2018 | 2020
MISSISSIPPI
STRATEGIC MASTER PLAN FOR INFORMATION TECHNOLOGY
Message from the Executive Director ................................................................. 1
Purpose and Context .................................................................................................. 2
Investment Model for Enterprise Infrastructure ...................................................... 3
Statewide Strategic Goals Mapped to Architecture Principles ............................. 5
Current IT Outlay in Mississippi ........................................................................... 7
Strategic Master Plan for IT | Executive Summary ................................................ 8
Mississippi IT Goals & Strategies ........................................................................... 9
  Goal 1 .................................................................................................................. 9
    Provide, Protect, and Support Enterprise Technology Infrastructure Components to Enable the Effective and Efficient Use of Information Technology
  Goal 2 ............................................................................................................... 13
    Investigate, Develop, and Promote Enterprise Business and Technology Solutions to Maximize the Benefits of Shared Services ........................................... 13
  Goal 3 ............................................................................................................... 16
    Promote the Funding, Procurement, and Management of Information Technology as a Strategic Investment
  Goal 4 ............................................................................................................... 19
    Promote Statewide Sharing of Information Technology Between all State Agencies to Foster a Collaborative Approach to Innovation and Digital Transformation of Government
Mississippi IT at Work ............................................................................................ 23
  ms.gov .............................................................................................................. 23
  Mississippi Automated Registration Vehicle Information Network (MARVIN) .......... 24
  Truck Routing and Intelligent Permitting System .............................................. 25
  Unemployment Insurance (UI) Modernization ................................................... 26
Mississippi: The Future Vision ............................................................................... 28
  Artificial Intelligence ......................................................................................... 28
  Blockchain ...................................................................................................... 28
  Connected Workplace ....................................................................................... 29
  Conversational Platforms ................................................................................. 29
  Enhanced Citizen Access .................................................................................. 29
  IT as a Service .................................................................................................. 30
  Internet of Things (IoT) ................................................................................... 30
  Intelligent Things .............................................................................................. 30
  Multisourcing ................................................................................................... 31
  Social Media and Public Sector ........................................................................ 31
IT Measurement | FY2017 ....................................................................................... 33
Mississippi IT Planning Cycle ................................................................................ 35
ITS Contact Information ....................................................................................... 37
December 31, 2017

I am pleased to present the 2018 – 2020 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, in conjunction with needs of state agencies, with achievement oriented goals and strategies set to optimize information technology (IT) services for the State of Mississippi.

In the just released 2017 State CIO Survey, the National Association of State Chief Information Officers (NASCIO) has positioned Security and Risk Management as the number one priority of State CIOs. The report, A New Engine: Driving Innovation in State Technology highlights the widespread adoption of a cybersecurity strategic plan and framework in many states, a significant increase over a four-year period. Recognizing the criticality of the cybersecurity challenge, the Mississippi Legislature passed House Bill 999 (HB999) during the 2017 Regular Session, with Governor Bryant signing the bill into law. Codified as Section 25-53-201, Mississippi Code of 1972, the Enterprise Security Program provides for the coordinated oversight of the cybersecurity efforts across all state agencies, including cybersecurity systems, services, and the development of policies, standards and guidelines.

For Mississippi, the newly developed 2017 – 2018 Enterprise Security Plan documents our commitment to improving the State’s cybersecurity posture, integrating security into the business operations of supporting the Enterprise State Network and State Data Centers, operating solutions to reduce the cybersecurity risks of every agency and overseeing the enterprise-wide cybersecurity effort. However, essential to the advancement of the cybersecurity effort across all areas of state government is the full engagement of all stakeholders, each understanding the current and future goals for protecting the State’s IT assets, possessing confidence in the enterprise cybersecurity policies and plans, and performing their role in the enterprise security effort.

Given its current course, cybersecurity risk in state governments is unlikely to diminish, and will likely grow, largely as a result of the increase in innovation and use of technology and data. Together, we must continue the work of providing concrete, strategic solutions to diminish cybersecurity risks.

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 2018-2020 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 strategies and goals 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 driving towards and delivering the most efficient and 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 2018-2020 State of Mississippi Strategic Master Plan for Information Technology should serve as a guide to government agencies in not only selecting technology that supports their existing business operations but also fostering innovation into the digital transformation of government services.

The development of Mississippi’s 2018-2020 goals and strategies are guided by the following technology leadership principles:

- Delivering 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
- 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

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.
- 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

The Strategic Master Plan does not replace the business-oriented plans of individual state agencies. As a companion planning document, it assists agencies in aligning their use of technology with the direction established for the state’s IT enterprise. Technologies highlighted in this plan can be used by all state agencies regardless of their mission or complexity.

**INVESTMENT MODEL FOR ENTERPRISE 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 enterprise statewide shared infrastructure and architecture.

