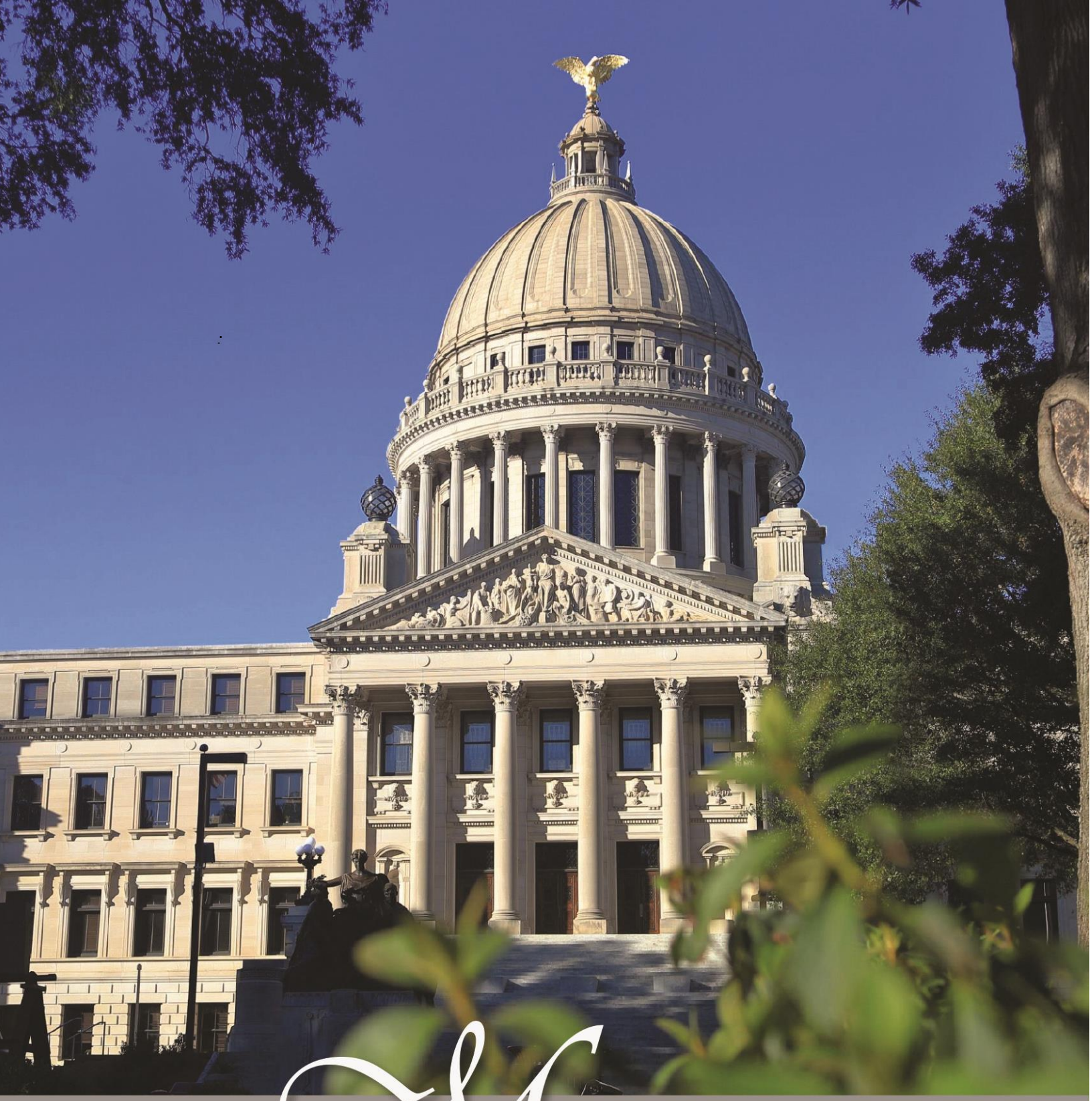

MISSISSIPPI

2020 | 2022

Strategic Master Plan for Information Technology

Mississippi Department of Information Technology Services

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Message from the Executive Director

December 31, 2019

I am pleased to present the *2020-2022 State of Mississippi Strategic Master Plan for Information Technology.* The Mississippi Department of Information Technology Services (ITS) strives to provide trusted technology resources and services that offer proven value to all stakeholders in Mississippi government. To meet that objective, the development and publication of the *Strategic Master Plan* seeks to outline current strategic initiatives of ITS. These initiatives are formulated in conjunction with needs of state agencies utilizing goals and strategies designed to optimize information technology services for the State of Mississippi.

In the just released 2019 State CIO Survey, *The Responsive State CIO: Connecting to the Customer*, it is noted that Cloud contracts are becoming more established, with states turning to the mechanics of migration to cloud environments and putting effective governance of Cloud contracting in place. In addition, when asked about states' approaches to Cloud governance, more than half of states are providing and governing cloud hosting centrally in a brokered delivery model. With Cloud adoption as the driver, the shift of shared service organizations towards a broker of services model continues. When the survey respondents were asked about challenges in moving to the CIO as broker of services model, most states cited change management and the evolving role of traditional workforce.

For Mississippi, addressing these challenges took the form of the establishment of a special technical advisory committee, the Statewide Cloud Advisory Council, in accordance with MS Code § 25-53-5(f) and § 25-53-109(a). Cloud, in its various derivations, embodies much of the debate often entertained in the public sector; that is, how to maximize the shared investment in technology in order to deliver a significant return on investment, and lower the cost of service delivery. Solutions which drive value through collaboration are at the heart of the ITS mission, to "provide statewide services that facilitate cost-effective information processing," as well as "minimize duplication" while "providing common technology services across agency boundaries."

A statewide partnership in an effort of this magnitude is imperative – a successful outcome will allow for the establishment of a standards-based, enterprise solution, minimizing operational costs for all parties by leveraging the volume buying power throughout state government, in addition to the potential inclusion of local governments and educational entities.

On behalf of the Mississippi Department of Information Technology Services, I look forward to our continued work together in advancing the goals and strategies presented in this plan.

Sincerely,

Craig P. Orgeron, Ph.D.
Executive Director

PURPOSE AND CONTEXT

The *2020-2022 State of Mississippi Strategic Master Plan for Information Technology* is intended to assist state government's technology and business leaders in making informed technology decisions that support state business goals. It establishes a common set of statewide goals and strategies for the state's information technology (IT) enterprise over the next three years.

As part of the statewide IT planning process, selected goals and strategies have been updated and/or restructured, and new action items have been added to assist the Mississippi Department of Information Technology Services (ITS) in delivering the most effective services set forth in this plan. ITS endeavors to work collaboratively with state agencies, universities, public education, and other public entities in Mississippi to focus on excellence through quality of service, responsiveness, innovation, professionalism, and teamwork. The *2020-2022 State of Mississippi Strategic Master Plan for Information Technology* should serve as a guide to government agencies for selecting technology that supports their existing business operations and fostering innovation into the digital transformation of government services.

The development of Mississippi's 2020-2022 goals and strategies are guided by the following technology leadership values:

- Deliver state government business outcomes, goals, and objectives supported by technology strategies that have a sound business case before new investments are made
- Maintain flexibility with accountability in order to respond to new service needs
- View IT in Mississippi government from the perspective of the entire enterprise, aggregating resources, where feasible, in order to reduce duplication, increase efficiency and effectiveness, and increase purchasing power
- Foster a culture that recognizes the need for investing in information security resources and implementing information security strategies

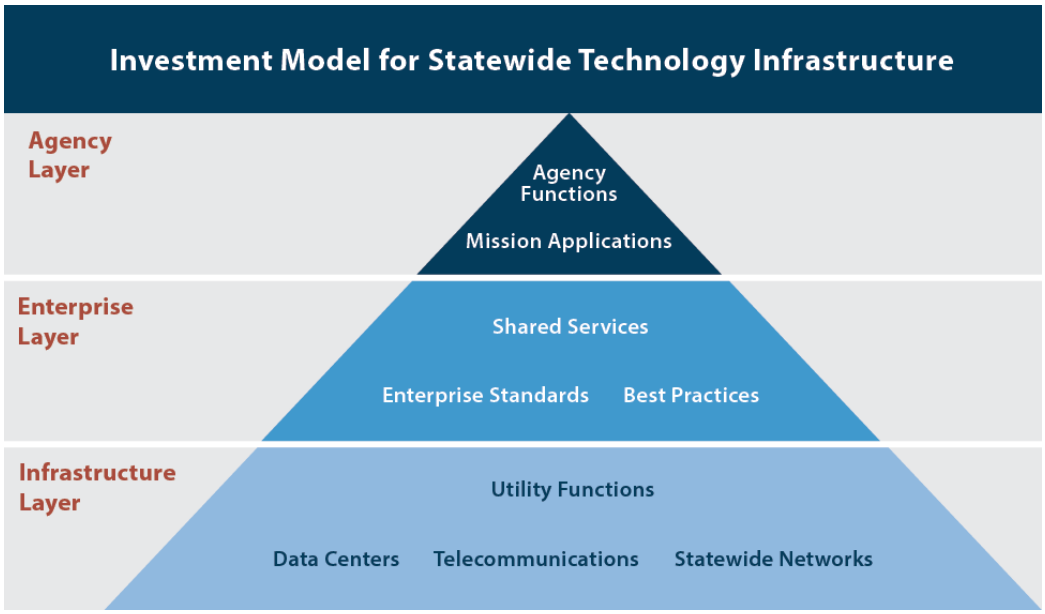
ITS endeavors to work collaboratively with state agencies, universities, public education, and other public entities in Mississippi to focus on **EXCELLENCE** through **QUALITY OF SERVICE**, **RESPONSIVENESS**, **INNOVATION, PROFESSIONALISM**, and **TEAMWORK**.

