



Transforming State Government

A Case Study in Collaboration

State of Ohio IT Optimization

Summer 2018

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A Message from the DAS Director and the State Chief Information Officer

The pace of technology-driven change continues to accelerate. The constant change presents significant opportunities to governmental entities to leverage this velocity and innovation to transform how things get done. This change is occurring in our personal lives, businesses, classrooms, in society, and in government.

In managing the use of technology in Ohio state government, we look ahead, but we also reflect on the path that led us to today.

Ohio's government agencies have made tremendous progress in recent years in their use of technology to streamline state operations and to provide enhanced services to our constituents.

The Digital States Survey, conducted by the independent Center for Digital Government, assesses each state's effectiveness in using technology. Ohio earned the highest grade possible in the 2016 survey along with four other states. These five states were identified as innovators and leaders in government IT.

Ohio consistently ranks first in the nation in the category of Enterprise Consolidation, Leadership, Innovation and Creativity – all of which was accomplished through our dedicated state IT community. This includes agency leadership, IT leadership, state workers, business partner community and the Kasich administration sharing a common, enterprise vision of making Ohio a great place to live, work, raise a family and operate a business.

The consolidation of the state's computing model validates an accomplishment that very few states have achieved, and the results speak for themselves. Agencies are now spending IT dollars on modernizing applications, solving business problems, reinventing decades old business practices and utilizing state data as an asset. Consolidation has not been an easy task and was enabled only through open communications, shared vision and driving the IT community to common standards. Cross agency collaboration is the secret ingredient of driving sustainable and meaningful change in governmental IT.

Looking ahead is always difficult, especially because technology is a rapidly changing environment. In developing our view of the future, we worked with technology leaders across the state and learned from other states, standards bodies and the private sector. Based upon the IT Optimization foundation, Ohio is poised for its next evolution of technology that includes migration to public/private cloud operating models; strengthening cybersecurity for Ohio's agencies, citizens, and businesses; leveraging a growing pool of data to support state decision makers and taking advantage of digital technologies to improve interactions between government agencies and our constituents.

Thank you all for the courage to think and do things differently and participating in Ohio's IT Optimization Journey! The measure of success for this effort was that we spend more time talking about how we work together and less time on why we cannot... and the results speak for themselves.

Sincerely,



Robert M. Blair
Director
Department of Administrative Services



Stuart R. Davis
State CIO/Assistant Director

Pre-Optimization Landscape

In 2011, the state's IT enterprise operated as a federated, decentralized IT environment, with 26 cabinet agencies and over 70 boards and commissions spending more than \$930 million annually with approximately 80% on infrastructure and operations (FY13). Given 21st century expectations of an increasingly digital and mobile connection with government services, this was not sustainable.

The state's IT portfolio contained more than 2,600 applications, 20% of them more than 10 years old and 54% more than 5 years old. An assessment of agency legacy systems determined that they were: more expensive to maintain due to obsolete tools and development languages; not ideally aligned with a digital constituent engagement model; unnecessarily fragmented and duplicative; and due to a retiring workforce, increasingly difficult to maintain and secure.

The state had more than 14 separate networks with more than \$54M annual contract spend. Many networks serviced the same facilities occupied by multiple agencies – these networks were overly complex, reliant on aging equipment, expensive to operate and maintain, and lacking the interoperability and robust security required to protect the state from intrusions. Each network “segment” represented not only duplicative cost, but a duplicative attack vector for intrusion and denial of service.

There were nearly 2,500 IT professionals supporting duplicative IT functions, with 32% of that workforce eligible for retirement at any time. The primary focus of these professionals was supporting the state's fragmented infrastructure, a complex patchwork of over 32 data centers, networks, servers, storage, security, and services.

Before Ohio began the optimization process, there were:

- ◆ 26 agencies, managing their IT environments differently, in over 32 data centers
- ◆ 26 different security postures
- ◆ 26 different backup, archive and disaster recovery approaches
- ◆ 26 different patch management methodologies
- ◆ 26 different approaches to running critical systems and applications – some on obsolete windows and unix operating platforms.
- ◆ More than 19 standalone email systems – it was impossible to send a single email to all state workers.