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

*Mississippi Statewide Architecture and Infrastructure Plan* outlines eight guiding principles that guide technology investments. These principles provide the rationale for adherence, serve as starting points for difficult evaluations and decisions, and guide the design and selection of shared technology components.

**THE DEVELOPMENT OF THE STATEWIDE ARCHITECTURE AND TECHNOLOGY INFRASTRUCTURE PLAN IS GUIDED BY EIGHT ARCHITECTURE PRINCIPLES.**
<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>RATIONALE</th>
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<tbody>
<tr>
<td><strong>Business Drives Information Technology</strong></td>
<td>• Align and optimize IT resources with changing needs of state entities and local governing authorities.</td>
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<td></td>
<td>• Enable the effective implementation of state business strategies.</td>
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<td></td>
<td>• Highlight and promote the value of IT to executives and policy makers.</td>
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<td><strong>Statewide Enterprise Focus</strong></td>
<td>• Reduce implementation and support costs through a consistent enterprise-wide approach to IT solutions.</td>
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<td></td>
<td>• Consolidate or integrate existing systems and technical infrastructure.</td>
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<td>• Provide the IT foundation to support the business processes of state entities and local governing authorities.</td>
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<td><strong>Common Business Solutions</strong></td>
<td>• Reduce the number of duplicate technology solutions across the state.</td>
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<td>• Ensure interoperability by eliminating technology silos.</td>
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<td>• Share and re-use IT assets.</td>
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<td><strong>Secure Enterprise Information</strong></td>
<td>• Reduce the security risks of the state’s IT infrastructure and data.</td>
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<td>• Increase support for funding a functional, secure, and reliable infrastructure.</td>
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<td>• Improve delivery, efficiency, and accessibility of government services to the public.</td>
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<td><strong>Compliance with National and Statewide Standards</strong></td>
<td>• Support the statewide IT vision.</td>
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<td>• Align with national compliance standards.</td>
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<td>• Increase the consistency, accessibility, and sharing of data and applications.</td>
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<td><strong>Continuous Improvement</strong></td>
<td>• Ensure IT efforts support the state’s evolving business needs.</td>
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<td>• Leverage the advantages of new technologies while balancing investments in existing systems.</td>
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<td>• Respond to agency changes in technology and business requirements.</td>
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<td><strong>Minimize Technical Diversity</strong></td>
<td>• Reduce costs by eliminating redundant investments in technology.</td>
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<td>• Increase the consistency, accessibility, and sharing of data.</td>
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<td><strong>Business Continuity</strong></td>
<td>• Support the high-availability of services required for state and local governing authority missions.</td>
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<td>• Ensure a stable, long term, and viable technology environment.</td>
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<td>• Improve recoverability of critical government services after a disaster.</td>
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**STATEWIDE STRATEGIC GOALS MAPPED TO ARCHITECTURE PRINCIPLES**

The goals and strategies outlined in the *State of Mississippi Strategic Master Plan for Information Technology* provide direct foundational elements for the principles and architecture defined in the *Statewide Architecture and Infrastructure Plan*. The following table shows the relationship between the statewide architecture principles established in the *2017-2019 Statewide Architecture and Infrastructure Plan* and the state’s strategic goals provided in this document.

<table>
<thead>
<tr>
<th>Statewide Strategic Goal</th>
<th>Related Statewide Enterprise Architecture Principle(s)</th>
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| Provide, protect, and support enterprise technology infrastructure components to enable the effective and efficient use of information technology | ➢ Principle #4  
➢ Secure Enterprise Information  
➢ Principle #8  
➢ Business Continuity |
| Investigate, develop, and promote enterprise business and technology solutions to maximize the benefits of shared services | ➢ Principle #1  
➢ Business Drives Information Technology  
➢ Principle #3  
➢ Common Business Solutions |
| Promote the funding, procurement, and management of information technology as a strategic investment | ➢ Principle #2  
➢ Statewide Enterprise Focus  
➢ Principle #6  
➢ Continuous Improvement |
| Promote statewide sharing of information technology between all state agencies to foster a collaborative approach to the innovative and digital transformation of government | ➢ Principle #5  
➢ Compliance with National and Statewide Standards  
➢ Principle #7  
➢ Minimize Technical Diversity |
Infrastructure provides a statewide framework to achieve these principles and presents a vision of a flexible and innovative-shared services and technology infrastructure. The Investment Model is comprised of three layers:

- **The Statewide Infrastructure Layer** includes: Managed Service Delivery, which encompasses State Data Center services; communications technology services; ms.gov; and shared applications.