- Employ enterprise solutions capable of reducing the evolving threat and protecting Mississippi government's informational assets
- Recognize that IT is a statewide resource where technology investments should be aligned with strategic goals of the State
- Develop a process that fosters intergovernmental cooperation to share information easily within government organizations and with outside partners
- Employ technology that is flexible and interoperable so that changing business needs can be responded to quickly and efficiently
- Recognize that many agencies have substantial investments in existing technology and devise strategies that leverage those investments when practical
- Develop an IT workforce with the skills required to develop, manage, and fully utilize the State's IT enterprise

Investment Model for Statewide Infrastructure

To ensure the effective and efficient use of public funds, ITS collaborates across state and local government agencies to effectively manage and deliver statewide IT services and technologies that are beneficial, secure, accessible, and that leverage the statewide shared infrastructure and architecture.

The Investment Model is comprised of three layers:



- **The Infrastructure Layer** includes managed service delivery, which encompasses State Data Center services, telecommunications and networking services, and shared computing resources.
- **The Enterprise Layer** represents the areas where ITS and agencies work together to leverage Mississippi's technology investment. Another aspect of the Enterprise Layer is to ensure that effective and innovative solutions are identified and broadly communicated as best practices across the enterprise. Partnerships are an essential element of the Enterprise Layer as Mississippi government seeks to fully leverage the shared services and technology infrastructure.
- **The Agency Layer** represents agencies' business lines. It encourages creative approaches and supports an innovation-centered environment where individual agencies have the time and resources to focus on creative business solutions.

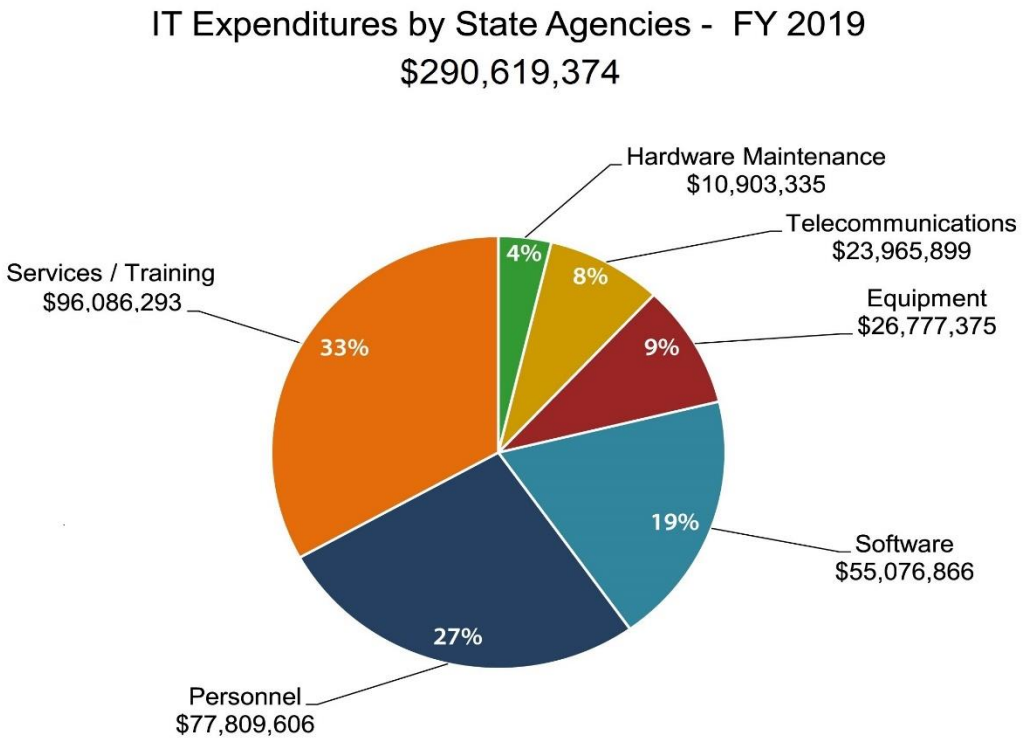
By utilizing the shared services depicted in the bottom layer of the model and by leveraging the statewide enterprise policies, best practices, standards, partnerships, and blueprints reflected in the middle layer, individual agencies are able to innovate with creative solutions that focus on fulfillment of their agency's core missions while taking advantage of the enterprise statewide technology architecture. Deployment of innovative technology solutions will expand access to information and services, equip employees with the tools needed to accomplish their jobs, and improve decision making within organizations.

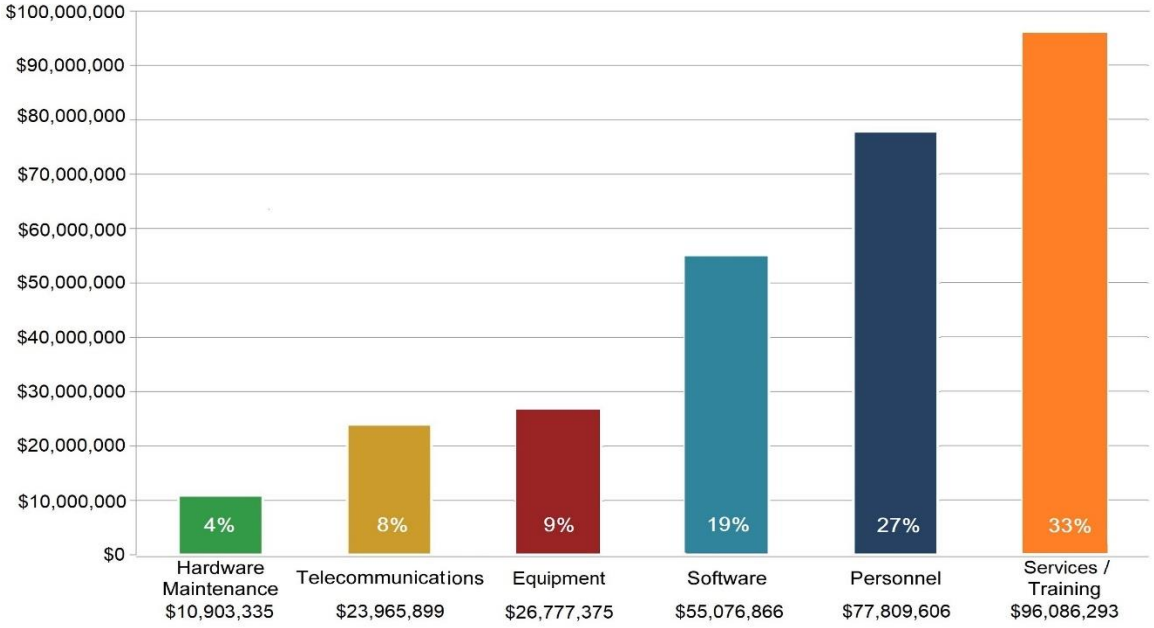
COMPLIMENTARY PUBLICATIONS

Complimentary to the *State of Mississippi Strategic Master Plan for Information Technology*, ITS also publishes the *Mississippi Statewide Architecture and Technology Delivery Plan*. These expansive enterprise plans in no way supplant the business-oriented plans of individual state agencies. These documents are used to assist agencies in aligning their use of technology with the direction established for the state's IT enterprise.

CURRENT IT OUTLAY IN MISSISSIPPI

The spend reflected in this section is as categorized in Mississippi's Accountability System for Government Information and Collaboration (MAGIC) and is only as accurate as the information entered by agencies at the time the funds were expended. Payments to vendors by schools, libraries, community colleges, universities, and other governing authorities are not included in the noted expenditures. Additionally, the personnel category is an annualized projection of IT filled and vacant positions.





Mississippi Strategic Master Plan for IT

Executive Summary

Goal 1

Provide, Protect, and Support Enterprise Technology Infrastructure Components to Enable the Effective and Efficient Use of Information Technology

Strategies

- Utilize fully the Primary and Co-Processing Data Centers' Technology Infrastructure Services
- Provide, manage, and facilitate efficient and cost-effective usage of telecommunications services
- Provide, protect, and support enterprise technology infrastructure components to strengthen the security posture of the state

Goal 2

Investigate, Develop, and Promote Enterprise Business and Technology Solutions to Maximize the Benefits of Shared Services

Strategies

- Implement and promote digital government and mobile solutions to deliver public sector services
- Implement an effective and efficient messaging service for state government
- Investigate, propose, and implement an effective and efficient enterprise disaster recovery service
- Investigate, propose, and implement an effective and efficient enterprise hybrid cloud solution for state government

Goal 3

Promote the Funding, Procurement, and Management of Information Technology as a Strategic Investment

Strategies

- Initiate innovative and collaborative procurement strategies and practices
- Raise awareness and seek alignment of the IT investment process
- Enhance contract management strategies and practices
- Provide innovative and timely information technology training to state employees

Goal 4

Promote Statewide Sharing of Information Technology Between all State Agencies to Foster a Collaborative Approach to Innovative and Digital Transformation of Government

Strategies

- Develop a technology blueprint that drives improved IT coordination and investment
- Facilitate and coordinate inclusive planning and outreach processes across state government
- Continue emerging technology research and strategic private sector relationships
- Provide effective communications via media-related activities to improve communication with all partner agencies, advance agency's mission and vision, and encourage public interaction

MISSISSIPPI IT GOALS & STRATEGIES

GOAL 1

PROVIDE, PROTECT, AND SUPPORT ENTERPRISE TECHNOLOGY INFRASTRUCTURE COMPONENTS TO ENABLE THE EFFECTIVE AND EFFICIENT USE OF INFORMATION TECHNOLOGY

Strategy 1.1 *Utilize fully the Primary and Ancillary Data Centers' Technology Infrastructure Services*

In recent years, Mississippi government has seen a rapid growth in the implementation of redundant IT hardware and software resources implemented to address specific needs. This growth continues to result in state agency hardware and software infrastructures with independent operations across a broad range of technical environments, service levels, and security standards. Often, these disparate environments are more expensive to maintain and operate than a federated statewide system. This fragmentation creates a duplication of effort and presents a challenge for statewide disaster preparedness and response. Fully utilizing the investment in the State's Primary Data Center is a critical step toward helping government build a more secure, agile, and cost-effective infrastructure for the delivery of government services.

The protection of the State's electronic information is also a critical component for the delivery of government services. To compliment the attributes of the State's Primary Data Center, agencies have access to the State's Ancillary Data Center for backup and disaster recovery options to meet the agencies business needs.