In short, the pre-optimized state IT environment was fragmented, duplicative and spending money on the “wrong things” – infrastructure and manual effort.

Driving a Consolidated IT Function for the State

IT Optimization was designed to drive transformational change to the way IT is utilized to enable business change and better support the needs of Ohioans. The goals of the state have been to create high-quality citizen and business experiences with state programs, support state employees with common and efficient enterprise solutions and provide secure and reliable information technology services. To achieve these goals, the state established the following elements of a program called IT Optimization.

Spend Reallocation and Reductions

- ◆ Targeted IT cost reductions
- ◆ Workforce reduction through retirement and attrition
- ◆ Cost avoidance by leveraging existing assets, services and investments and managing to industry standards

Revising the Focus of Information Technology

- ◆ Reposition spending on legacy systems modernization and consolidation
- ◆ Utilize modern business applications and services
- ◆ Harvest savings from consolidation of core infrastructure and operations
- ◆ Replace legacy applications and operating models with cloud, digital and mobile platforms

Driving Better Outcomes and Services

- ◆ Adopt standard policies, practices and procedures and remove bureaucracy
- ◆ Seek fewer disruptions in service, faster resolution times and better internal controls
- ◆ Introduce methodologies to drive better projects deliveries: COTS, cloud and Agile

Protecting State Assets and Data

- ◆ Reduce the number of devices, facilities, systems to patch and external access points
- ◆ Consolidate security functions and equip security professionals with the visibility and tools required to defend the state from malicious systems access and actors
- ◆ Build confidence that state is a trusted custodian of confidential and business data

Driving Scalability, Efficiency and Reliability through Enterprise Thinking

- ◆ Moving to a cloud architecture (both private and public)
- ◆ Leverage automation and tools to drive efficiency and transparency in IT operations, reduce error rates and enhance system availability

Migrating to Modern Application Development Platforms and Shared Solutions

- ◆ Positioning IT expertise from across the state to take advantage of opportunities and development
- ◆ Support agencies in the migration of legacy systems and processes to the cloud

Emphasizing Best Practices and Proven Industry Standards

- ◆ Adopting a standard set of industry best practices, leading tools and methodologies as well as modern innovation platforms to reimagine legacy state applications and services
- ◆ Performing comprehensive analysis to improve IT business decision making, procurement, and vendor management to drive positive outcomes for agencies via the application of technology

IT Optimization Highlights

Redirection and Reinvestment of Information Technology Spending: The state, via the IT Optimization program, focused on the centralization of core computing elements (servers, storage and network) to the State of Ohio Computer Center (SOCC). This achieved more than \$162M of reductions in state infrastructure spending. These reductions have originated from:

- ◆ Retirement/attrition of IT infrastructure workforce positions (2,459 to 1,896)
- ◆ Reductions in annual agency server hardware spending (\$40.2M to \$0.98M)
- ◆ Hardware repairs and maintenance (\$27.6M to \$3.3M)
- ◆ Backbone network optimization (\$54M to \$34.9M)
- ◆ Software (\$34.3M to \$27.1M)

The savings resulting from this effort have repositioned the state from spending less than 20% on new applications and services (i.e., 80% focused on infrastructure / operations in FY12) to more than 59% of spending focused on new systems and services (FY17) with an aspirational target goal of a 70%/30% systems/infrastructure spending ratio, driven by legacy modernization and digital citizen engagement.

IT Modernization: OIT manages more than 7,100 servers - all virtualized as a single, logical private cloud as a centralized service. As a result of virtualization in 2014-15 and consolidation to the state's private cloud, the state has driven: CPU utilization up by 336% - more than tripling efficiency; memory utilization up 97% - a doubling; virtualization up 333% - another tripling; and in FY2016, with the deployment of new hardware, another 77% of overall efficiency gains have been realized.

Creation of Essential Enterprise Services: The state has moved to enterprise platforms that serve all agencies from a common platform including: email, productivity and collaboration (Exchange, Office365 and SharePoint); enterprise document management (Hyland OnBase); time management (Kronos); Voice over IP (CBTS); service management (ServiceNow); centralized payment gateway (CBOSS); eSignature (OneSpan Sign); and endpoint and security management (McAfee and IBM respectively).