- **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.
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 the state agency 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 not expenditures but 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 telecommunication 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 enterprise email 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 ITS’ 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 Co-Processing Data Centers’ Technology Infrastructure Services

In recent years, many state IT organizations have seen a proliferation of redundant IT hardware and software resources implemented to address state agencies’ specific needs. This proliferation has resulted in state agency hardware and software infrastructures with independent operations and 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 can present a challenge for statewide disaster preparedness and response. Fully utilizing the investment in the State Data Centers is a critical step toward helping government build a more secure, agile, and cost-effective infrastructure for the delivery of government services.

Action:
- Investigate and implement a cloud-based Disaster Recovery solution for the Enterprise Virtual Environment or a dedicated Disaster Recovery collocated infrastructure to improve recovery times, reduce cost and provide opportunity for all agencies to directly subscribe to the service as deemed necessary in support of their program areas.
- Investigate and implement alternative storage strategies in the Enterprise Virtual Environment and Mainframe systems, potentially including pay-as-you-grow and hybrid solutions, to enhance service delivery and increase scalability.
- Provide planning and technical leadership to agencies in mission critical re-platforming and modernization initiatives, porting mainframe applications to a new environment, most commonly to UNIX and Wintel platforms.
- Implement and expand Storage Area Network (SAN) environments by upgrading SAN fabric switches and increasing online storage capacity.
- Expand Disaster Recovery Services to include options for direct subscription by non-covered agencies, while enhancing and reevaluating business continuity and disaster recovery processes.
- 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, expanding the Service Center to provide partner agencies with a single point of contact for system monitoring, ticket tracking, and 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
- Provide secure and accessible hosting services in support of the Mississippi Interactive (MSI) infrastructure to support the ms.gov state portal and associated applications
- Expand the usage of Linux on zSeries and Intel platforms, as well as migrate candidate applications to the Linux environment after completing appropriate analysis
- Continue and enhance the implementation of Windows and Unix applications on platforms that leverage standard virtualization technologies and tools
- Research, select, and implement toolsets to provide seamless web access to legacy data residing on any enterprise server
- Enhance and expand the use of enterprise performance monitoring software across all technology stacks
- Develop, maintain, and test disaster recovery and business continuity processes and procedures for critical enterprise state network infrastructure

**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 Greater 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 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 research network (MissiON).

**Action:**
- Manage the Statewide Multi-Protocol Label Switching (MPLS) data communications network and related contracts
- Manage and maintain the core data center network and metro area fiber 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 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 ITS managed, vendor-provided services to better utilize ITS Telecommunications resources and manage costs 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 billing reconciliations on telecommunications contracts to ensure correct billings by telecommunications vendors.
Strategy | Provide, Protect, and Support Enterprise Technology Infrastructure Components to Strengthen the Security Posture of the State

ITS is committed to the Enterprise Security Program for improving the State’s cybersecurity posture, integrating security into the business operations of supporting the Enterprise State Network and State Data Centers, operating solutions to reduce the cybersecurity risks of every agency, and overseeing the enterprise-wide cybersecurity effort. With the complexity of the enterprise and the challenges associated with securing an environment composed of decentralized agencies, enterprise oversight helps the State better understand the aggregate security maturity level of the individual agencies. A successful enterprise approach is dependent on active participation of agencies, government leaders, and policymakers. Cybersecurity must be communicated both at the enterprise level to these stakeholders, as well as internally within each stakeholder’s environment. The effort must be continuous, coordinated, and focused.

Action:

- Align the Enterprise Security Policy and overall information 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, the recommendations in the National Governor’s Association Call to Action for Cybersecurity paper, and the Center for Internet Security (CIS) Controls
- Develop and release an RFP for the acquisition of an enterprise security education and awareness training solution to be utilized by agencies for increasing the cybersecurity awareness of state employees
- Develop and release an RFP for the acquisition of comprehensive security and risk assessment services to investigate, identify, measure, and prioritize the potential risks that exist on the IT assets for the State of Mississippi
- Replace ITS’ existing virtual private network (VPN) solution by evaluating and awarding an RFP for the acquisition of a statewide (VPN) solution extending the state private network across a public network to both provide authorized users secure remote access to the state private network and facilitate secure access to remote third parties
- Secure support and funding for the acquisition and implementation of an enterprise perimeter defense solution to enhance the ability to protect the state’s assets against attacks by detecting and filtering unwanted software, malicious code, and traffic to malicious sites from user-initiated Internet traffic
- Research cloud security solutions, services, and architecture for gaining visibility into statewide cloud usage and risks, meeting compliance requirements, enforcing security policies, and detecting and responding to potential threats
- Evaluate network architecture to determine methods of joining cloud infrastructure to the Enterprise State Network without introducing undue risk
- Enhance and refine the tools and processes utilized to distribute detailed notification alerts of security incidents detected by the enterprise perimeter defense systems
- Research and consider developing an RFP for establishing a contract with a third party forensics firm to reduce the timeframe required to respond in the event of a major cybersecurity incident
- 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 via 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

2.2 Implement an Effective and Efficient Enterprise Email Service for State Government

In 2015, an enterprise hosted email solution was established for the state to provide the means of consolidating many agency-managed standalone systems to improve efficiencies, drive standardization, 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 and is also available to local government. 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 legal hold, as well as access to other enhanced hosted service offerings such as SharePoint, Skype, and the complete Office 365 suite.

