoperable push-to-talks	699,952
Total air time (over six year program lifespan)	3,161,157 minutes
Number of resource busy errors	16 (1 failure for every 1,786,442 PTTs)

Major IT Development Projects	
Total active MITDPs in previous fiscal year	49
Number of MITDPs closed in previous fiscal year	7
Number of MITDPs in current fiscal year	51
Number of governmental units with MITDPs	25
Total MITDP portfolio value	$1.6 billion
Total current fiscal year appropriation	$355 million

Maryland OneStop Portal	
Agencies on the Portal	15
Forms accessible in July 2020	379
Forms submitted from July 2019-July 2020	92,000
Accounts created prior to July 2020	More than 105,000
Unique visitors from July 2019- July 2020	More than 400,000
Page views from July 2019 - July 2020	More than 4.5 million

networkMaryland (Wide Area Network) Services	
Government Units Served	123
Types of Circuits Available	100+
Speeds of Circuits Available	1 Mbps – 10 Gbps
Backbone Bandwidth	10 Gbps – 100 Gbps
Wide Area Network Availability	99.9%

Voice Services	
Total Traditional Phone Lines	21,444
Total Call Center Agents	1,932
Total VOIP Lines	6,101
Total SIP Trunks	1,40
System Availability	99.9%
Total LD Calls	2,730,443
Total LD Minutes	11,648,743

End User Services	
Total Annual Service Desk Calls	49,293
Call Abandonment Rate	9.04%
First Call Resolution Rate	41.5%

Statewide IT Governance

This ITMP provides the basis for the management and direction of IT within the executive branch of State government. Its scope includes all aspects of state IT including telecommunications, data processing, and information management. Finally, it considers interstate transfers as a result of federal legislation and regulation. DoIT works with the Department of Budget and Management (DBM) to ensure that IT plans and budgets are consistent.

DoIT develops IT plans, policies, and standards on behalf of the State. DoIT also develops statewide goals, objectives, and information resources pertinent to IT in State government and applies a long-range vision for using IT to improve the overall effectiveness of State government. Collectively, this is referred to as the State Technology Governance Framework (STGF). DoIT ensures that the STGF is clearly communicated to covered units of State government and requires that covered units of State government remain in compliance with the STGF. Covered units of State government include all units of the executive branch of State government including public institutions of higher education other than Morgan State University, the University System of Maryland, and St. Mary's College of Maryland. See MD Code Ann., State Finance & Procurement Article § 3A-302 (2013).

DoIT embraces its responsibility to ensure that information technology procured by the State is nonvisual access compliant such that individuals with disabilities are provided nonvisual access in a way that is fully and equally accessible to and independently usable by individuals with disabilities. This is accomplished through the adoption and enforcement of nonvisual access regulations and standards applicable to the procurement of new or upgraded IT services . DoIT works regularly with other units of government to fulfill this responsibility.

DoIT requires that the IT of each unit of State government covered by DoIT's oversight authority remains consistent with this ITMP and the STGF.

Purpose & Guiding Principles

Maryland law states that DoIT is responsible for "developing and maintaining a statewide information technology master plan" that serves as "the basis for the management and direction of information technology within the executive branch of State government." See MD Code Ann., State Finance & Procurement Article § 3A-303 (2013).   Through this ITMP, DoIT provides direction to the community of stakeholders that support and interact with the State's information systems about how DoIT will remain a strategic, innovative, secure, and responsive IT organization. The ITMP also serves as an important governance document that applies to other units of government covered by DoIT's oversight.

The fiscal year (FY) 2021 ITMP, therefore, enables the State government to make informed decisions regarding technology goals related to business and programmatic operations. It provides insight to the actions that will be undertaken by DoIT, including a set of statewide strategies and goals for Maryland's IT enterprise, which includes all state technology resources and assets. As an oversight agency and service provider, DoIT can ensure these strategies and goals have utility and applicability throughout State government.