Initiation of Statewide Data Analytics Program: In the winter of 2017, the state issued an RFP to obtain data analytics expertise and platforms across fourteen domains that encapsulate and generalize the needs of Ohio's state agencies, boards and commissions across agency operational systems that maintain a wealth of data. Unlocking this data allows the state to identify and drive meaningful social change to make a difference for the citizens of Ohio — fixing communities, restoring hope to those most in need, identifying inefficiencies, creating jobs and economic growth, adjusting policies, and predicting and preparing for otherwise unexpected events.

Migration to Public Cloud-Based Platforms and Offerings: Ohio now maintains 72 applications in public cloud offerings, including Salesforce, ServiceNow, Office 365, Kronos and others. Ohio's move to the cloud allows the state to conceive and build systems much more rapidly and is an indicator of the future of systems development projects in the state. A foundation of cloud solutions, either on state premise or in the public cloud, has been firmly established to fuel innovation, digital outreach and application modernization.

Alignment of Focus and the IT Community

Organizing around State Lines of Business (LoBs): The Ohio Tech Board

DAS/OIT and agencies have implemented an organization structure designed to foster better collaboration and enterprise thinking. To accomplish this, the CIO aligned the agencies into five Lines of Business (LOBs). These LoBs, identified below, focus on IT investments impacting citizen- and business-facing applications while continuing IT Optimization to deliver cost-effective services.

The LoBs are organized by agencies that share similar opportunities and focus:

Health and Human Services	Business and Industry	Administration and Finance	Public Safety and Criminal Justice	Infrastructure and Environment
Aging; Developmental Disabilities; Mental Health and Addiction Services; Job and Family Services; Health; Medicaid; Opportunities for Ohioans with Disabilities; and Veterans Services	Bureau of Workers' Compensation; Commerce; Development Services; Public Utilities Commission; Industrial Commission; Insurance and Taxation; and Secretary of State*	Administrative Services; Auditor*; Budget and Management; Education; Higher Education; Legislative Information Systems*; Lottery; and Treasurer*	Adjutant General; Attorney General*; Public Defender*; Public Safety; Rehabilitation and Correction; Youth Services; and Inspector General	Agriculture; Natural Resources; Transportation; Environmental Protection Agency; Ohio Facilities Construction Commission; and Ohio Turnpike *voluntary participation

Ohio Technology Board

The Technology Board is chaired by the State CIO and consists of the five LoB chairs and OIT leadership. By working together, OIT and the five Lines of Business work to make efficient use of resources to deliver services faster, better and at a more effective cost to the state around three strategy pillars:

- 1 Create high-quality citizen and business experiences with state programs;
- 2 Support state employees with common and efficient enterprise solutions; and
- 3 Provide secure and reliable information technology services.

Agencies are aligned into Lines of Business and the Tech Board to:

- ◆ Drive increases in the level of adoption for enterprise shared solutions and services and new enterprise shared solution opportunities across agencies that share business and technical components.
- ◆ Help agency CIOs to leverage initiatives, resources, tools, infrastructure and solutions.
- ◆ Ensure alignment and adoption of state strategies, enterprise architecture and major expenditures, purchases and the direction and development of strategies for enterprise shared solutions.
- ◆ Support prioritization of agency initiatives and projects while facilitating discussions around solutions, roadmaps, budgetary matters and common goals across agencies.
- ◆ Create opportunities to share resources within/across lines of business while ensuring the creation of IT related standards, policies, architecture, procedures, and programs that are of importance to state agencies

Multi-Agency CIO Council (MAC)

Additionally, all agency CIOs participate in the Multi-Agency CIO Council (MAC). The MAC meets every six weeks to provide an opportunity for bidirectional communications on opportunities and challenges faced by the IT community.

The Tech Board, LoBs and MAC promote communications and collaboration around program and IT related issues across the state.