Action:
- Continue to solicit 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 to continue day-to-day operations and the desired functionalities to improve productivity
- 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

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. Having a robust disaster recovery plan and enterprise backup solution are vital to meet recovery time and recovery point objectives to sustain accessibility to government resources in the event of a disaster.
Action:
- Create an improved comprehensive disaster recovery strategy tailored to meet the State’s requirements for recovery time and recovery point objectives
- Develop an enterprise disaster recovery solution through strategic partnerships
- Evaluate direct-to-cloud and hybrid backup solutions to safeguard state information
- 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

Investigate, Propose, and Implement an Effective and Efficient Enterprise Statewide 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 prominent in the value proposition. Many state governments, during the stress 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 – the need to procure, implement, and run dedicated infrastructure – to a more obtainable Operating Expense (OPEX) model – a pay-as-you-go shared service model. Maximizing the economies of scale in the cloud is a potent driver allowing agencies to avoid upfront infrastructure costs, with improved manageability and normalization of fluctuating and unpredictable resource demand. The rapid commoditization of computing resources has led to high growth in cloud services.

Action:
- Investigate the development of a hybrid cloud solution where the selected business partner owns and manages all technical aspects in the cloud to provide a low cost, general purpose, and virtual compute and storage environments via a self-service portal
- Leverage the State 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 partner agencies the ability to rapidly provision compute and storage needs via a self-service web interface
- 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 co-location 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

Implement statewide cloud service contract(s) for agency use

Develop a statewide cloud computing strategy and policy

**GOAL 3**

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

**Strategy**

*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 collaboration opportunities, whereby procurements are conducted to provide the state’s technology infrastructure, to facilitate the use of that infrastructure, and where multiple agencies can 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, and 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 sole source content and advertisements
  - Dynamic presentation of procurement status information
  - Publication of agendas and minutes for ITS Board meetings
  - Publication of procurement outcome/award information
- Continue to enhance and standardize best practices for RFP and sole source format, content, and proposal evaluation methodologies
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 which ensures that state agencies utilize innovative, smart-buying, investment techniques. With IT becoming a critical component of state government infrastructure, many states have focused on using IT to solve problems in government operations. However, choosing an IT application requires 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 Mississippi can leverage 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 government procurement clients for the acquisition of IT hardware, software, and services. An ongoing initiative is the continuous improvement of contract development and negotiation strategies and practices, and contract management strategies and practices, with the ultimate goal of strengthening the state’s contractual position with technology vendors for the mutually beneficial and 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
- 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

Strategic Action 3.4: Provide Innovative and Timely Information Technology Training to State Employees

ITS provides both self-paced, online training to Mississippi public entities via the Internet as well as more traditional classroom training. The online training is available to state agencies, county and local governments, public schools, community colleges, and institutions of higher learning. There are currently over 1,000 courses in technical, end-user, and professional development topics with new courses added quarterly. For classroom based training, ITS provides an ongoing program designed to enhance and improve the skills of state employees who develop or use information systems.

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 blueprints, often referred to as an Enterprise Architecture, and IT enterprise investments. A technology blueprint depicts the technology components
for a statewide IT system. 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, servers, vendor platforms, storage, help desks, applications, and networks to reduce initial purchase and ongoing maintenance costs, ensure better use of existing IT assets, and promote interoperability.
- 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.
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.

Provide guidance and assistance to agencies in developing business case analysis on strategic projects.

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

**Continued Emerging Technology Research and Strategic Private Sector Relationships**

ITS utilizes research capabilities and vendor relationships to keep pace with industry standard technologies. ITS monitors changes and future technology trends in the IT ecosystem to embrace advanced technology to service the government needs of the state. The continued research is used in conjunction with agency technology plans, emerging technology initiatives, participation in national organizations, and vendor relationships to build strategic technology roadmaps for the future.

**Action:**

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

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

ITS strives to provide effective outreach to state government entities, to improve communication with all partner agencies, and to provide resources to assist with technology products and services.