In this strategic planning process, DoIT strives to align with the goals and mission objectives of the agencies the Department serves. We strive to deliver the most efficient and effective IT solutions possible to protect continuity and predictability while addressing the State's accumulated technical debt and advancing adoption of proven solutions that take full advantage of state of the art tools and techniques available in the marketplace today. DoIT endeavors to work collaboratively to leverage the strengths inherent in each IT service organization of State government. This ITMP therefore serves a twofold purpose to covered units: to be a guide in selecting technology services that support existing operations, and as a roadmap to foster innovation and transform services that the unit of government provides.

In developing this FY2021 ITMP, DoIT is guided by the following principles:

- **Technology Strategies:** These have a sound business case and are rooted in the fulfillment of the goals and mission objectives of the entities we serve, and in doing so DoIT assists these entities in providing a responsive, accessible, and mobile technology service. Technology strategies are therefore informed by two important factors: the non-technological business and strategic objectives of state government, and the standards, risks, and needs of the data related to the business and strategic objectives.

- **Confidentiality and Accessibility:** Maryland will continue to lead the nation in making public data open and accessible while maintaining the privacy of individuals and the security of sensitive information. This will be accomplished through the implementation of strong security and governance protocols, and by leveraging modern technologies that support and enable real time decision making.

- **IT Financial Management:** DoIT is working diligently to maximize the value of its investments. Sound IT financial management practices present one way to accomplish this. The State accomplishes this by providing an accurate and complete view of IT spending. This transparency provides decision makers with the information they need to make informed

decisions with respect to their investments. DoIT has adopted the Technology Business Management framework to support the State's IT financial management practices.
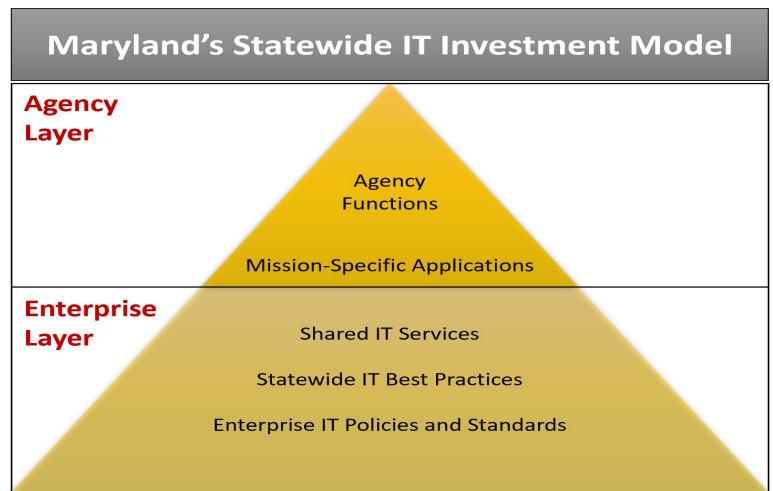
- **Collaboration:** Maryland state government encompasses an increasingly diverse range of business requirements. The State IT enterprise supports and coordinates this complexity through sound IT governance and standards that IT and business leaders apply to technology decision making. DoIT, therefore, encourages covered units to bring their business requirements to DoIT where a collaborative effort can surface the most appropriate technology solutions.

- **Consolidation:** When feasible, IT strategies are designed with the statewide IT enterprise in mind. IT solutions, where possible, should aggregate resources, reduce duplication, and increase the State's purchasing power. Also, many agencies throughout Maryland government possess significant IT investments and subject matter expertise; when practical, DoIT will devise strategies that leverage those investments and subject matter expertise, and will implement policies and standards that homogenize security and data management.

- **Security:** Maryland State government not only has statutory obligations to secure the information in its custody, but public trust in the State IT enterprise depends upon the State's ability to keep its information appropriately secured. DoIT will foster a culture that prioritizes and invests in information security and will apply strategies that reduce risks associated with the evolving security threat landscape.