Supporting Informed Decision Making and Sound IT Policies

Smart and
Informed
Decision Making
Grounded in
Enterprise
Strategy

Enterprise IT Strategy

OIT aligns agency planning with enterprise strategy to facilitate agency identification and justification of planned IT projects. Evaluation and analysis for an enterprise planning portfolio is facilitated using the Decision Lens project prioritization tool.

In 2018 OIT refocused its Strategic Investment Management (SIM) group to leverage agency planning information to identify opportunities for shared services and collaboration opportunities between agencies and to identify value in potential technology standardization.

SIM inventories all applications within the state, inclusive of the underlying software titles, required infrastructure, and costs for each application. The SIM group is then charged with identifying opportunities for application rationalization and retirement through the analysis, triage, and rationalization of the state's more than 2,600 applications to reduce redundancy, save money and reduce the risk of maintaining obsolete and unsupported applications.

IT Research and Planning

OIT utilizes a variety of IT research and advisory services and makes them available to state IT personnel. Subscriptions are established with Skillsoft (Learning on Demand) and Gartner.

IT Research and Planning is not a formal organization within OIT but occurs under the Office of the CIO and Assistant Chief Technology Officer. The function drives the establishment of long-term strategies, identification and procurement of enterprise services as well as the direct support of specialized agency procurements and initiatives that are topical to the agency and relevant to the enterprise. This includes leading-edge initiatives such as blockchain, internet of things, enterprise service automation and APIs, systems development frameworks such as waterfall, Agile, scrum and other iterative methods.

Focus on
Standards and
Emerging
Trends

Technology
Enablement
through
Innovative
Policies

Enterprise IT Policy

Section 125.18 of the Ohio Revised Code provides DAS the authority to lead, oversee and direct state agency activities related to information technology development and use, including specific authority to establish policies and standards related to state agencies' acquisition and use of information technology. This authority includes hardware, software, technology services and security for all state agencies.

State policies, standards, procedures, and bulletins are regularly reviewed and modernized to remain contemporary with state needs and industry best practices.

Operating Information Technology as a Business

Infrastructure as an Enabler of Business

The State's Private Cloud has allowed agencies to focus on modernizing applications and business processes

State Data Center Remediation

FY12 and 13, OIT commissioned a series of facility and operating model updates to the State of Ohio Computer Center (SOCC) designed to:

- Utilize available space more efficiently, increase power from 4MW to 7MW with redundancy as well as cooling and power distribution capabilities of the facility.
- Remove power and space constraints that were in place prior to 2012 and allow the state to operate as a single computing enterprise in the facility for all server, storage, networking and security systems.
- Provide co-location service opportunity for local government and higher education entities.

State Private Cloud

The state's consolidation to its private cloud has driven significant savings in the cost of managing the distributed computing environment. Managing its hardware more efficiently, in a virtual shared environment has resulted in almost a 9x efficiency gain with less physical equipment to license, operate, patch, and maintain.

The state has reduced agency spending on hardware and associated maintenance by more than 90% and reduced IT infrastructure positions by 563 FTE. The migration to a virtual environment has driven software efficiencies in operating systems and tools.

2018 will see the final migrations of agencies to the state's private cloud and will bring this count to nearly 7,500 virtual machines. These servers operate in the state's private cloud, with more than 90% of them working as virtual machines on the latest supported operating systems and databases.

Computing Infrastructure Operating Improvements

State IT infrastructure investments are now based on the state's IT strategy. SOCC capabilities ensure that services are designed and operated in a robust, repeatable and commercially viable fashion. Improvements included:

- Governance that represents the entire enterprise that includes participation by agency constituencies and stakeholders;
- Willingness and discipline to standardize across the enterprise;
- Operational service level agreements designed to drive high levels of customer satisfaction;
- Resource commitment that meets strategic people, processes, technology and investment profile goals;
- An emphasis on protecting the privacy of state data through the implementation of strong data protection and security policies.

The state has moved to a high-performance private cloud. Consolidation has resulted in a modern process architecture that is supported by tools and consoles to drive high levels of availability, consistency, resiliency, and computing uptime as well as provide better protection and security from cyber threats.