**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 audience and message
- Develop and ensure social media and the ITS website maintain a content strategy focused on the planning, creation, delivery, and governance of content
- Manage production of strategic publications such as the *Mississippi Strategic Master Plan for Information Technology*, *Statewide Architecture and Technology Infrastructure 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 2018-2020 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 the official website for the State of Mississippi and provides citizens with a central access point for interacting with state government. Citizens’ expectations of digital platforms have changed, and Mississippi has responded by bringing the interaction directly to users’ fingertips through the most recent redesign of the ms.gov website completed in June 2017. One-third of all visits to ms.gov come from a mobile device, and this ms.gov design ensures every user has the same experience across all platforms.

Recognized by the Center for Digital Government as having one of the best state websites in the country, placing top 10 in the Best of the Web Awards in 2012 and 2013, fourth in 2015, third in 2016, ms.gov placed fifth in 2017 at the Government Experience Awards.

Mississippi’s government experience delivered through ms.gov includes connected technologies like virtual reality, digital voice assistance, and a Chatbot. Important alerts and reminders are available to citizens through the enhanced Amazon Alexa Ask Mississippi skill. Ask Mississippi provides traffic alerts from the MS Department of Transportation and top local Mississippi news as well as many other inquiries such as “Alexa, ask Mississippi when my driver’s license expires,” “Hey Alexa, ask Mississippi, what is the phone number to the Department of Revenue,” and “Alexa, ask Mississippi for a state fact.”

The state of Mississippi’s first Artificial Conversational Chatbot, Missi, provides support for over 200 commonly searched inquiries, making government support available 24/7. Since the launch, Missi has helped answer over 2,100 questions, further improving the availability of ms.gov’s citizen support.

The new immersive virtual tour of the Mississippi State Capitol provides students, citizens, and visitors a look inside the historical building where they might never have the opportunity to visit. The augmented reality powered tour of the Mississippi State Capitol transports viewers directly inside the capitol with exclusive access to six historic areas. Users can access the Virtual Capitol Tour directly from ms.gov using a VR headset, mobile device, or computer.

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 $1.73 million.
The eGovernment partnership between MSI and the State of Mississippi, has garnered the creation of 207 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 nearly 200,000 individual downloads of native mobile apps, electronic revenue collected on behalf of the State in excess of $244 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 $7.6 million to date. Additionally this technology partnership has garnered numerous awards. Mississippi services provide through this program have been nationally recognized with forty-eight awards in the past seven years, including multiple AIVA Communicator Awards, dotcom Platinum Award, IMA Best in Class Award, Gold and Platinum Hermes Creative Awards, and multiple WMA Outstanding Achievement Awards. A full listing of Mississippi’s eGovernment awards can be found at ms.gov.

MISSISSIPPI AUTOMATED REGISTRATION VEHICLE INFORMATION NETWORK (MARVIN)

The Mississippi Department of Revenue (DOR), partnered with ITS to take advantage of the advanced capabilities of the State Data Centers to implement a new statewide vehicle registration system. The Mississippi Automated Registration Vehicle Information Network (MARVIN) is a state-of-the-art system whose functionality will benefit each county for vehicle registrations, revenue accounting, and audit monitoring capabilities. Vehicle owners will benefit from a quicker turn-around time for titles and improved customer service when registering their vehicles and renewing license plates. The new system provides Mississippi the ability to access and communicate with a nationwide system that helps prevent fraud and keeps unsafe vehicles off the road.
MARVIN replaced the legacy Title Network system originally built in the early 1980s, eliminating the dependence on antiquated technologies and limited technical resources to support the system. MARVIN utilizes modern technologies that support a service-oriented architecture with built-in redundancy. The system provides real-time processing and access to data. Information and transaction outputs are now available as soon as the transaction is completed. The new system has a data store with the ability to access statistical data and information, through ad hoc and standard reporting. The system communicates with business partners by providing a consistent method to interface and a consistent message format for exchanging data.

Since the implementation of MARVIN, agency resources (both staff and financial) have been reduced while performing specific functions that relate to registration and/or titles in a more expedient manner. Citizen services have greatly improved at both the county and state level for every individual registering a motor vehicle and/or manufactured home.

Each county is benefiting from the state-of-the-art functionality for vehicle registrations, renewals, revenue accounting, and audit and event monitoring capabilities. The county Tax Collectors utilize the system for issuing license plates to Mississippi vehicle owners.