Action:

- Implement in the State's Data Center an enterprise cloud ecosystem built upon an on-premise hybrid-cloud computing environment with access to public cloud solutions to keep pace with the dynamic changes in technology and to meet the computing requirements of the agencies
- Expand the State's Primary Data Center colocation area to encourage agencies to relocate their stand-alone systems to a more robust and secure computing environment
- Implement an improved backup and disaster recovery solution for the enterprise Tier 0 services critical to the State's IT operations
- Implement service-based disaster recovery solutions that can be agency specific to improve recovery times, reduce cost and provide opportunity for an agency to directly subscribe to the service as deemed necessary in support of their program areas

- Implement a Configuration Management Database System interfacing with the Service Center System, to assist with help-desk ticket creation and verification of hardware and software components thus expanding the Service Center to provide partner agencies with a single point of contact for system monitoring, ticket tracking, and accessing a knowledge database
- Build on the benefits of implementing Information Technology Infrastructure Library (ITIL) best practices for incident management, service request management, problem management, and change management
- Expand the capabilities of the zSeries platform that supports the Department of Finance and Administration's MAGIC application
- Continue to enhance the Windows and Unix applications on platforms that leverage standard virtualization technologies and tools
- Enhance the use of enterprise performance monitoring software across all technology platforms
- Develop, maintain, and test disaster recovery and business continuity processes and procedures for critical enterprise state network infrastructure
- Leverage the attributes of the Ancillary Data Center for those applications and systems that necessitate off-site backups and disaster recovery requirements

Strategy 1.2 *Provide, Manage, and Facilitate Efficient and Cost-Effective Usage of Telecommunications Services*

Statewide voice and data communications are provided for state entities and local governing authorities within the Capitol Complex, the Jackson Area, and across the state through a combination of vendor contracts and directly managed services. The current contract for statewide voice and data communications leverages the State's aggregate buying power to ensure that the best possible rates and Universal Service offerings are available to government entities. This long-term contract includes access to local and long-distance telephone services, dedicated Internet, broadband data network services, and audio/web conferencing and router management services. Telecommunications services provided directly to agencies within the Capitol Complex include access to the Capitol Complex fiber network, telephone system, voicemail, and high-speed network connectivity to the State Data Centers, Internet, and the Mississippi Optical Network (MissiON).

Action:

- Manage the Statewide Multi-Protocol Label Switching (MPLS) data communications network and related contracts
- Manage and maintain the Primary Data Center network and Ancillary Data Center network
- Manage and maintain the statewide enterprise telephone system

- Provide agencies and institutions throughout the State with cost-effective telecommunications services (voice and data) that support the missions and objectives of state government
- Provide agencies and institutions with statewide access to the Internet and computing resources through the State's shared data network infrastructure
- Enhance the State's communications infrastructure (voice and data) to expanded services and provide reliable, secure communications access to State resources and mission critical applications
- Perform annual needs assessments and upgrades to State communications resources at the enterprise level
- Install and maintain the copper and fiber cabling infrastructure in and between all State government buildings in the Capitol Complex area
- Provide statewide contract for audio, web, and desktop video teleconferencing
- Monitor, enhance, and modify all telecommunications networks to maximize utilization and decrease operational overhead
- Promote access and use of the State telecommunications contract for governing authorities to improve infrastructure and services and reduce telecommunications expense at the local level
- Manage the implementation of technically sound and cost-effective communications platforms at all newly constructed or renovated facilities through inter-agency policies and procedures
- Coordinate relocation of communications services for all agencies impacted by new building and renovation activities
- Provide value-added services to our partner agencies such as end-user training, vendor bill auditing, system administration, network monitoring, and on-going project management
- Examine security functions and services for core voice communications platforms
- Implement Voice over Internet Protocol (VoIP) and other real-time applications, where appropriate
- Coordinate the transition to approved ITS enterprise technologies ensuring interoperability and effective cost management related to inventory, support, and maintenance of the statewide network
- Incorporate new and proven industry standards in telecommunications technologies to enhance the service and delivery needs of the State
- Perform reconciliations on agency invoices to ensure accurate billing by telecommunications vendors

Strategy 1.3 *Provide, Protect, and Support Enterprise Technology Infrastructure Components to Strengthen the Security Posture of the State*

ITS administers the Enterprise Security Program to execute the duties and responsibilities of Mississippi Code Annotated § 25-53-201. ITS provides coordinated oversight of the cybersecurity efforts across all state agencies, including cybersecurity systems, services, and development of policies, standards, and guidelines. The complexity of the enterprise and the challenges associated with securing an environment composed of decentralized agencies requires a coordinated effort to help the State better understand its aggregate security maturity level. ITS uses this understanding to refine the enterprise security effort.

Action:

- Align the Enterprise Security Policy and overall Enterprise Security Program with the National Institute of Standards and Technology (NIST) Cybersecurity Framework, the security controls defined in the 800 series of publications by NIST and the Center for Internet Security (CIS) Controls
- Evaluate and award an RFP for the acquisition of managed security services to assist with identifying, measuring, and prioritizing the potential risks that exist on State IT assets
- Centralize termination of all VPNs in the enterprise remote access VPN solution. The VPN solution extends the private network across a public network to provide authorized users secure remote access to the State network
- Collect and analyze information regarding the use and associated costs of cybersecurity solutions and services within state government. The analysis of this information will assist the Enterprise Security Program in deciding the appropriate enterprise security solutions and services for reducing risk and cost
- Research cloud security solutions and services for gaining visibility into cloud usage and risks, meeting compliance requirements, enforcing security policies, and detecting and responding to potential threats. Implement an enterprise architecture joining cloud infrastructure to the Enterprise State Network without introducing undue risk
- Provide managed security services to deliver security device management to assist in meeting agency security needs, as well as any state and federal legal and regulatory requirements for providing effective protection of their networks and computing platforms
- Develop an RFP for the acquisition and implementation of an enterprise perimeter defense solution to enhance the ability to protect state assets against attacks by detecting and filtering unwanted software, malicious code, and traffic to malicious sites from user-initiated Internet traffic

- Provide managed security services to assist with evaluating and researching threats and prioritizing alerts and response recommendations based on risk
- Research and consider developing an RFP for the acquisition of managed security services to assist with the monitoring and analysis of cybersecurity incidents reducing the timeframe required to respond in the event of a cybersecurity incident
- Provide managed security services to assist with the monitoring and analysis of cybersecurity incidents reducing the timeframe required to respond in the event of a cybersecurity incident
- Continue to research the cybersecurity insurance market for available coverage to mitigate losses from a variety of cyber incidents, including coverage for data destruction, data theft, network damage, and liability of losses to others

GOAL 2

INVESTIGATE, DEVELOP, AND PROMOTE ENTERPRISE BUSINESS AND TECHNOLOGY SOLUTIONS TO MAXIMIZE THE BENEFITS OF SHARED SERVICES

Strategy 2.1 *Implement and Promote Digital Government and Mobile Solutions to Deliver Public Sector Services*

The public-private partnership between the State of Mississippi and Mississippi Interactive (MSI) is focused on the timely and leading-edge delivery of web-based and mobile services in an efficient and cost-effective manner. Citizens, businesses, government employees, and local entities benefit from the solutions provided by this program. Effective governance provided by the Electronic Government Oversight Committee (EOC) has afforded MSI clear direction to efficiently prioritize, develop, and launch over 20 interactive services each year. The goal of the partnership is to enable government entities to create program efficiencies, meet legislative service deadlines, and establish a citizen-centric website, as well as an effective social media presence.

Action:

- Provide administration and support for the effective functioning of the EOC, including the use of a methodology for prioritizing the deployment of digital government applications across state government
- Establish Mississippi as an innovative leader in mobile technology offerings
- Expand the use of the eGovernment payment engine, in conjunction with the EOC and Department of Finance and Administration (DFA)
- Continually improve Mississippi's portal, ms.gov, to provide additional information to ms.gov visitors and to encourage the use of digital government services

- Promote the use of MSI services for agency websites, digital government services, and mobile applications
- Leverage the eGovernment shared services environment to give state agencies equal access to advanced technologies
- Expand the use of web-based and mobile services to localities and small boards and commissions

Strategy 2.2 *Implement an Effective and Efficient Enterprise Messaging Service for State Government*

The State's enterprise hosted messaging solution provides the means of consolidating agency-managed standalone systems to improve efficiencies, drive standardization, promote modernization, and leverage the State's volume buying power to reduce overall cost. The solution is built on Microsoft's Office 365 platform, which further expands the capabilities and benefits beyond traditional email services. When state agencies fully adopt this shared service, the Office 365 platform will provide the State with a common naming convention, comprehensive employee address book, calendaring, archival, and access to other enhanced hosted service offerings such as SharePoint, Teams, and the complete Office 365 Suite. As part of the agreement, these services are also available to other government authorities.

Action:

- Continue to solicit agencies' executive support for a centralized email solution with a focus on operational efficiencies and potential cost savings
- Develop a comprehensive identity management solution for state government
- Continue to communicate with state agencies concerning the core email functionality and infrastructure required for day-to-day operations
- Work toward a single licensing agreement that will consolidate existing individual contracts into a statewide enterprise solution
- Improve the State's spam filtering and email relay services at the enterprise level
- Develop a comprehensive reporting and management tool to capture usage and performance measures related to the services provided
- Continue to research and implement best practices to promote and accelerate the enterprise cloud email migration strategy for the State

Strategy 2.3 *Investigate, Propose, and Implement an Effective and Efficient Enterprise Disaster Recovery Service*

The modernization of many government applications coupled with web-enabled access makes it necessary for the State to rethink and significantly improve its existing disaster recovery strategy. Today's citizens expect conducting business with the government to be as instantaneous and reliable as doing business across the Internet. To sustain accessibility to government resources in the event of a disaster, a robust disaster recovery plan and enterprise backup solution are vital for agencies to meet recovery time and recovery point objectives. Rather than a single disaster recovery approach, a new solution is required that offers agencies with options to meet their specific and often unique requirements. The new solution offers a portfolio of services that can be tailored to match the criticality of the application being supported.