Migrating to Cloud Technologies and Operating Models

Agencies have Embraced the State's Private Cloud

Secure,
Reliable,
Repeatable
and Cost-
Effective
Computing

Agencies that have consolidated to the state's private cloud have enjoyed ongoing infrastructure cost savings and rate reductions in every year of the program. Ohio's server, storage, networking, and mainframe rates are among the best in the country and a model for many states that are in early stages of planning or implementing consolidation efforts. As part of collaboration with customer agencies, OIT has established several core competencies designed to ensure that the service aligns with agency needs and is contemporary to the advances in the industry, including:

- ◆ **Service Strategy:** Service portfolio management; IT financial management; capacity, performance and availability management.
- ◆ **Service Design:** designed to harmonize service catalog management; IT service continuity management; information security management and robust supplier management capabilities.
- ◆ **Service Transition/Onboarding:** Transition planning and support; change management; infrastructure asset and configuration management; release and deployment management; service validation and testing; and knowledge management.
- ◆ **Service Operation:** supporting agencies through ITIL/ITSM driven processes for incident management; event management; request fulfillment; access management and robust service level agreements.
- ◆ **Reduced Rates:** Every year of the IT Optimization has resulted in reduced rates for core SOCC-based services as a result of economies of scale, more efficient operations, automation and volume purchases.
- ◆ **Virtualization:** In addition to driving security and software versions and patches consistently, agency server migrations allowed the state to push for a virtual environment, driving improvements of memory by 97%, CPU utilization over 330% and an increase of host to virtual machine (VM) ratio by 77%.

As a result of agency migrations, state servers have collapsed from nearly 9,000 spread across more than 32 data centers/computing closets to a cloud concentrated at the SOCC that serves as the life blood of state applications and services.

Networking and Colocation Services

Network Services

The State's Ohio Academic Research Network (OARnet) is leveraged as the state's backbone and Internet Service Provider (ISP) due to its ultra-high bandwidth (100 gigabit) and statewide pervasiveness.

Through Ohio One Network, the state is leveraging OARnet and consolidating its networking needs across all agencies, computing concentrations and locations.

Agencies now leverage OARnet at the closest point of presence (PoP) as the state's backbone and onward to the state's private cloud. Agencies can now compute, collaborate and better serve our citizens.

In addition, local governments, K-12 and higher education institutions are leveraging OARnet to migrate their production and disaster recovery functions to the SOCC, realizing IT savings in a similar fashion to what the state is enjoying through consolidation of IT infrastructure and operations.

Higher Education and Local Government Co-location Services:

The SOCC, on a square footage basis, is one of the top 10 government data centers by size in the country. The third floor of the SOCC has been upgraded and repurposed to facilitate co-location of local government and higher education computing functions.

OIT is leveraging the SOCC's wealth of space to support not only the state's consolidation, but also the consolidation needs of our education and local government communities.

Winning Collaborations:

- ◆ The state collaborated with The Ohio State University to locate OSU's computing functions on the third floor of the facility. This effort resulted in \$1M+ in annual operating savings to OSU as well as cost avoidance of more than \$40M in designing and constructing a new data center elsewhere on campus. OSU's move to the SOCC leveraged state expertise and methods and executed with no unplanned downtime or loss of data.
- ◆ The University of Cincinnati is one of many universities and counties that are leveraging the SOCC for disaster recovery services, and Cuyahoga County has relocated their production environments to the SOCC, as have the Ohio Supreme Court, the Auditor of State and the Ohio Legislative Information Services (LIS). The University of Cincinnati saved more than \$8M in cost avoidance and Cuyahoga County, an additional \$12M.
- ◆ Discussions continue with more than 60 institutions that comprise the Ohio higher education community to leverage the SOCC for primary computing or disaster recovery purposes. A robust pipeline of higher education, county and large municipalities as potential future customers of the service has been established for ongoing conversations and onboarding.

The collaborative use of state assets has been an extraordinary benefit to Ohio agencies, higher education and local governments

Legacy Modernization with a Cloud-Centric Strategy

Modernizing Decades-old Systems to Modern Cloud Architectures

Mainframe Consolidation and Closeout

Over FY12–17, the state aggressively consolidated mainframe computing and application support from five mainframes to a single mainframe located in the SOCC.