- **Nonproprietary Technology:** The State leverages open source and vendor agnostic opportunities as its initial option to developing solutions. This approach reduces dependence on monolithic and proprietary platforms that are frequently difficult and expensive to modernize or move away from.

- **Support:** DoIT maintains an online enterprise architecture standards baseline and an enterprise architect's handbook that provide technical specifications, reusable solutions, and analysis/design methods for agencies to use in developing and implementing business and technology solutions at the State-wide and local levels.

The goals and strategies selected for FY2021 build upon core strengths available within IT service organizations throughout Maryland government. This FY2021 ITMP provides a foundation for covered units to engage in strategic planning that is specific to the agency's mission and to produce a plan that is fully responsive to their unique needs, while remaining consistent with practices statewide.

Investment Model for State Information Technology

As part of its mission to provide effective and efficient technology solutions, DoIT partners with covered units to manage and deliver statewide IT services and technologies. These technology solutions ensure that the State's financial resources are used wisely and improve the overall benefits, security, and accessibility of technology to the statewide IT environment. Maryland's investment model for technology is therefore represented in two tiers, an agency layer and an enterprise layer. The agency layer supports technology initiatives specific to agency mission or

function, and the enterprise layer supports technologies, services, standards, and best practices that are applied across the state. The enterprise layer is utilized throughout covered units to address common IT technology requirements such as telecommunications, internetworking, and cloud services. The DoIT service catalog represents the current base of service offerings available within the enterprise layer. The enterprise layer also addresses statewide policies and standards as set forth in the STGF.

Maryland's Statewide IT Investment Model

Agency Layer
- Agency Functions
- Mission-Specific Applications

Enterprise Layer
- Shared IT Services
- Statewide IT Best Practices
- Enterprise IT Policies and Standards

Major IT Development Project Planning Cycle

In FY2021, DoIT is estimated to have 53 Major IT Development Projects (MITDPs) across 25 agencies. The Maryland Code requires that covered units of government submit technology requests to DoIT for review. The Secretary reviews the requests and may deem a request as "major" based on certain criteria as defined in statute. When a technology initiative is officially declared by the Secretary as major, it becomes an MITDP. The statute then sets forth certain reporting and oversight requirements that DoIT, and covered units, must follow. One of these requirements is the submission of an Information Technology Project Request (ITPR) at MITDP inception for approval by the Secretary. Subsequent ITPR submissions are required annually to provide updates, and are also subject to approval by the Secretary. DoIT then compiles and transmits information concerning these ITPRs to the legislature at the commencement of each regular legislative session. Prior to approval and transmission to the legislature, DoIT carefully reviews all ITPRs while ensuring alignment to the Statewide IT Master Plan.

The ITPRs outline the business case for the system development effort and associated requests for funding (General, Special, Federal, Reimbursable) approval.

ITPRs include:

- Documenting a project description and status
- Identifying the risks, security and proposed architecture
- Funding expectations and spending plans
- Benefits and cost savings
- Acquisition strategy
- Business need justification
- Stakeholder involvement
- External dependencies
- Schedule, deliverables, and milestones reporting

ITPRs are to be completed during the FY budgeting cycle and are expected to be completed for DoIT's review on August 30th of each fiscal year. If a project/system request occurs outside of the budgeting cycle, DoIT will initiate an out of cycle process for ITPRs. Funding must be made available by that agency for any out of cycle MITDP/ITPR submission. Once funding is appropriated via the legislative session, budget amendments are required to authorize spending for the appropriation of that MITDP.

Organizational Goals and Strategic Objectives Development Framework

DoIT has developed a framework to align strategic goals with the mission objectives of the Hogan administration and the business strategies and information that support them. This framework assists IT leaders with identifying and validating technology-focused strategies that are fully responsive to the underlying non-technical foundations. It also assists leaders with rationalizing and justifying technology investments. DoIT utilized this framework for the development of the organizational goals and strategic objectives for this IT Master Plan. This development framework will also be applied to the development of agency IT Master Plans.