Action:

- Create an improved comprehensive disaster recovery strategy with options tailored to meet the agency's requirements for recovery time and recovery point objectives
- Develop an enterprise disaster recovery portfolio solution through strategic partnerships
- Evaluate direct-to-cloud and hybrid backup solutions to safeguard state government data
- Ensure off-site data is secure with approved encryption and security measures
- Foster executive support of the enterprise disaster recover service available to state agencies
- Test, evaluate, and measure outcomes regularly to ensure disaster recovery capabilities are adequate and functional

Strategy 2.4 *Investigate, Propose, and Implement an Effective and Efficient Enterprise Cloud Solution for State Government*

Cloud computing has moved to the forefront of IT in the public sector, with the promise of efficiencies and cost savings. Many state governments, during the economic downturn of the Great Recession, sought to consolidate data centers and technical services. Similarly, the foundation of cloud computing is the concept of converged infrastructure and shared services. Cloud has also simplified the cyclic Capital Expenditure (CAPEX) model (procuring, implementing, and running a dedicated infrastructure) to a more obtainable Operating Expense (OPEX) model (pay-as-you-go shared services). Maximizing the economies of scale in the cloud is a potent driver allowing agencies to avoid upfront infrastructure costs, with improved manageability. The rapid

commoditization of computing resources has led to high growth in cloud services.

Action:

- Fully deploy a hybrid cloud solution within the State Data Center where the selected business partner owns and manages all technical aspects in the on-premise cloud to provide a low cost, general purpose, and virtual compute and storage environments via a self-service portal
- Leverage the Primary Data Center's physical and mechanical resources to support a long-term partnership with a vendor to provide a robust hybrid cloud solution
- Develop a delivery model that will provide government agencies the ability to rapidly provision compute and storage needs via a self-service web interface
- Work closely with state agencies to evaluate applications for cloud readiness to ensure performance expectations are met and right-sized for economies
- Document the development of an instance based (small, medium, large, and extra-large) service menu
- Establish a portal interface to broker select cloud solutions and allow for the transfer of services between approved cloud service providers
- Investigate colocation and cloud solutions that will provide a highly available disaster recovery and backup server environment using hypervisor technology
- Work with selected business partners to improve service level agreements for disaster recovery and backup solutions
- Investigate the use of off-the-shelf technology for network/compute/storage hardware and backup software
- Document cloud best-practice industry standards
- Develop a statewide cloud computing strategy and policy
- Implement statewide cloud service contract(s) for agency use

GOAL 3

PROMOTE THE FUNDING, PROCUREMENT, AND MANAGEMENT OF INFORMATION TECHNOLOGY AS A STRATEGIC INVESTMENT

Strategy 3.1 *Initiate Innovative and Collaborative Procurement Strategies and Practices*

ITS assists state agencies, universities, and local governing authorities with the acquisition of IT hardware, software, and services. An ongoing initiative is the re-engineering and continuous improvement of

procurement processes and procedures through both strategic and incremental changes. In addition, focus is placed on the identification of collaborative opportunities. With this, procurements are conducted to provide and facilitate the use of the State's technology infrastructure which allows multiple agencies to benefit from a single procurement. Improvements in the procurement process focus on the following initiatives with the goal of providing better service to our partner agencies, universities, and local governing authorities while delivering cost savings to the state.

Action:

- Facilitate the technology procurement process through the utilization of MAGIC, Mississippi's statewide SAP Enterprise Resource Planning (ERP) solution
- Continue to enhance the procurement process to provide accessibility and transparency to both vendors and procurement entities utilizing web-enabled applications, including:
  - Web publication of Request for Proposals (RFP) and Notice of Intent to Certify Sole Source procurements and advertisements
  - Dynamic presentation of procurement status information
  - Publication of agendas and minutes from ITS Board meetings
  - Publication of procurement outcome/award information
- Continue to enhance and standardize best practices for RFP and sole source procurements, content, and proposal evaluation methodologies
- Align government purchasing options for IT equipment and service solutions with the *Statewide Architecture and Technology Delivery Plan*
- Work with manufacturers and resellers on the Express Products Lists (EPL) to provide agencies, public universities, and local governing authorities with purchase choices of current technologies in a timely and cost-effective manner
- Enhance internal ITS procurement processes, emphasizing consistent, appropriate, and timely processing of all requests, plus, effectively responding to seasonal workload fluctuations caused by agency funding constraints
- Provide expedited approval of commodity-level procurements for agencies that have submitted comprehensive technology plans
- Provide proactive training to vendors and partner agencies, universities, and local governing authorities regarding procurement law and procedures, timelines, and best practices
- Facilitate dialog between the ITS Board and partner agencies and universities on technology strategy and initiatives
- Coordinate the procurement process with the IT planning process to address partner agency requests and technology direction
- Identify and promote opportunities for utilization of existing technical resources in lieu of procuring redundant equipment and products

- Coordinate the requirements of multiple partner agencies in developing procurement instruments that leverage the State's combined purchasing power to achieve the best possible discounts for technology products and services
- Facilitate the acquisition and adoption of enterprise solutions to provide standard products across state government for common functions

Strategy 3.2

Raise Awareness and Seek Alignment of the IT Investment Process

The National Association of State Chief Information Officers (NASCIO), the National Association of State Technology Directors (NASTD) and the National Governors Association (NGA) strongly emphasize the need for a strategic IT investment process to ensure that state agencies utilize innovative, smart-buying, investment techniques. With IT being a critical component of state government infrastructure, many states have focused on using IT to solve workforce and service delivery problems in government operations. However, choosing an appropriate IT application requires planning, thorough analysis, and a strong business case that it can meet citizens' needs better, facilitate business/government interactions, and improve internal government processes, at reasonable costs and with ease of implementation. Currently, the budgeting and funding of IT within Mississippi state government is accomplished on an agency by agency basis. Many opportunities exist that can be leveraged to accomplish an increasingly strategic investment of IT resources across the statewide enterprise, including strategically planning for upgrades, transferring cost savings to fund applications, and implementing return-on-investment programs.

Action:

- Seek opportunities to develop and implement IT services that are common to multiple agencies and governmental programs in order to minimize duplication of efforts among organizations
- Utilize economies of scale by spreading fixed costs over larger volumes to reduce overall unit costs, efficiently leveraging scarce and expensive IT staff resources
- Focus on enhancing input and direction from the State's executive and legislative leadership with aims to achieve economies of scale, increase accountability, and implement enterprise-focused solutions
- Seek interagency dialogue to address the enterprise of state government across all functions to enable the use of common software, hardware, communication systems, data applications, and professional service contracts
- Focus on enabling strategic technology projects to be critiqued and prioritized by the State's executive and legislative leadership, with funding appropriated via a separate budgeting process and

management monitored and reported through a project management office

- Improve current, traditional IT funding approaches by expanding adoption of innovative and alternative funding models focused on enabling the State to deliver savings and improve services to citizens
- Investigate the transfer of savings from shared service IT initiatives to fund applications and upgrades

Strategy 3.3 *Enhance Contract Management Strategies and Practices*

ITS contracts on behalf of state agencies, universities, and other local procurement clients for the acquisition of IT hardware, government software, and services. An ongoing initiative is the continuous improvement of the development and management of contracts and negotiation strategies with the goal of strengthening the State's contractual position with technology vendors. This would be mutually beneficial and provide efficient delivery of technology products and services to government.

Action:

- Continue to enhance the development of vendor contracts
- Incorporate contractual terms and conditions to support the evolution of technology and its implementation in state government, including measures to strengthen the State's security posture
- Administer and manage the State's software escrow services contract for use by state government agencies
- Administer and manage the State's Cellular Master Agreement for the delivery of cellular devices and services to state and local government
- Administer and manage the State's e-Government Agreement for the delivery of electronic government services to state and local government
- Administer and manage the State's Managed Service Provider Agreement for the delivery of technology resources as independent contractors to state government

Strategy 3.4 *Provide Innovative and Timely Information Technology Training to State Employees*

ITS provides self-paced, online training to state agencies via the Internet. There are currently over 1,000 courses in technical, end-user, and professional development topics, with new courses added quarterly. ITS provides an ongoing program designed to enhance and improve the skills of state employees.

Action:

- Provide self-paced, online training to state agencies via the Internet

- Provide continuous online curriculum updates to keep pace with new and emerging technologies, including new products and new releases of software
- Provide a comprehensive information systems training program for end-users, technical, and managerial personnel

GOAL 4:

PROMOTE STATEWIDE SHARING OF INFORMATION TECHNOLOGY BETWEEN ALL STATE AGENCIES TO FOSTER A COLLABORATIVE APPROACH TO INNOVATION AND DIGITAL TRANSFORMATION OF GOVERNMENT

Strategy 4.1 *Develop a Technology Blueprint that Drives Improved IT Coordination and Investment*

Many states are investigating the link between a technology blueprint, often referred to as an Enterprise Architecture, and IT enterprise investments. A technology blueprint depicts the key technology components to create an IT ecosystem. It is a holistic, comprehensive planning approach for a government enterprise that integrates information and services across government agency boundaries. A technology blueprint supports the coordination of various IT support functions. It also can create and enforce statewide standards and policies for data, security, purchasing, management, and operational procedures for all technology investments.