Agencies have replaced many applications that were developed more than 25 years ago to modern COTS or cloud-based applications that leverage the state’s private cloud and “as a Service” vendor offerings, as well as modernizing applications that leverage Infrastructure-, Platform- and Software- as a Service applications.

TAX, BWC, Commerce, ODOT and other agencies have dramatically reduced mainframe workloads as they modernize their applications. The state anticipates that this trend will continue; however, there are opportunities to partner with large county and municipalities as well as higher ed to address their ongoing mainframe workload needs. Cuyahoga County’s adoption of OIT mainframe services is a notable example of such opportunities.

Disaster Recovery and Business Continuity Support Services

Disaster Recovery as a Service

Mainframe disaster recovery (DR) tests continue to be successfully performed on an annual basis. In the most recent test, OIT was able to simulate a disaster and hand off the platform to the agencies to bring up their applications in under two hours from the simulated disaster event.

For the state private cloud and agency applications, the state has recently developed an innovative public sector “DR as a Service” capability to help ensure that the 1,600+ applications (of the total 2,600) identified by agencies to be critical to life, safety or business can be brought back on line quickly and that all servers and data are replicated to help protect our computing assets and resume state services as quickly as possible.

Support for the
resumption of
operations is a vital
statewide service

Voice over IP and Video Conferencing

Collaborating with Cloud Services

The state moved aggressively to retire analog/Centrex-based services for a modern voice over IP (VoIP) solution that both increased the capabilities of voice and video telephony while reducing the cost per handset for users across the state. As of June 2018, 50,000 phones are on the solution. The increase in volume has led to a decrease in cost dropping every year.

The state exceeds 2 million minutes of toll free calling and has more than 78 endpoints on the hosted video solution, which is used to connect remote and agency locations to save money and drive collaboration.

1,121 enhanced contact center agents use the solution. More than 100,000 pages of electronic faxing are enabled by the solution.

Ohio’s VoIP solution was the first in the world to include captioning on business phones for the hearing impaired and also includes solutions for visually impaired and mobility impaired workers.

Taking an Enterprise Approach to Platforms and Services

Ohio Administrative Knowledge System (OAKS)

The Ohio Administrative Knowledge System (OAKS) is the state's enterprise resource planning system integrating central government business functions, including human resources, procurement, budgeting, accounting and asset management.

The State of Ohio currently runs a broad scope of applications known as OAKS. Currently installed PeopleSoft modules include: Finance, Human Capital Management, and Enterprise Performance Management. The majority of support for these applications has been moved to a managed services contract to manage operational functions at market favorable rates, operating and service levels. The managed service arrangement includes a clear statement of work and prevents unplanned interruptions to state business.

Parts of OAKS have been disaggregated to cloud "as a Service" platform offerings, including learning management, time management and customer relationship management, with benefits to agencies that include better functionality and lower costs.

Ohio Benefits

As a result of Medicaid Expansion, the Ohio Benefits program and its Integrated Eligibility system have streamlined the state's eligibility criteria from 162 to 5, providing Medicaid benefits at launch to almost 1.8 million individuals in Ohio. Through the state's network of more than 83,000 active providers, Ohio Benefits makes coordinated, person-centered care available to residents in all regions of Ohio.

The foundation of the state's system modernization effort is a new integrated eligibility determination system that replaced the 30+ year old Client Registry Information System – Enhanced (CRISE) and other aging legacy systems that support the families that most need assistance.

In 2015 the state launched a cloud service-based evolution of the Medicaid Information Technology System (MITS), a sophisticated claims processing system, to boost efficiency and communications between the state and health care providers across Ohio communities.

To streamline health and human services program delivery, DAS collaborated with multiple state agencies and county leadership to launch the County Shared Services (CSS) program. The Enterprise Document Management System (EDMS) was added in 2017 followed by an interactive voice response (IVR) system in 2018. These systems converge to create the Ohio Benefits Enterprise Contact Center (ECC), allowing Ohio counties to collaborate across county lines to provide improved services to Ohioans. The ECC includes virtualized contact centers across agency and geographical locations and provides clients with multi-channel interactions so there is "no wrong door" to contact.