TRUCK ROUTING AND INTELLIGENT PERMITTING SYSTEM

Mississippi Department of Transportation (MDOT) procured and is currently implementing an intelligent routing and permitting system in an effort to create an efficient means of obtaining over dimensional permits for the trucking industry. Additionally, this system, Express Pass, will promote safety and help protect the integrity of Mississippi’s roads and infrastructure. The current cumbersome, inaccurate, labor intensive, and outdated permitting systems must be replaced. MDOT’s goal is to provide 24 hour, up-to-date access to purchase permits with the most accurate routing available and the ability to notify customers if anything changes that could affect the route.
The new system will:

- Issue all permits in one system
- Issue violations, warrants, and fuel tax charges
- Collect and reconcile fees/accounts
- Deliver real-time information to customers and MDOT officers
- Allow customers to purchase permits, pay fines and taxes with credit cards, and manage accounts 24/7
- Offer Paperless permits
- Provide automated routing with all state maintained roadways and interstates
- For loads between 120,000-180,000 pounds, the system will use MDOT’s Load Rating Tool to automatically analyze the bridges on a route
- Interface to the Bridge Division systems so that personnel can monitor bridge crossings of permitted loads
- Pull highway restriction data from MDOT’s Advanced Traffic Management System
- Inform customers with re-routing notifications (if a road is closed or a bridge has a posting once permit has been issued)
- Integrate with MDOT’s accounting system
- Provide robust internal reporting

With Express Pass, the citizen and customer experience will be greatly improved. Not only will customers be able to purchase permits and manage their accounts 24 hours a day, they will also be able to enter their vehicle and load configuration, and select their desired route from three approved routing options provided by the system. They will be able to see the restrictions that prevent them from taking certain routes. All the permit data, including the price and permit expiration, is available at their fingertips.

While Mississippi is not the first state to use this system, MDOT is working with the vendor to customize Express Pass to meet the specific needs of Mississippi. First, the state is using Google Maps as a layer on top of MDOT’s Linear Referencing System. This provides an easy-to-use and familiar interface for customers who are trying to route their trucks. Additionally, the development of the Mobile Receipts system will allow the enforcement officers on the roadside to issue overweight violations and fuel tax charges. Once complete, both of these newly developed options will become available to other states.

Express Pass will decrease the number of permit requests serviced by the MDOT call center, which will reduce the call waiting time and allow personnel to efficiently research and issue special loads or routing issues. Express Pass will not automate the issuance of all over dimensional permits as some will require special routing, bridge reviews, and approvals by the agency.

**UNEMPLOYMENT INSURANCE (UI) MODERNIZATION**

The United States Department of Labor (USDOL) proposed that multiple states come together to form a consortium for joint Unemployment Insurance Modernization efforts. The States of Rhode Island and Maine expressed their commitment to partner with Mississippi in an Unemployment Insurance (UI) Modernization Consortium effort. This partnership is referred to as the Mississippi, Rhode Island, Maine Consortium (MRM Consortium). The MRM Consortium is utilizing the Mississippi base system as the core system to enhance, extend, and build-out a complete, sustainable model UI Information Technology System that will be available for shared and common operational use by any other interested United States jurisdiction in the future. The project schedule for
development, implementation, warranty, and post implementation support is estimated to take six years and six months.

This partnership, led by Mississippi, focused its efforts on devising ways to reduce long-term maintenance and support costs by sharing those costs, and at the same time paving the way for additional states to join the consortium. The Mississippi UI System is recognized as the only successful comprehensive reengineered UI system in the nation, and this project will be used as a means to enhance the Mississippi Department of Employment Security (MDES) unemployment system and overhaul other state UI systems. The MRM Consortium received a $90 million grant from the USDOL in 2012. Additional funding of $4.5 million was received in 2014 to be used for expanded staffing. Funding for this project is through the approval of grants from USDOL, and includes $11.5 million for each of the three states for specific development, and $60 million for core development.

Connecticut petitioned the Consortium in 2015 to partner, leveraging the MRM system which has its base in Mississippi’s ACCESS MS. After discussion, Mississippi agreed to partner with Connecticut and prepare Connecticut for on-boarding the Consortium. Over the past two years, the preparatory work has been underway, and in early 2018, Connecticut will join the Consortium.

During 2017, the Consortium was renamed ReEmployUSA which is consistent with the concept of unemployment insurance being a tool for the unemployed to utilize while they are working toward becoming re-employed. Each state, using the national brand ReEmployUSA will have its own branding of ReEmployMS, ReEmployRI, ReEmployME, and ReEmployCT.

The ReEmployUSA Consortium is using cloud infrastructure procured through the National Association of State Workforce Agencies (NASWA) - Information Technology Support Center (ITSC). The system is built on industry leading open standards platforms to provide a modular, efficient, and extendable design and segregation of code by the process and business functions. The system is a robust, scalable, repeatable, and consistent platform, with the ability to control multiple functionality requirements, to support online claims processing, adjudication, appeals and extensive tracking of all claims, fraud detection and prevention, tax registration, wage and tax reporting, audit, and content mastery.