Action:

- Implement a standards-based blueprint for the State's use of technology, which addresses the whole enterprise of state government and enables data sharing across all government functions to enable the use of common software, hardware, communication systems, and data applications
- Optimize shared technology components, including data centers, email systems, computing environments, vendor platforms, storage, help desks, applications, and networks. These shared services can reduce initial purchase and ongoing maintenance costs, ensure better use of existing IT assets, and promote interoperability across government
- Implement new and review existing policies, standards, guidelines, and purchasing instruments for consistency and alignment to the state's strategic direction
- Identify and review business processes that are common across multiple agencies
- Support inter-agency efforts regarding collaborative initiatives for specific business areas such as Geographic Information System (GIS), employment security, retirement systems, and human services

- Develop business cases that consider alternatives and recommend actions related to future shared services that will provide value and cost savings
- Coordinate statewide enterprise architecture and planning initiatives

Strategy 4.2

Facilitate and Coordinate Inclusive Planning and Outreach Processes across State Government

ITS desires to make the greatest impact possible through the consistent delivery of services and the efficient use of IT resources. We make every effort to work with our partner agencies to find the best and most economical solution to their technology needs. Planning for technology allows our partner agencies to invest scarce public resources in strategically planned projects in order to improve productivity of government workers and improve service delivery to the citizens and businesses of Mississippi. ITS has a dedicated staff that consults with partner agencies on the services available through the State Data Center, as well as the acquisition of technology products and services, telecommunication solutions, and security. We will continue to provide outreach to state government entities, to improve communication with our partner agencies, and to provide resources to assist with technology products and services.

Action:

- Facilitate partner agency outreach meetings to review technology-based services provided by ITS, review services currently provided, help ensure partner agency satisfaction, and review agency project lists for potential opportunities to efficiently utilize information technology resources and provide capacity planning
- Develop ongoing interactive statewide IT advisory groups to help set direction and establish priorities for state technology initiatives
- Provide support and online tools to agencies, boards, and commissions to assist in the budgeting and planning of technology projects
- Expand the statewide technology planning system with more functionality and better reporting
- Review partner agency technology plans for statewide infrastructure impact and needs, opportunities for agency collaboration, potential volume purchases, technology training and education opportunities, and other focus areas
- Develop a formalized governing process for agency technology plan review and approval
- Facilitate regular change management calls with partner agencies to promote communications
- Develop surveys to capture information from agencies regarding services, performance, and various other topics

- Host interactive forums to inform stakeholders of changes in services, policies or procedures, standards, or costs for specific areas of service
- Facilitate statewide conferences with a technology agenda based on agency feedback
- Cultivate and strengthen existing partner agency relationships by developing mechanisms to facilitate outreach and information sharing with stakeholders

Strategy 4.3 *Continue Emerging Technology Research and Strategic Private Sector Relationships*

The State utilizes research capabilities and vendor relationships to stay informed of industry changes that may affect the enterprise. State IT leaders monitor changes and future technology trends in the IT ecosystem and embrace new technologies and methodologies to service the needs of the State. The continued research is used in conjunction with agency technology plans, emerging technology initiatives, participation in national and local organizations, and vendor relationships to build strategic technology roadmaps for the future.

Action:

- Fully utilize partnerships with leading IT research and advisory firms
- Continue involvement in national technology organizations with a focus on state government
- Continue research in new innovative technologies to stay abreast of the latest advances in technology
- Enhance partnerships with other government entities to understand how they are implementing new technologies
- Foster digital transformation to state government by bringing new innovative technologies

Strategy 4.4 *Provide Effective Communications via Media-Related Activities to Improve Communication with all Partner Agencies, Advance ITS' Mission and Vision, and Encourage Public Interaction*

ITS strives to provide effective outreach to state government entities, improve communication, and provide resources to assist with technology decisions for needed products and services. Communications channels range from one-on-one meetings, seminars and summits, and councils established for enterprise initiatives.

Action:

- Identify communication challenges and customize how and what is communicated to internal and external audiences
- Analyze communication platforms and methods to align different forms and channels of communication to best fit the audience and message
- Develop and ensure social media and the ITS website maintain content strategically focused on the planning, creation, delivery, and governance of content
- Manage production of strategic publications such as the *State of Mississippi Strategic Master Plan for Information Technology, Mississippi Statewide Architecture and Technology Delivery Plan, Mississippi Department of Information Technology Services (ITS) Annual Report, Five Year Strategic Plan,* and *ITS Services Catalog* along with additional brochures, manuals, surveys, etc.
- Seek out potential opportunities for award recognition on the national level in highlighting the great work done by state entities for providing our citizens with exceptional information technology services
- Provide consultative services to coordinate the development, effectiveness, and use of electronic and printed materials for public and professional meetings, seminars, and conferences

MISSISSIPPI IT AT WORK

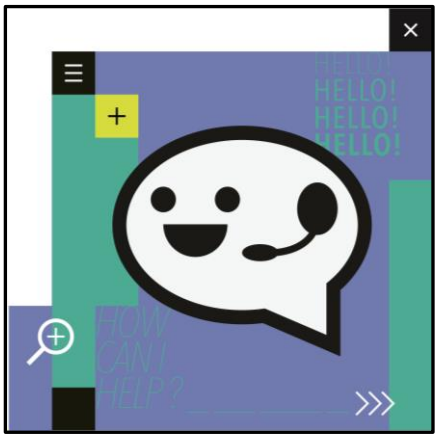
Each year, state agencies in Mississippi work to enhance government services by leveraging technology to implement strategic systems. The systems featured in this year's "Mississippi IT at Work" section of the *2020-2022 State of Mississippi Strategic Master Plan for Information Technology* provide improved services to citizens, businesses, and state employees through the implementation of innovative IT applications.

MS.GOV

MISSISSIPPI'S OFFICIAL STATE WEBSITE

Ms.gov is a joint effort between the State of Mississippi and Mississippi's eGovernment partner, Mississippi Interactive (MSI). MS.gov was implemented under a self-funded model at no cost to the State or citizens. To date, the design, maintenance, and customer support efforts of ms.gov are valued at over $2.07 million.

The eGovernment partnership between MSI and the State of Mississippi, has garnered the creation of 250 online and mobile services aimed at assisting citizens in day-to-day interactions with state government. The success of Mississippi's eGov services can be seen in the over 400,000 individual downloads of native mobile apps, electronic revenue collected on behalf of the State in excess of $383 million, and the 50+ percent mobile/tablet adoption of prime services including online hunting and fishing license sales and online driver license renewals. Through this public-private partnership, and its focus on efficient government solutions, the State of Mississippi has realized a cost savings in excess of $1 million per year; over $11.5 million to date. Additionally, this technology partnership has garnered numerous awards. Mississippi services provided through this program have been nationally recognized with ninety awards in the past nine years, including five consecutive Top 5 finishes in the Government Experience Awards (formerly Best of the Web), StateScoop IT Innovation of the Year for the MISSI Chatbot, multiple Communicator, Hermes and W3 Awards.



Mississippi's government citizen platform, My Mississippi (myMS), was selected as an award recipient in the Emerging & Innovative Technologies category at the National Association of State Chief Information Officers (NASCIO) 2018 IT Recognition Awards. My Mississippi (myMS) is an intelligent personalized platform developed for citizen use to help keep track of important reminders, receive alerts, save frequently accessed content online, interact with the "Ask Mississippi" digital voice assistant for Amazon Alexa and Google Home, and communicate with the State of Mississippi's chatbot, MISSI.

myMS is a companion platform to the award-winning State of Mississippi's official website, ms.gov. myMS features custom alerts and reminders, social sign-in, and hands-free voice-controlled technology integration.

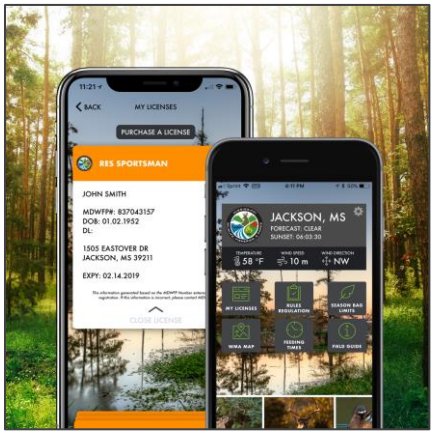
- Ask Mississippi: Voice interaction is only a few words away. Use your Amazon Alexa and Google Home products to access your myMS alerts and reminders, as well as receive a wealth of Mississippi government info. Citizens can simply "Ask Mississippi" to set a reminder for when their driver's license expires, provide their local state fishing report, ask for assistance in paying their taxes, receive traffic alerts before they leave for work or school, and hundreds of other supported interactions.
- MISSI: The state of Mississippi's first chatbot, serves as ms.gov's main citizen-focused communication channel. MISSI is located on every page of ms.gov and delivers information directly to the user through a chat interface. When you first access MISSI, you are presented with the most current Top 10 ms.gov searches. You can select any of these options and MISSI will respond with the appropriate information or URL to get you where you need to go quickly. If your choice is not listed, you can also chat with MISSI to get your requested response.
- If This Then That (IFTTT): Connects data across services and devices to create powerful data tools to aid how government and citizens interact digitally. IFTTT applets are user-driven commands or tasks. For example, a user can enable the twitter applet to alert them every time the MS Department of Transportation tweets, receive an email from the Center for Disease Control (CDC) when a food alert is issued, get an email when the Department of State issues a travel warning, and many more. Ms.gov plans to grow these applets to help Mississippians receive information through IFTTT channels, thus growing the reach of state government in Mississippi.
- myTacks: Insures relevant content remains accessible in a click. myTacks allows visitors to drag links important to their government experience to a vault to save for quick future reference.
- myAlerts: Quickly set alerts for weather events, amber and silver alerts, as well other high-profile statewide alerts by accessing your myMS profile and choosing your targeted alerts.
- myReminders: Subscribe to top government agency reminders or customize your own using the myMS widget.

Learn more about how Mississippi delivers innovative technology:
http://www.ms.gov/Technology

The Hunt is Over!

Mississippi Department of Wildlife, Fisheries and Parks (MDWFP)

In Mississippi, where approximately 50% of adults live in wireless-only households, accessing state services on mobile phones is a top priority for many state agencies. The Mississippi Department of Wildlife, Fisheries and Parks (MDWFP), ever committed to providing citizens with easy access to information and first of their kind services, responded to this need with the launch of their MDWF Hunting and Fishing App.



Within the app, Mississippi's Hunting and Fishing Auto-Renewal System and Customer Portal gives outdoor enthusiasts the ability to opt-in to auto-renew their annual hunting and fishing licenses. The new system is the first instance of a state offering automatic renewal for all license holders, regardless of purchase method. While providing citizens with a quick and convenient avenue to access important information and regulations was the driving force behind the application, the cornerstone services were developed to transform the way citizens interact with MDWFP. These transformative features include the introduction of hassle-free license purchases and bulk license package purchases.