Ohio Geographically Referenced Information Program (OGRIP)

OGRIP consists of a Governor-appointed council and is the geographic information system (GIS) coordinating body for state and local government. The OGRIP Forum is made up of volunteers who share in the development of GIS information in Ohio including the creation of digital geographic data, access and use in a variety of contexts and applications statewide. The statewide imagery is provided to all 88 counties and made available for download or through web map services to government entities and the public at no cost. The Location Based Response System (LBRS) a partnership between state and county government to create spatially accurate street centerlines with address ranges verified at site-specific address locations. GEOOhio is an open data portal that provides access to geospatial data and are made available to the public for download and have no use restrictions. The Ohio Spatial Data Infrastructure (OSDI) consists of framework data themes that align with the National Spatial Data

Infrastructure. As OSDI data sets are developed, they are made available through the OSDI downloads site and the Map and Data Services site.

Creation of Essential Core Services

Productivity and Collaboration

Office 365 and Hosted Exchange

Prior to IT Optimization, the state operated more than 19 autonomous email systems from a variety of vendors. In FY 2012, the state began the consolidation of all state email systems to utilize Office 365 ProPlus.

This service includes Outlook, Word, Excel, PowerPoint, Publisher, Skype for Business, OneNote, SharePoint, and OneDrive to provide customers the ability to use email, productivity, instant messaging, online meetings and web conferencing, and file storage all from the cloud. Customers access services virtually anytime and from anywhere.

By FY 2015, more than 70,000 state email boxes were migrated to the enterprise service.

Enabling the
State Worker

Hosted SharePoint

Driving Collaboration and Sharing

DAS collaborated with the Department of Medicaid (ODM) to migrate their current SharePoint 2013 environment to the new SharePoint 2016 and establish a foundation for the state enterprise for future SharePoint-based service offerings.

This foundation provides the state access to a variety of new benefits:

- ◆ **Single Sign-on** - Networked and VPN users logging in with their OAKS ID won't have to separately log into the new SharePoint environment;
- ◆ **Secure Collaboration** - The upgraded SharePoint service provides agencies, boards, and commissions the ability to better control and lock down information they need to ensure data stays "within the walls" of the agency;
- ◆ **Access to Latest and Greatest Technology** - The new upgraded SharePoint service is architected and governed to ensure that it can be upgraded to newer versions of SharePoint;
- ◆ **Improved Search Experience** - Users will be able to execute a search in Office 365 and see documents and sites in SharePoint Online, as well as sites and documents across all the SharePoint sites within the SharePoint service;
- ◆ **Centralized Support and Management** - OIT's vendor provides all administrative and maintenance functions to support SharePoint, functions governed by defined SLAs. With these in place, users can focus on providing collaborative solutions with SharePoint and related technologies without the worry of the mechanics of the solution;
- ◆ **Improved Reporting, Training and Governance** - Custom reports that can include usage, deprecated sites, user permissions, governance issues, etc. are included in the service training site to keep users up-to-date on changes to the service, what other agencies are doing in SharePoint, site tips and tricks, and more.

Enterprise Document Management System

In 2014, OIT identified a variety of statewide requirements for a standardized imaging/workflow/integration platform that are specific or related to the business needs of the state and aligned with the missions of each agency, board and commission.

OIT began a project in support of the DAS Human Resources Division to address needs for personnel file management and to serve as the basis for ongoing standardization for other systems requirements as an extensible enterprise platform that is “image source” and “target system” integration agnostic.

The enterprise solution implemented was based on Hyland OnBase is flexible and extensible to address high volume imaging, transaction processing, storage, retrieval, and integration requirements of any agency in the state.

The solution was extended by ODM and ODJFS to support county-level requirements that allows the state to leverage existing investments and deployments in scanning technology and services, workflow, document management, storage, networks, and open systems based on modern APIs and integration format capabilities. This extension also serves to reduce the enterprise rate associated with these services due to the increased volume.