Technology strategies...	Outcomes...
Align with mission objectives and agency business strategy.	• Respond and fulfill the changing needs of State agencies. • Automate business processes in a manner that increases effectiveness and efficiency. • Justify investments by delivering value.
Adhere to data and information security standards.	• Maintain public trust by reducing information security risks. • Improve the accessibility of government services. • Empower decision making through improved consistency and accessibility of information across platforms.
Apply statewide standards in providing solutions to common business needs.	• Support Maryland's statewide vision for IT. • Reduce redundancy, increase shared use, and increase standardization through a consistent approach to information technology solutions. • Consolidate and leverage existing strengths available within the State IT enterprise.
Are structured for consistent and continuous improvement.	• Are highly dependable and meet or exceed service level requirements. • Protect the continuity of business operations. • Maintain relevance to current and future business needs with minimal investment and effort.

The ITMP document is a four year plan that is updated annually. This is because strategic objectives are not a year to year event, rather they are an ongoing and evolving process of transformation and progress. The goals identified in this FY2021 ITMP adhere to the principles described in this framework. Additionally, they provide guidance and oversight so that

agency-specific technology strategies appropriately balance the unique needs of the agency, while also meeting Maryland's statewide strategic information technology framework.

The strategic framework distinguishes investments between the agency and the enterprise. Agency investments generally perform functions specific to the agency mission, whereas enterprise investments generally involve shared services that provide common utility across multiple agencies. DoIT's objective is to provide enterprise services, published via a service catalog and made commonly available for agency subscription statewide. DoIT strives to ensure that these technologies meet or exceed the level of quality otherwise available in the marketplace. While DoIT may from time to time approve agency procurement of solutions outside of the DoIT service catalog, agencies must justify the rationale for investments that are potentially redundant. By coordinating services in this way, the State will more effectively leverage statewide IT policies and standards, industry best practices, and limited resources.

Organizational Goals and Strategic Objectives

Maryland's statewide technology goals are memorialized into four areas. These include providing IT leadership across State government, promoting IT as a strategic investment, providing a reliable, secure, and modern IT infrastructure and creating measurable improvements in the cybersecurity posture of the State. These goals and strategies apply to the entire statewide IT environment. The IT environment includes all components of technology in use at DoIT and units covered by DoIT, including by way of example but not limited to such things as hardware, software, networks, and personnel resources.

Goal 1 - Provide IT Leadership for State Government

Until 2015, DoIT historically served as a contract management and procurement office, oriented toward the fulfillment of transactions initiated by a decentralized statewide IT organization. DoIT pivoted initially toward a consolidation effort and then the development of a statewide IT services catalog. DoIT is now poised to transition into a leadership role in the digital management of government. As a leader and partner, DoIT will provide targeted solutions that address the specific business needs of covered units of the State government. This model more fully leverages the statewide technology portfolio, taking into account best practices, statewide IT policies and processes, applicable regulations, and statute.

Strategy 1.1 - Provide technology advice and leadership to covered units to enhance decision making and improve outcomes.

Owner: Portfolio Office

- Analyze the specific business needs of covered units and identify appropriate strategies and solutions that leverage technology to support and address these specific business needs.
- Provide guidance and direction to covered units to address business needs through technology and automation, using statewide IT resources where practicable, to make government more efficient and more accessible for Marylanders.
- Present a high-level perspective to bring together, prioritize, and balance covered units' business and technology needs.

- Facilitate access to relevant technical expertise in the development of solutions available in DoIT's information technology portfolio.
- Provide covered units access to private industry and the marketplace when required solutions are not already available within the statewide IT environment.

Strategy 1.2 - Evaluate statewide trends pertinent to automation, and develop enterprise frameworks around solutions that solve common business needs.