The auto-renewal system gives the customer the ability to enroll in an auto-renew program within the mobile application or online in their customer portal. Once enrolled, the user can select the licenses they would like to auto-renew on an annual basis. The dynamic auto-renewal system provides the online and mobile application the ability to securely store the user's payment method, renew and purchase the user's license, and deliver the new license directly to the user via a digital license or hard copy. License holders will no longer have to manually renew every year, instead the user will get to keep and manage their current licenses inside of the mobile app. It's designed to be a seamless experience anywhere using any Internet connected device—PC, Mac, tablet or a smartphone—regardless of browser or operating system.

The introduction of user-led reporting has helped MDWFP track not only wildlife harvests but also cases of chronic wasting disease (CWD), a very serious ailment killing white-tail deer across the country. The mobile accessibility of this reporting is important for timely response and accurate location of the affected animal.

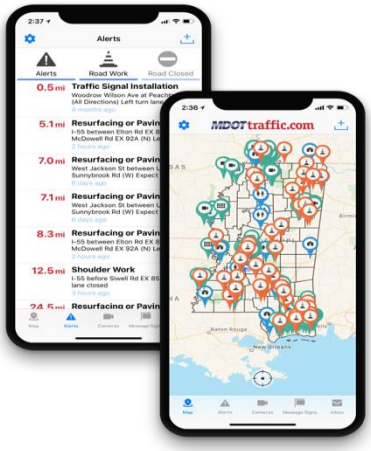
To date, 72% of all users that purchased a license through the new system have elected to auto-renew their license purchase. Additional features such as on-the-go license purchases, push notifications, a sunrise/sunset timer, hunting/fishing reports, mapping, and feeding times round out the robust application. MDWFP Hunting and

Fishing App provides outdoor enthusiast with an engaging user experience and enhanced interaction with one of Mississippi's largest agencies.

MDOTTRAFFIC.COM

MISSISSIPPI DEPARTMENT OF TRANSPORTATION (MDOT)

With the ever-growing adoption of mobile solutions and services in Mississippi, MDOT recognized a need for an accompanying mobile application to the existing MDOTTraffic website. The MDOTTraffic 1.0 iPhone and Android applications provided users a convenient and quick avenue to access the features of the MDOTTraffic.com website when they need it most, on the go. Real-time streaming traffic cameras, push notifications, and up-to-date transportation alerts are all available in the convenient applications.



In 2018, MDOT launched a major redesign of the MDOT Traffic 2.0 Mobile App. The iOS and Android Mobile App was rebuilt from the ground up to incorporate the latest in mobile technologies including geo-location push notifications that alert travelers whenever a traffic alert or road incident occurs within an 8-mile radius. In addition, the mobile app provides real-time video streaming access to over 400 traffic cameras places throughout the state. A new reporting system allows citizens to submit a crash or hazard report directly to MDOT.

The accessibility of the application is due in large part to the consistent design that is displayed throughout all platforms that the application is available including; iPhone, iPad, Apple Watch, Android and Tablet. With an up-to-date and modern application, it is easy to access all the application features in one or two clicks. These features include:

- Interactive Mapping: The home screen displays a full map of Mississippi that can be user location based within a ten-mile radius with just a touch of a button. At a glance a user can see a visual representation of traffic cameras, message boards, traffic incidents, rest stops, and much more.
- Customizable Pin Selections: For finding specific locations or events faster, users can toggle on and off between six different map pin indicators: alerts, cameras, signs, rest areas, welcome centers, and roadway weather stations. The pins can toggle off or on in any combination, and a touch to any pin on the map will trigger a pop-up map annotation.
- List Option: Users can select a toggle button on the mapping screen and have the ability to open five different tabs; alerts, cameras, message signs, rest and welcome areas, and weather stations. These tabs show users the most recent

notifications. Alerts are displayed by proximity to the user, and upcoming rest areas and welcome centers are based on location.

- Statewide Traffic Cameras: Users can access the camera's map view and displays all the live streaming cameras currently active in the MS Traffic Incident Management System anywhere in the state.

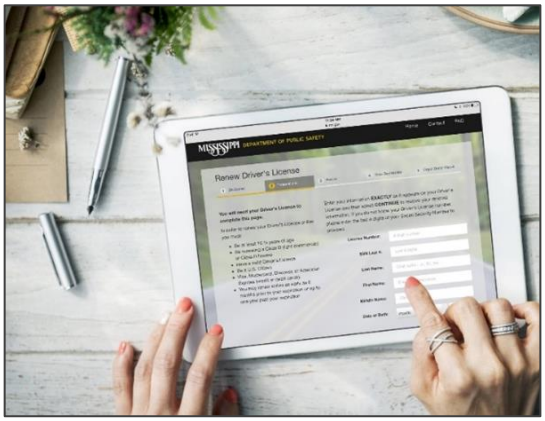
MDOTTraffic 2.0 provides users with up-to-the-minute access to all Mississippi weather and traffic information, including road closures, road work, streaming traffic cameras, weather sensors, message signs, rest areas, and welcome centers. To date, the mobile app has been downloaded over 158,000 times by citizens traveling the roads and highways in Mississippi.

Skipping the Drive

Mississippi Department of Public Safety (DPS)

In 2014, the DPS sought to modernize their outdated driver's licensing system and associated services and increase the level of involvement in which they engage citizens. Partnering with Mississippi's eGovernment provider, Mississippi Interactive (MSI), DPS launched the new Driver Self-Service Portal (www.drive.ms.gov), a secure, one-stop suite of seven mobile-optimized applications, more accessible and streamlined for handling DPS needs on the go. For the first time ever, the new online process gives Mississippi citizens the chance to skip the trip to their local DPS location by offering the most common driver transactions within one portal.

After more than 25 years of using an antiquated driver's license system, DPS set out to meet the technological advances and demands of an increasingly mobile state by completely transforming how they interact with the public. Through the reorganization and consolidation of content, users can immediately complete renewals, order replacement credentials, and pay reinstatement fees online. The improved user interface features an intuitive navigation pane providing users quick access to a multitude of DPS features including individual motor vehicle requests, commercial driver's license medical card submissions, and a driver's license kiosk locator.



Constituents interested in learning more about DPS and online transactions can access the FAQ information with just one click, allowing them to quickly identify commonly asked questions and link directly to DPS resources. The launch of the application suite replaced outdated cumbersome processes with timesaving online solutions, by decreasing the need for individuals to wait in line.

The Self-Service Portal has created significant operational efficiencies for citizens and Driver Services staff, including:

- 25% decrease in walk-in transactions at physical Driver's License Stations
- Reduction in cash/check transactions with over to $16 million in electronic payments in the years since launch
- 59% of transactions take place from mobile devices or tablets
- Average transaction time barely surpassing two minutes per user

In addition, the department has recently launched the Wait Anywhere Appointment Scheduler. At six driver's license locations throughout the state, citizens can simply wait anywhere using their mobile phone to claim a spot in line. The system automatically places you in line and sends a text message confirmation/reminder of the scheduled appointment time.

WEBEOC

MISSISSIPPI EMERGENCY MANAGEMENT AGENCY (MEMA)

MEMA implemented WebEOC a statewide application that provides the mechanism for effective information management and event reporting. WebEOC is used to store files, contact information, plans, and procedures. Event reporting is another facet of WebEOC. Position-specific activity logging and significant event tracking provides the key elements accurately depicting the real-time lifecycle of an incident.

The ability to communicate information effectively is critical to any disaster response and subsequent recovery. Historically, the problem has been integrating the existing tabular data into a Geographic Information System (GIS) dynamic digital map or common operating pictures (COP). Until recently, Mississippi used legacy methods to integrate WebEOC data into GIS.

In mid-2016, Mississippi worked to integrate an application programmable interface (API) that allowed the seamless sharing of WebEOC data with GIS data. GIS needs to transmit the exact location of the person, place, thing, or event. MEMA uses the Daily Event Log within WebEOC to track real-time events occurring in Mississippi from the moment they are reported to MEMA to resolution. For example, if an accident occurs on a Mississippi highway and a hazardous chemical is spilled, this information can be shown spatially and include vital details.

In the last biennium, Mississippi created the MEMA COP. The COP provides real-time situational awareness based on data that is dynamically collected from WebEOC. Additionally, services are being consumed from the US Geological Survey (USGS), MDOT, National Oceanic and Atmospheric Administration (NOAA), and the Federal Emergency Management Agency (FEMA) just to name a few. These organizations are providing dynamic information concerning weather, earthquakes, and the conditions of Mississippi roadways to include traffic cameras. The MEMA COP greatly enhances situational awareness and communications. More than 2000 users in 140 public safety

and emergency management entities take advantage of the MEMA COP statewide. In the past two years, more than 3000 damage assessments have been performed with mobile devices in the field using the GIS-based Collector Application. This real-time information is fed into the MEMA COP and has resulted in a 65% timesaving recovery process for thousands of Mississippians.

Mississippi's implementation of situational awareness tools like the MEMA COP and the Homeland Security Information Network (HSIN) Situation Room has provided critical reporting and sharing of information daily not just during disasters. MEMA's Operations Bureau has fully developed and implemented the State version of the HSIN using Adobe Connect technology. This collaborative tech tool is used to share live video, mission documents, live chat, and other incident information in a secure web environment to various public safety departments across the state. AtHoc Mass Notification System was implemented in the last biennium, it is utilized in every day disaster situations to provide our state emergency operation center stakeholders with timely information through multiple platforms. Presently, it only takes minutes for employees to reach thousands by phone, email, and/or secure mobile application.

AccessMS

Mississippi Department of Human Services (MDHS)

MDHS and the Division of Medicaid (DOM) prioritized working together to develop a long-term vision for offering benefits to the state in an effort to increase coordination, reduce taxpayer burden, improve health outcomes and citizens' paths to self-sufficiency. The product of the State's vision is AccessMS (access.ms.gov), a dynamic web application that allows Mississippi citizens, for the first time, to jointly apply for many of the benefits offered by each agency. A first of its kind product in Mississippi, AccessMS has provided a common space where all State benefits can be offered, applied for, and managed, making Mississippi more accessible than ever to its citizens.