Mississippi successfully deployed the first phase of the MRM Consortium system in May 2015, the second phase in June 2016, and the final phase in September 2017. Mississippi is now operating a fully reengineered, multi-tenant capable, cloud hosted unemployment insurance system. Maine is currently finalizing preparations to join Mississippi in the cloud environment. Maine’s second and final deployment will be the multi-tenant tax system and is scheduled to be deployed in the common cloud environment in August 2018. Rhode Island will deploy the full benefits and tax systems near the end of March 2019. Code merge for Connecticut is expected to begin in early 2018 with two deployments scheduled. The first will be benefits which is scheduled for early 2020 and then tax which is scheduled for early 2021.
Mississippi has recently engaged in formation of a new consortium with the states of Missouri, Wyoming, Rhode Island, and Connecticut. The goal of this consortium is to understand commonalities among the respective state systems that may allow the ReEmployUSA Consortium, the WyCAN Consortium, and the State of Missouri to leverage common support to the fullest extent possible. The common thread from these states is all have used the ACCESS MS, Mississippi’s original UI technology, as the heritage system for development. Application for funding this Consortium has been made to the USDOL through a recent grant opportunity.

**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; thus, the potential impact on the economy is enormous. It is still early in state government, but with the potential in the public sector, blockchain is one of the State’s innovative research priorities to, among other things, enable the deployment of cutting-edge information security technologies to outpace emerging threats.
Blockchain is a shared, global, incorruptible and therefore trusted ledger of economic 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, to property deeds and titles of ownership, educational certificates, financial accounts, medical procedures, insurance claims, to 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 across the state.

**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, mobile 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 multichannel 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
2017. 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. Cloud computing offers responsiveness, timeliness, and cost effectiveness. For public sector shared services, where typically there is already an internal cloud and a large existing user base, it makes sense to consider internal resources first, and the “as a service” catalog grow out of existing services that can be effectively and efficiently adapted to the cloud 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 definition of IoT architecture interoperability with various back-office processes of multiple entities that may have different levels of understanding about the impact of IoT data on their enterprise information architecture. 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, smart machines are a diverse combination of digital technologies that do what we once thought only people could do. While the list of smart machine capabilities is evolving rapidly, it already includes deep neural networks, autonomous vehicles (mining), virtual assistants (with services for specific users, such as knowledge workers), and smart advisors (visual battlefield reporting, customer service) that interact intelligently with people and other machines. Government IT leaders must explore smart machines 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. Intelligent things are either semiautonomous or fully autonomous. The word “autonomous,” when used to describe intelligent things, is subject to interpretation. When Gartner, Inc. uses this term to describe intelligent things, they do not mean that these intelligent things have Artificial Intelligence-style freedom from external human control or influence. 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 smart machines. The prediction is that intelligent things will 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 and 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.

- **Twitter** – 2,625 followers of the ms.gov Twitter account receive Mississippi news, alerts, and a constant flow of content designed to aid users in interacting with Mississippi government agencies.
- **Facebook** – ms.gov’s largest social media channel, with 3,150 followers responding to targeted posts, sponsored videos, and news from daily sources including the Department of Transportation, Department of Public Safety, Department of Wildlife, Fisheries & Parks, and the Department of Human Services to name a few.
- **Instagram** – with over 60% of Instagram’s users between the ages of 18 – 29, the ms.gov Instagram account was launched in 2015 to bring Mississippi’s younger audience additional awareness of ms.gov services.
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 fifth 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 smartphone market. In FY2017 ms.gov social media made over 403,000 citizen impressions.

**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 potentially an exploratory data analysis manner to discern how to use this information more deeply will enrich the state’s understanding of critical issues.
## IT Measurement | FY2017

### State Data Centers

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<tr>
<td>State agencies served</td>
<td>120</td>
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<tr>
<td>Batch jobs processed</td>
<td>1.52 Million +</td>
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<tr>
<td>Transactions processed</td>
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<td>Online storage (Mainframe and Open Systems)</td>
<td>3.6 Petabytes</td>
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<td>Offline tape storage</td>
<td>3.25 Petabytes</td>
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<td>Growth last year - Virtual servers</td>
<td>Increased by 1.12%</td>
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<td>Average 360 per month</td>
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<tr>
<td>Service Center incidents resolved</td>
<td>Average 221 per month</td>
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### Statewide Network

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<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth (Number of end sites connected)</td>
<td>2700+</td>
</tr>
<tr>
<td>Types of circuits available</td>
<td>100+</td>
</tr>
<tr>
<td>Speeds of circuits available</td>
<td>T1-10G</td>
</tr>
<tr>
<td>Internet (Cost per megabit)</td>
<td>$3.43/Mbps</td>
</tr>
<tr>
<td>Internet Capacity</td>
<td>18G</td>
</tr>
<tr>
<td>Internet availability</td>
<td>99.90%</td>
</tr>
<tr>
<td>Wide area network availability</td>
<td>99.90%</td>
</tr>
<tr>
<td>Wide area network average latency</td>
<td>36ms</td>
</tr>
<tr>
<td>Capitol Complex network availability</td>
<td>99.90%</td>
</tr>
<tr>
<td>Capitol Complex network average latency</td>
<td>&lt;2ms</td>
</tr>
<tr>
<td>Average network device uptime</td>
<td>314 days</td>
</tr>
</tbody>
</table>