Owner: Office of Enterprise Architecture

- Continuously evaluate and make periodic enhancements to the STGF to protect and preserve the statewide IT environment.
- Provide education to DoIT personnel and governmental units under DoIT's jurisdiction and authority on the application of and compliance with the STGF.
- Identify and prioritize areas where technology can provide value and enhance services for Marylanders.
- Identify enterprise technologies that reduce duplication, and elevate these technologies to improve statewide IT integration and operational and cost efficiencies.

Strategy 1.3 - Implement strategies that help agencies to more effectively manage data as a strategic information asset.

Owner: Office of Application Management

- Protect and secure Marylanders' private data.
- Develop and foster statewide data governance to ensure that data is managed, shared, and used correctly and consistently across the State.
- Ensure policies and procedures are communicated to and understood by owners and stakeholders responsible for IT across the State to assure the reliability of the State's data environment to drive business decisions, derive strategic value, and facilitate government transparency.
- Develop and execute architecture, policies, practices, and procedures that properly manage the collection, preparation, analysis, distribution, maintenance and deletion of data across the State's data environment.

Strategy 1.4 - Leverage the State IT environment to reduce the total time required to deliver IT solutions, take advantage of economies of scale, and build a statewide community of practice.

Owner: Office of Infrastructure Management

- Provide technology leadership and expertise to covered units and determine solutions to technological problems, particularly by utilizing economies of scale derived from building platforms and services that can be accessed and utilized by multiple agencies so efforts are not duplicated across state government.
- Fully leverage the State's buying power to drive down the cost of shared technology needs.
- Establish IT portfolio rationalizations to anticipate and plan for future technology needs.
- Design and implement standards to ensure our state can invest, plan, and prioritize its technology needs.

Strategy 1.5 - Partner with agencies to use technology to connect with Maryland and provide better online government services.

Owner: Office of Infrastructure Management

- Design, develop, procure, and integrate IT service offerings that strengthen the State's ability to deliver services digitally, and make such IT service offerings available for statewide consumption.
- Maintain and assure the ongoing quality of Maryland's statewide IT service offerings to meet the needs of units covered by DoIT.
- Assure a cohesive online, mobile presence that provides secure access by the public to government services and information.
- Assure the availability of the statewide IT environment through the application of the STGF to the statewide IT environment.

Strategy 1.6 - Protect the confidentiality, integrity, and availability of the State's data and information systems against external and internal threats, while maintaining efficient and secure availability to authorized parties.

Owner: Statewide Chief Information Officer

- Continue to invest in the State's information security infrastructure to sustain the State's cybersecurity foundation.
- Implement communications and updates to the STGF to educate the State workforce on matters pertinent to information security.
- Foster continued intergovernmental information sharing in support of a strong cybersecurity posture.

Goal 2 - Promote IT as a Strategic Investment

DoIT has implemented a delivery model for the acquisition and provision of technology that builds upon DoIT's role as a service provider model toward a more collaborative partnership with each unit. DoIT's portfolio office ensures that feedback from unit IT and business leadership is incorporated into DoIT's strategic and tactical planning efforts. This feedback is incorporated into the development of Maryland's ITMP and STGF. DoIT also has adopted principles of IT financial management based upon the Technology Business Management (TBM) framework that increases financial transparency and supports the transformation toward the more collaborative model. In so doing, the State will make more coordinated, smarter IT investments that deliver improved outcomes and value for the State.

Strategy 2.1 - Support and advance investments in major IT systems and services development efforts.

Owner: Enterprise Portfolio Management Office

- Oversee, consult, and guide covered units in the development of existing mission-specific major IT systems and services, and directly assume project management responsibilities for new or failing major IT development efforts as set forth in the STGF.
- Prioritize and control the state's portfolio of major IT development projects to build a strategic roadmap for modernization of critical systems.

- Advocate for agile system development methodologies to move away from once-in-a-generation investments.
- Enhance the management of State major IT development investments through improved structures for financial oversight.