The Health and Human Services Transformation Project (HHSTP) includes two phases. Phase I, implemented in December 2018, consisted of two components; a pre-assessment wizard and an intuitive, shared benefits application between the DOM and the MDHS. By answering a handful of eligibility questions, the pre-assessment tool eliminates guess work by determining the benefits that may be available to the user at that time. The Joint-Online Application tailors the questions to each user by presenting only the questions required to apply for their chosen benefit. For example, if the user chooses to apply for Medicaid benefits only, the system will not display SNAP, TANF, or LIHEAP specific questions. Additionally, the AccessMS platform has been constructed to allow for easy integration of future benefits offered by the State.

Phase II consists a User Dashboard which currently scheduled to be completed in December 2019. Through individual, secure accounts, the User Dashboard will not only provide applicants with valuable and timely information regarding the status of their benefits but will also provide a platform for participating State agencies to communicate directly with applicants. The User Dashboard will allow: open, two-way communication

regarding any additional information needed to complete the application process, the submission of changes to a user's circumstances, and the completion of renewal/recertification applications, when necessary. All of which will be done without having to visit a regional or county office or interact with a State employee.

By allowing the user to create an account and then gain access to the user dashboard, AccessMS creates a cross-platform arena where the user can begin, pause, and restart any benefit related task, no matter where they are or what device they are using. AccessMS saves partially completed applications, allowing the user to return to the application at their convenience.

AccessMS has empowered the citizens of Mississippi by giving them control of their own benefits. For the first time, users can carry out the entire benefit lifecycle of completing an application. Some of these tasks include:

- Providing additional information: Users can upload additional documentation to be provided to the State to help in the processing of their application. Examples would include driver's licenses, birth certificates, paystubs, utility bills, or other documentation.
- Paperless Notifications: The State can distribute notices through AccessMS directly to the user in real-time instead of utilizing the USPS.
- Fraud Prevention: AccessMS users are authenticated through LexisNexis to validate that the user is who they say they are and are only provided with information that they are legally allowed to see.
- Automated Functionality: Automatically closing or denying cases for failure to submit renewals/recertifications during the provided time.

Since the launch of Phase I over 31,000 applications have been submitted via the AccessMS platform. These applications are routed directly into the agency databases without the need for the manual entry process that was previously being utilized, allowing the caseworker to focus their time on assisting and serving customers rather than documentation.

Mississippi: The Future Vision

Today in Mississippi state government, information technology (IT) is at the core of all government services utilized by citizens, businesses, and employees. Statutory requirements direct the Mississippi Department of Information Technology Services (ITS) to maximize the benefits of IT through planning, procurements, and effective and efficient use of the State's enterprise IT resources by all state agencies. To that end, ITS collaborates with state agencies and institutions to assess emerging technology trends which will benefit individual agencies, statewide enterprise IT services, and subsequently, the whole of state government.

Since its inception, ITS has fulfilled this mission by adapting to changes in the landscape of Mississippi state government by adopting service-oriented business practices. These practices allow for more choice and flexibility in developing and implementing technology solutions, which includes research, testing, assessment, and recommendation of new technologies. Where applicable, ITS collaborates with agencies and institutions to implement pilot technical projects that would be beneficial to multiple agencies across the state. This section details many existing and emerging technologies that are worthy of research and analysis in the near future.

Artificial Intelligence

Artificial intelligence (AI) can deliver value to every industry, enabling new business models. AI is seen as a major force in future economy and workforce and does so by supporting key initiatives such as customer engagement, digital production, smart cities, self-driving cars, risk management, computer vision, and speech recognition. As people, places, processes, and "things" become increasingly digitalized; they will be represented by digital twins. This will provide fertile ground for new event-driven business processes and digitally enabled business models and ecosystems. The way we interact with technology will undergo a radical transformation over the next five to ten years. Conversational platforms, augmented reality, virtual reality, and mixed reality will provide more natural and immersive interactions with the digital world.

Blockchain

Blockchains have emerged as one of the next big transformational technologies. Scan any business, technical, or financial media source today, and you are sure to find an article on blockchains. However, blockchains are more than technology and how transactions will be executed, it is a fundamental shift away from a traditional private

trust ideology to a shared trust data model; thus, the potential impact on the economy is enormous. Practical implementations are still in the early stages in state government, but with its potential for transformation in the public sector, blockchain is one of the State's innovative research priorities.

Blockchain is a shared, global, incorruptible, and inherently trusted ledger of transactions. It is controlled equally by all who wish to participate and is transparent, yet private. Think of it as a steadily growing spreadsheet of records or "blocks" that create an immutable record where each block is "chained" or linked to the previous block using state-of-the-art cryptography. Each entry is then validated and reconciled by all participants in the network, ensuring consistent integrity. The hype surrounding blockchain originally focused on the financial services industry. However, blockchain has many potential applications beyond financial transactions. Blockchain technology can be programmed to record not just financial transactions, but nearly anything that holds value and can be expressed in code. Anything from birth, death and marriage licenses, property deeds and titles of ownership, educational certificates, financial accounts, medical procedures, insurance claims, or votes -- the possibilities are truly limitless. ITS plans to actively investigate the use of blockchain technology and seek appropriate opportunities to leverage this technology to improve efficiency and security.

Connected Workplace

In the future, the workforce drawn to public service will be digitally capable, from entry-level employees to high-level administrators. As with all employment sectors, a premium is placed on employee satisfaction, productivity, and effectiveness. While the mission of many public sector programs will remain intact, the nature of work and the culture of the workplace will change dramatically. The rapid commoditization of technologies, as well as ease of access to these technology products will create a work environment where employees are more agile and engaged, centered on consumer-oriented styles and technologies. Public sector IT leaders need to communicate the need to build a more social, mobile, accessible, and information-driven work environment, exploiting private sector innovations, and equipping government to operate with greater efficiency and effectiveness. The public sector connected workplace should be responsive to a strategy which leverages multiple operating channels, so that each can be optimized in its own right and, when integrated with the other channels, deliver measurable benefits for all citizen stakeholders.

Conversational Platforms

Conversational platforms will drive the next big paradigm shift in how humans interact with the digital world. These platforms will shift the model from technology-literate people into people-literate technology. The burden of translating intent will move from the user to the computer. The system takes a question or command from the user in natural language then responds by executing a function, presenting content, or asking for additional input.

A conversational platform provides a high-level design model and execution engine whereby the machine interactions occur. As the term "conversational" implies, these interfaces are implemented mainly in the user's spoken or written natural language. In time, other input/output mechanisms will be added to exploit sight, taste, smell, and touch for multimodal interaction. The use of expanded sensory channels will support advanced capabilities, such as emotion detection through facial expression analysis and human health status through olfactory analysis. However, exploitation of these other sensory channels will be isolated and limited for the next three to five years.

Enhanced Citizen Access

Government must think outside the browser to keep up with citizen's digital expectations, and that is what Mississippi did with the redesign of the ms.gov website in 2018. The user experience for visitors of the official website of Mississippi, ms.gov, extends beyond the traditional browser and encapsulates new emerging Internet of Things (IoT) technologies. The user experience is only as good as the service that is available, which is why Mississippi took numerous measures to not only update existing core ms.gov services but also introduce new technologies not commonly used in government interactions. These include a chatbot called Missi, augmented reality featuring a virtual tour of the Mississippi Capitol, voice interaction using Amazon Alexa, a personalized platform called myMS, and an enhanced help portal.

IT as a Service

The promise of IT as a service is a financial conversion from regular capital expenditures to a more stable operational expense. These consumption-based models lay the foundation for IT services like cloud computing, which offers responsiveness, timeliness, and cost effectiveness. For public sector shared services where there is typically a significant investment in internal cloud infrastructure and a large existing user base, it makes sense to consider internal resources first. However, growth and replacement of IT catalog services can be adapted to a more effective and efficient cloud delivery model. Future cloud-based projects will be described as business initiatives rather than IT initiatives, which will focus on the related business outcomes rather than the technical details. Cost reductions combined with rapid application deployments and improved security features represent a "win-win" situation for budget conscious governments.

Internet of Things (IoT)

The Internet of Things (IoT) is the architecture of dedicated physical objects (things) that contain embedded technology to sense or interact with their internal state or external environment. The IoT is not restricted to the internet and can be experienced through any medium that supports communication between the thing and its associated applications. The IoT architecture operates in an ecosystem that includes things, communication, applications, and data analysis, and is a critical enabler for digital business applications in all private sector and public sector industries.

Public sector agencies can expect IoT-driven changes in several different areas, including environmental or public infrastructure monitoring, emergency response, supply chain inspection, asset and fleet management, and traffic safety. Wearable devices and mobile health monitoring devices will collect lifestyle, behavioral, and health data that will help manage the costs of publicly financed health insurance and healthcare programs. A forecast from Gartner, Inc. states that there will be over 25 billion installed things by 2020, with 6.8 billion alone in smart government infrastructure, suggesting that IoT deployments will become a daunting array of components, ubiquitous connectivity, embedded intelligence, and software with few standards.

IoT architectures offer greater opportunities when the data from IoT devices can be shared with other entities — for example, license plate recognition in order to improve the effectiveness of Department of Motor Vehicles (DMV), traffic control, or intelligent traffic systems. This requires the architecture of IoT systems to be interoperable with various back-end processes and systems, many of which are owned and managed by multiple entities that may have different expectations and understanding about the impact of IoT data streams on their enterprise systems. Assessing organizational change readiness and determining performance, security, technical, data, or other requirements are essential to building environments that can accommodate differing architectures and new business models.

Intelligent Things

In practice, Intelligent Things are a diverse combination of physical or virtual digital technologies that do what we once thought only people could do. While the list of Intelligent Things' capabilities is evolving rapidly, it already includes deep neural networks, autonomous vehicles, virtual assistants, and smart advisors that interact intelligently with people and other machines. Government IT leaders must consider these Intelligent Things as enhancements to existing business practices and possibly as foundations for new public services or ways of accomplishing business goals altogether.