### Statewide Telecommunications

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone lines</td>
<td>22,298</td>
</tr>
<tr>
<td>Voice mail services</td>
<td>5,841 Users</td>
</tr>
<tr>
<td>Centrex systems</td>
<td>71 Statewide</td>
</tr>
<tr>
<td>Grade of service for PBX/Centrex at P.01</td>
<td>99.99%</td>
</tr>
<tr>
<td>Toll free numbers</td>
<td>380</td>
</tr>
<tr>
<td>Toll free usage</td>
<td>12,415,040 minutes</td>
</tr>
<tr>
<td>Long distance usage processed</td>
<td>12,720,008 minutes</td>
</tr>
<tr>
<td>Audio/web conferencing accounts</td>
<td>449</td>
</tr>
<tr>
<td>Total number conference calls</td>
<td>47,880</td>
</tr>
<tr>
<td>Number of conferencing minutes</td>
<td>1,738,488</td>
</tr>
<tr>
<td>Telecommunications systems availability</td>
<td>99.99%</td>
</tr>
</tbody>
</table>

### E-Government

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Launches</td>
<td>22</td>
</tr>
<tr>
<td>Mobile Application Downloads</td>
<td>38,147</td>
</tr>
<tr>
<td>Total E-Government Services</td>
<td>27</td>
</tr>
<tr>
<td>Social Media Impressions</td>
<td>43,282</td>
</tr>
<tr>
<td>National Awards</td>
<td>6</td>
</tr>
<tr>
<td>Online Transactions Processed</td>
<td>631,478</td>
</tr>
<tr>
<td>Funds Processed</td>
<td>$464,472,145.47</td>
</tr>
</tbody>
</table>
**E-Rate**

The Schools and Libraries Program ([www.usac.org/sl](http://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%. The highest discounts go to the schools and libraries serving the most disadvantaged populations. The majority of E-Rate funds have gone to the most disadvantaged schools and libraries, where over 50% of the students in the district qualify for the National School Lunch Program.

During the 20 years of the E-Rate program, schools and libraries in Mississippi have been eligible to receive over $674 million dollars. The following table reflects the amount committed to Mississippi by year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017*</td>
<td>$20,844,055.73</td>
</tr>
<tr>
<td>2016</td>
<td>$31,607,952.30</td>
</tr>
<tr>
<td>2015</td>
<td>$44,604,061.46</td>
</tr>
<tr>
<td>2014</td>
<td>$26,544,399.65</td>
</tr>
<tr>
<td>2013</td>
<td>$29,356,424.05</td>
</tr>
<tr>
<td>2012</td>
<td>$34,941,543.82</td>
</tr>
<tr>
<td>2011</td>
<td>$37,045,632.10</td>
</tr>
<tr>
<td>2010</td>
<td>$34,082,604.44</td>
</tr>
<tr>
<td>2009</td>
<td>$35,396,434.76</td>
</tr>
<tr>
<td>2008</td>
<td>$34,537,855.88</td>
</tr>
<tr>
<td>2007</td>
<td>$32,370,376.22</td>
</tr>
<tr>
<td>2006</td>
<td>$35,027,195.88</td>
</tr>
<tr>
<td>2005</td>
<td>$41,289,131.02</td>
</tr>
<tr>
<td>2004</td>
<td>$43,341,949.85</td>
</tr>
<tr>
<td>2003</td>
<td>$38,546,627.10</td>
</tr>
<tr>
<td>2002</td>
<td>$33,546,801.21</td>
</tr>
<tr>
<td>2001</td>
<td>$34,459,775.11</td>
</tr>
<tr>
<td>2000</td>
<td>$29,559,630.69</td>
</tr>
<tr>
<td>1999</td>
<td>$32,765,886.15</td>
</tr>
<tr>
<td>1998</td>
<td>$24,225,723.06</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$674,094,060.48</strong></td>
</tr>
</tbody>
</table>


Note: 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 and provide analysis that is compiled into 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 to the Governor and Legislature annually to advise them concerning 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. In 2013, Legislative leadership tasked its members to reinvigorate performance budgeting in Mississippi by developing 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), and the Multi-State Information Sharing and Analysis Center (MS-ISAC) and
Mississippi Strategic Master Plan for Information Technology   |

subscribes to Gartner, Inc. - a leading knowledge broker, 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, annually hosts an ITS Users Forum, 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 as reflected in the 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 Technology Infrastructure and Architecture Plan and the ITS Services Catalog.

Mississippi IT Planning Cycle
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