Strategy 2.2 - Discover new opportunities to leverage IT, especially those opportunities that are unforeseen by business stakeholders, while maximizing the potential value of statewide IT investments.

Owner: Portfolio Office

- Institute processes that support the clarification of business capabilities needed to implement business strategies, and the IT capabilities that support enablement.
- Provide technology leadership expertise to identify the best solutions for individual and shared problems.
- Guide business needs toward pre-existing services and contracts to avoid costly procurement and integration activities.
- Identify collaborative opportunities between multiple business stakeholders by identifying commonalities and supporting these commonalities through shared IT solutions.

Strategy 2.3 - Leverage the breadth and depth of the State IT environment to reduce total time to deliver solutions, leverage economies of scale, and build on the State's combined expertise.

Owner: Office of Finance

- Leverage buying power at enterprise scale to drive down the cost of shared technology needs.
- Implement IT portfolio rationalization to anticipate and plan for future needs.
- Institute technology standards via the STGF to ensure our state can invest, plan, and prioritize for current and future technology needs.

Strategy 2.4 - Provide the financial transparency and agility required for units to make and adjust IT investment decisions based upon evolving business needs.

Owner: Office of Finance

- Apply full transparency in DoIT's construction of rates and cost allocation methodologies.
- Offer plain language descriptions of enterprise services along with the service options available to enable more effective IT investment discussions.
- In collaboration with DoIT's partners, streamline and modernize processes for IT procurement.

Goal 3 - Provide a Reliable, Secure, and Modern IT Infrastructure

The success of the statewide IT enterprise is measured by the effectiveness that IT brings to the services the State of Maryland provides to its constituents. DoIT governs and delivers IT services with this priority in mind. Additionally, statewide IT must be sustainable while taking into account ever-evolving technology practices, changes to state law and policy, and planned improvements in public services envisioned by current and future administrations.

<u>Strategy 3.1 - Protect and further strengthen the State's fulfillment of technology priorities.</u>

Owner: Enterprise Portfolio Management Office

- Strategically invest in life-cycle replacement of hardware inventory to maintain supportability, availability, and security.
- Support the statewide portfolio of active technology projects by identifying new major IT development projects that align with state priorities, and monitoring and controlling existing major IT development projects to ensure that solutions are delivered on time and on budget.
- Further enhance the State's development of project portfolio management practices to provide leadership, expertise, and guidance in support of improved project quality and efficiency.
- Utilize the State's enhanced portfolio management practices to re-direct or terminate technology projects that are not delivering the value or outcomes expected.
- Work with unit business and IT leadership to coordinate the modernization of mission-specific IT platforms in the most efficient manner possible.

<u>Strategy 3.2 - Ensure that the State remains in alignment with industry best practices and emerging trends for technology management.</u>

Owner: Office of Enterprise Architecture

- Evaluate and apply appropriateIT industry standards relevant to the statewide IT environment, while working with unit IT leadership to apply mission specific standards.
- Identify and implement trends and emerging practices to ensure that the State's IT environment is fully prepared to meet evolving business needs.

<u>Strategy 3.3 - Forecast and plan for the future of technology, leveraging established and emerging technologies, to ensure that Maryland is prepared to succeed in the digital economy.</u>

Owner: Office of Enterprise Architecture

- Identify emerging trends and technologies that provide opportunities for technology transformation in Maryland.
- Collaborate with unit business and IT leadership in the development and implementation of technology transformation initiatives.
- Assure that units retain cost-effective solutions that meet the unit's technology needs, while engaging in lifecycle management to prevent the accumulation of technical debt in the State IT environment.
- Collaborate with unit IT leadership to explore opportunities to improve and further develop the technology and data currently available.

Strategy 3.4 - Assure a stable and viable statewide technology workforce that possesses the knowledge and skills to support the State's technology environment and implement the State's future technology plans.