Intelligent Things offer and require a higher degree of automation than many existing government interactions, controls, or workflows can deliver. They are either semiautonomous or fully autonomous. When Gartner, Inc. uses the word "autonomous" to describe Intelligent Things, they do not mean that these things have an Artificial Intelligence-style freedom from external human control or influence. However, these Intelligent Things can operate unsupervised for a defined period to complete a task. Governments' organizational ability to move beyond traditional thinking and incremental improvement will affect the adoption rate of these technologies. Intelligent Things will likely be the most disruptive class of technologies over the next ten years.

Multisourcing

Simply being a trusted IT provider is not good enough in today's complex IT environments; the new core competency is being the trusted broker for services delivered from many, changing providers. A multisourcing service integrator is a role undertaken by an organization to coordinate and integrate service delivery in an environment that uses multiple internal and external service providers for the delivery of IT and business process services. The growth in cloud service adoption is taking multisourcing to a new, more dynamic level, changing the model for IT and infrastructure operations, particularly in the aggregation of various hosted partnerships. Multisourcing is key to simplifying management of this environment and achieving end-to-end service outcomes as it responds to the growing complexity of the hybrid IT ecosystem used by state government agencies.

Social Media and Public Sector

Mississippi continues to expand ms.gov content and service offerings through social media. As with websites, it is important to tailor content across social media channels, creating not only engaging content that people want to talk about but also additional channels to listen to Mississippi citizens.

The continuing rise of social media platforms that foster two-way communication allows citizens to experience a personal connection with state officials and employees enhancing a sense of participation in the business of government. Real-time conversations and transparency offer a glimpse into the everyday workings of government. Social media has played a role in the creation of a more digital and connected workplace as well as enhancing citizen access. To this end, emerging technologies and the evolving social networking tools will require constant modifications to policy frameworks to ensure ongoing relevancy. With a third-place finish in the Government Experience Awards, ms.gov continues to innovate, delivering future-focused user experiences on the web, using a mobile-first approach focused on the tablet and smart phone market.

Strategic Data Management

The introduction and combination of new and diverse datasets in the public sector can benefit organizations to solve complex public policy challenges. The utilization of disparate data conflated into a repository can be viewed as an evolution from historical analysis towards a predictive analysis. Recognizing specific patterns allow decision makers to set strategic goals for future initiatives. Government entities within a governance framework must embrace data analysis as a tool to affect present and future initiatives.

Program evaluation, resource utilization management, policy, and fraud detection are among the functional business areas enhanced and continuously monitored by analytics which are conducted at all junctures of the service delivery network. Open government data portals require effective information governance, privacy,

confidentiality, and security protocols, as well as intuitive analytics and visualization tools to build public trust and confidence in the value of open data. The demands on government in the digital era require data management and business analytics professionals to take specific action to enhance their data and analytics architecture, environment, and approach in order to put data at the heart of the organization.

The volume, velocity, and variety generated by digitization of government require that technical professionals build the data management and analytics architecture to accommodate changing and varied data and analytics needs. Forward-minded government IT organizations will realize that their current rigid data architectures and the data silos that make end-to-end service delivery impossible will not scale to meet the needs of digital government.

State governments are continuing to collect and store a vast amount of data at increasing rates each year. States are evaluating and are still determining how to leverage big data technologies. In order to achieve a more comprehensive perspective on consumers of state services, there is a potential for applications of big data in cross-functional areas combining data sets across agencies and government programs. Evaluating the specific data streams in through a data analysis approach to discern how to use this information more deeply will enrich the State's understanding of critical issues.

IT Measurement | FY2019

State Data Centers

State agencies served	90
Batch jobs processed	1.10 Million +
Transactions processed	31 Million +
Online storage (Mainframe and Open Systems)	3.9 Petabytes
Offline tape storage	2.6 Petabytes
Yearly hours VMware cluster available for use	8,750
Service Center requests processed	Average 292 per month
Service Center incidents resolved	Average 201 per month

Statewide Network

Growth (Number of end sites connected)	1684
Types of circuits available	100+
Speeds of circuits available	T1-10G
Dedicated Internet Access (Cost per megabit)	$3.43/Mbps
Internet Capacity	10G
Internet availability	99.90%
Wide area network availability	99.90%
Wide area network average latency	36ms
Capitol Complex network availability	99.90%
Capitol Complex network average latency	<2ms
Average network device uptime	300 days

Statewide Telecommunications

Telephone lines	23,202
Voicemail services	6,108 Users
Grade of service for PBX/Centrex at P.01	99.99%
Toll free numbers	351
Toll free usage	11,917,983 minutes
Long distance usage processed	12,809,791 minutes
Audio/web conferencing accounts	493
Total number conference calls	46,268
Number of conferencing minutes	1,635,854
Telecommunications systems availability	99.99%

eGovernment

Service Launches	19
Mobile Application Downloads	71,606
Total E-Government Services	250
Social Media Impressions	409,951
National Awards	38
Online Transactions Processed	934,846
Funds Processed	$79,785,091.56

E-RATE

The Schools and Libraries Program (www.usac.org/sl) was established by Congress to help make advanced telecommunications affordable for the nation's kindergarten through grade 12 (K-12) schools and libraries. It provides discounts on the costs of eligible telecommunications services, Internet access, and internal connections ranging from 20% to 90%. Based on the percentage of students within the district eligible for the National School Lunch Program, the highest discounts go to the schools and libraries serving the most disadvantaged populations.

Historically, Mississippi receives on average approximately 1.4% of the national total annually from the program. During the 22 years of the E-Rate program, schools and libraries in Mississippi have been eligible to receive over $732 million dollars in credits. The following table reflects the amount committed to Mississippi by year.

Mississippi's E-Rate Funding	
2019*	$27,710,841.97
2018	$27,540,812.30
2017	$24,998,965.62
2016	$30,375,443.58
2015	$44,301,024.20
2014	$26,544,399.65
2013	$29,356,424.05
2012	$34,941,543.82
2011	$37,045,632.10
2010	$34,082,604.44
2009	$35,396,434.76
2008	$34,537,855.88
2007	$32,370,376.22
2006	$35,534,814.49
2005	$41,289,131.02
2004	$43,341,949.85
2003	$38,546,627.10
2002	$33,546,801.21
2001	$34,459,775.11
2000	$29,559,630.69
1999	$32,765,886.15
1998	$24,225,723.06
Total	$732,472,697.27

Source: http://www.e-ratecentral.com/us/stateInformation.asp?state=MS
**Some funding requests remain under review.*

MISSISSIPPI IT PLANNING CYCLE

The primary goal of the IT Planning Cycle is to improve the overall efficiency and effectiveness of information technology in state government. Investing scarce public resources in carefully selected IT projects offers significant benefits including improved service delivery to the citizens and business of Mississippi. While planning is a prerequisite to the budget process and necessary for the procurement of information technology and services, an information technology plan (IT Plan) is the single most important ingredient to the effective use of technology in an agency.

The IT Planning Cycle has four components: Strategic Planning, Legislative and Budget, Technology Events, and Strategic Publications. These components are not necessarily sequential in all aspects, but they are designed to overlap to assist state government in making wise technology investments.

Strategic Planning provides a method for determining how well technology is currently meeting the business needs of an agency and helps identify technology gaps that could improve agency performance and service. As stated in § 25-53-5(a) Mississippi Legislation requires all agencies of state government to submit an IT plan to the Mississippi Department of Information Technology Services (ITS) each year. The due date for submitted agency IT plans is September 1, which directly correlates to the agency budget submission in order to assist agencies in determining the resources needed for their technology initiatives. ITS provides a planning methodology to guide agencies through the planning process as well as staff to assist agencies through their IT plan development.

Once agency IT plans are received, ITS will formally review each agency IT plan, provide an analysis, and generate reports that are evaluated for possible statewide infrastructure impact and needs, opportunities for agency collaboration, potential volume purchases, IT training and education opportunities, and other technology focus areas. The information is also used to prepare the *State of Mississippi Strategic Master Plan for Information Technology*. This report is presented annually to the Governor and Legislature to advise them of the allocation of fiscal resources to best achieve statewide information resource management goals.

Funding for technology initiatives makes the **Legislative and Budget** component essential in the IT Planning Cycle. The Joint Legislative Budget Committee meets in September of each year to consider agency budget requests and state revenue estimates and budgets are approved the following April. Agencies are also required to submit a *Five Year Strategic Plan* in the first quarter of each fiscal year. Legislative leadership have tasked its members to develop ways to better integrate agency planning and performance information into the appropriations process. Agencies must align the *Five Year Strategic Plan* submitted with their budget request to the statewide strategic planning elements as close as possible to create a unified statewide strategic plan.

The **Technology Events** component includes research, communication, and collaboration that make it the vital link to all other components in the IT Planning Cycle. ITS utilizes partnerships with leading IT research and advisory firms, government technology organizations, and vendor relationships to identify, analyze, and track new technologies or products that could benefit state government. On a national level, ITS participates in technology organizations such as the National Association of Chief Information Officers (NASCIO), the National Association of State Technology Directors (NASTD), the Multi-State Information Sharing and Analysis Center (MS-ISAC) and subscribes to a leading knowledge broker, Gartner, Inc., to stay abreast of the latest advances in technology and to understand how other government entities are implementing them. In Mississippi, ITS serves with other state agency representatives

on the Advisory Board for the Mississippi Digital Government Summit, hosts strategic technology councils, and hosts several Security Council meetings throughout the year to share knowledge with other state government agencies, boards, and commissions.

The key deliverable of the IT Planning Cycle is the **Strategic Publications** component. Information gathered from agency IT Plans is used to assist ITS in developing the goals and strategies reflected in the *State of Mississippi Strategic Master Plan for Information Technology*, and the *Five Year Strategic Plan*. The technologies, architecture, and services that are developed and implemented from ITS' goals and strategies are described in the *Statewide Architecture and Technology Delivery Plan* and the *ITS Services Catalog*.

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