Owner: Office of Human Resources

- Develop innovative recruitment and retention strategies that fully leverage the State's strengths as an employer.
- Build a pipeline of talent that enables the State to build its workforce through the utilization of innovative recruitment strategies and the development of entry-level personnel into higher-skilled career IT professionals.
- Strategically engage with the State's partners in the business community to increase effectiveness of the State's workforce development efforts.

Strategy 3.5 - Ensure that technology remains accessible for all Marylanders.

Owner: Office of Application Management

- Design and deliver technologies that enable more efficient and productive engagements with State government and its customers.
- Provide technologies that make digital government more accessible to people with disabilities.
- Provide effective communications via media-related activities to improve communications with other units and to encourage public interaction.

Strategy 3.6 - Assure a stable and dependable IT environment that meets the current and future needs of the State.

Owner: Office of Infrastructure Management

- Develop a technology planning roadmap that drives improvements in IT coordination and investment.
- Design quality into the State's shared IT environment to ensure that service offerings provided by DoIT retain their applicability to a broad range of needs throughout the State.
- Maintain and implement enhancements that drive improved IT capabilities and service delivery through the statewide IT service catalog, and direction to units on mission-specific IT initiatives.
- Perform continuity planning and lifecycle management of existing systems to ensure that IT systems remain dependable in a variety of current and future circumstances.

Goal 4 - Create Measurable Improvements in the Cybersecurity Posture of the State

Ensuring the privacy of citizen data and the availability of services is one of the Governor's top priorities, with cybersecurity being the keystone for meeting these commitments. With the rapid changes in workforce habits and the ongoing efforts to digitize all government services, protecting the State's resources from cybercriminals is an essential consideration in retaining the State's trust.

In cybersecurity incidents, mean time to detect (MTTD) and mean time to respond (MTTR) are the two key differentiators in determining the scope and scale of a cybersecurity event. The primary rival to reducing the MTTD and MTTR is the massive volume of data, telemetry, and external threat intelligence. As the magnitude of data requiring analysis increases, automated data analytics, combined with security orchestration, automation, and response (SOAR) and Robotic Process Automation (RPA) are becoming the most effective ways to address security issues before they become a large-scale incident.

Strategy 4.1 - Enhance network boundary protection.

Owner: Office of Security Management

- Implement a solution that is scalable to the State enterprise level that considers risks to availability through a fault-tolerant design.
- Create and implement defined baselines for all boundaries with planned and scheduled improvements based on industry and vendor best practices.
- Establish feedback loops using internal and external information to further fortify the network boundaries.
- Collaborate with unit business and IT leadership to identify the risks to State security and ensure that the solution considers that risk.

Strategy 4.2 - Implement a statewide vulnerability management program.

Owner: Office of Security Management

- Develop a program that integrates multiple data sources to identify vulnerabilities in traditional Information Technology (IT) assets, Operational Technology (OT) assets, and Internet of Things (IoT) assets.
- Create metrics to track the performance of the program.
- Implement external scanning of State web applications to detect vulnerabilities and unauthorized content.
- Coordinate with development teams to integrate security scanning into CI/CD pipelines with the goal of resolving security issues before applications move to production.

Strategy 4.3 - Establish a Statewide Cybersecurity Incident Response Capability.

Owner: Office of Security Management

- Develop job classifications using the NIST NICE framework, and an organizational structure for a top-tier cybersecurity incident response team.
- Create a qualified candidate pipeline through State government job programs and contractors, creating an opportunity for internships and other growth programs.
- Establish threat-hunting and purple-teaming programs to keep resources contextually and institutionally aware.
- Establish a rhythm of proactive incident response testing with agencies through process review and table-top exercises to ensure that we are prepared to respond to cybersecurity events.

<u>Strategy 4.4 - Reduce Mean Time to Respond (MTTR) through Security Orchestration, Automation, and Response (SOAR).</u>

Owner: Office of Security Management

- Develop a SOAR capability within the Security Operation Center (SOC), along with measurement metric to produce a quantifiable reduction in MTTR.
- Implement Robotic Process Automation (RPA) to produce quantifiable improvements in the time for notification of vulnerabilities and handling of cybersecurity events.
- Invest in integrating the full stack of system components into SOAR capabilities.

The Future Vision

Through this ITMP, DoIT establishes the foundation for a fundamental rethinking of the way technology enables the fulfillment of the State's mission. Transformation strategies are not just about technology. Rather, they are based upon business and stakeholder needs. While technology plays an important role in DoIT's work, the mission, vision, goals, and objectives set forth in this ITMP guide the State's future creation of value through technology. DoIT's future vision describes how the State enables this transformation.

Artificial Intelligence and Machine Learning

Artificial intelligence (AI) represents a paradigm shift from the traditional computational tasks commonly associated with computing, whereby technology performs functions commonly associated with human cognitive skills. The scope of artificial intelligence has evolved since its advent in the twentieth century. While AI is certainly not a new concept, the advent of commercially viable, narrow AI applications such as human speech recognition and processing, machine learning, and deep learning present opportunities to enhance government services. DoIT intends to explore AI tools that automate the knowledge based work presently done by humans.

Broadband Access for All

DoIT has actively supported Governor Hogan's effort to make affordable high speed internet access available to all Marylanders by the year 2022, and played a crucial role in accelerating local jurisdictions' projects in eastern and western Maryland. Many of the homes and businesses that remain unserved at this time are located in a remote area and the scarcity of demand in these underserved communities presents a difficult economic model for private industry.

DoIT is exploring emerging technologies in global satellite mesh networks and next generation cellular and wireless technologies, and is also exploring innovative approaches to supporting wireline implementations to bridge this digital divide.

Cloud Smart

The term "cloud" is used broadly to describe technology solutions provided by a party outside of the state IT environment. The definitions for traditional cloud deployment models of Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) are

no longer well-defined, giving way to characteristics oriented toward outcomes achieved such as on-demand services, access, resource pooling, elasticity, and measured services (*see* NIST "Definition of Cloud Computing" Special Publication 800-145). Cloud Smart supersedes Cloud First strategies commonly seen in the IT industry and relies upon principles of portability, where solutions are provider-agnostic, meaning that a solution may be developed, deployed, and migrated anywhere. Cloud Smart typically relies on open platforms and open source technologies, where solutions are designed by the State or its integrating partner in a manner that eliminates vendor lock-in. To be "cloud smart," the State will procure technological resources that align with these principles of portability, will adopt modern security protocols to protect the State's systems and data assets, and will engage in reskilling to ensure that the State workforce possesses the capabilities to manage in this new environment.

Data-Centric Enterprise

Since the advent of the digital age, the data landscape of Maryland state government has become complex. The current paradigm for information is centered upon applications delivering a specific governmental function, resulting in a fragmented and decentralized model for the storage of information. Platforms in use throughout the state vary in size, scope, and level of technical debt. This legacy is disrupted by recent evolutions in technology that place information directly in the hands of users and decision makers. The challenges and opportunities experienced in Maryland are common among many large enterprises in both the public and private sectors. DoIT is prioritizing the exploration of emerging technologies designed to respond to these challenges and opportunities and intends to incorporate the most successful technologies and approaches into its data governance and stewardship strategies.

Enhanced Citizen Access

Technology is present in the everyday lives of the people we serve. Citizens often experience real time access and interaction in performing everyday tasks from shopping to the consumption of news and information. Unfortunately, government frequently lags behind in many aspects of this digital revolution. Over the past three years, the Maryland Department of Technology has made achievements toward delivering a modern experience. DoIT is now building on previous successes like our award winning Maryland.gov website, with new initiatives to make it faster and easier for Marylanders to receive the government services and information they require. Projects like Maryland's OneStop licensing portal are examples of this forward momentum and are fulfilling DoIT's commitment to create user experiences similar to or better than those commonly available in the marketplace.

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