Going Green
while Saving
Money and
Time

Digital Engagement

Enterprise
Services
Based on
Common
Standards

Enterprise ePayment Gateway

In 2017, the state obtained an electronic payment processing gateway service (ePayment) to process Automated Clearing House (ACH), credit card and other payment transactions and support on-line bill presentment in support of state agency systems and processes. The ePayment service processes payments on various platforms (web, mobile devices, interactive voice response, etc.) and is offered as an enterprise service that will provide each agency with the technology to facilitate and process payment for services by state customers.

Enterprise eSignature Service

In 2018, the state secured a vendor to provide an enterprise eSignature solution that is specific to the business needs of the state and aligned with the missions of each agency, board and commission. This platform includes interaction within and across state agencies as well as with the general public in a variety of routine and private or personal transactions. At a high level, eSignature processes include: providing access to the electronic signature capability for all participants involved in the business process, authenticating the participants involved in the business process, presenting the documents for review and signatures, establishing intent through a signature process and capturing the signature and allowing signers to upload supporting documents, and finally delivering the completed documents to all participants.

Protecting State Data and Assets

DAS is charged with the protection of our state assets, including data, systems, applications, citizens, businesses and employees. Security defenses are mandatory in IT operations due to literally millions of cyber threats and attempts to which state systems and networks are exposed on a daily basis. State applications and systems present a prime target for malicious actors, and our defenses must outpace their efforts. Ohio has a dedicated staff focused on cybersecurity governance, operations, and compliance. They are driving a layered and standards-based approach to Ohio's cybersecurity efforts and maintain a comprehensive and coordinated defense, reaction and resolution capability that operates every day, 24x7x365.

In the FY 2014-2015 biennium, Ohio centralized both the security organization as well as operational monitoring of the state's most vital computing assets. This centralization allows consistent training on process and procedures before assign security personnel to an agency. The state continues to bolster the security of its systems, data and the identities of the citizens, business entities and state workers through the establishment of proofed identities, multi-factor authentication, data encryption and robust data handling and privacy measures.

Approaches and enterprise solutions to raise our statewide cyber profile include:

Standards

- ◆ National Institute Standards in Technology (NIST) 800-53 security standards.
- ◆ Security Information and Event Management (SIEM) to aggregate security logs and correlate events to identify security threats at an enterprise level.
- ◆ Unified identity and access management to both drive digital constituent engagement and adopt the highest standards of credential management in the public sector.
- ◆ Domain-based Message Authentication, Reporting and Conformance (DMARC).

Protection

- ◆ Vulnerability management scans more than 100,000 endpoints to identify vulnerabilities and help contain risk on state endpoints and cloud computing environments.
- ◆ A Cloud Access Security Broker (CASB) controls the use of sensitive information in the state's cloud storage solutions. This prevents social security numbers and other sensitive data from being uploaded to unsecure sites.
- ◆ Web filtering protects state users from connecting to websites which may contain ransomware, and malicious content.
- ◆ Intrusion detection systems monitor the state network for suspicious network activity.
- ◆ File system and database encryption protects the confidentiality of sensitive data in our file systems and databases.
- ◆ Mobile device management safeguards smart phones and tablets used for state business.

Response & Oversight

- ◆ Penetration testing services on our systems validate security controls and identify gaps and remediate these gaps for internet-facing systems.

Cyber Testing, Remediation and Risk Management

Security
Is the
Number
One
Issue
Facing
Public
Sector
Entities

Cyber Testing, Remediation and Risk Assessments

The Office of Information Security and Privacy (OISP) has established a variety of cyber testing and remediation contracts and tools to perform penetration testing, remediation, active threat response/remediation services.

Assessing security risks using the NIST cybersecurity framework is central to the state's capabilities. OISP routinely performs an objective risk-based assessment of agency strengths, challenges, opportunities and direction to protect the state enterprise from cyber threats and to provide fit/gap analyses to identify strategies and implementation plans to enhance the state's capabilities in response to ongoing evolutions in the cyber-threats and responses.

Multiple state agencies have performed penetration tests and risk assessment projects with many more interested in the capabilities available via OISP.

Data is a State Asset

The Office of Information Security and Privacy and DAS Office of Legal Services have collaborated with multiple agencies to initiate the development of an enterprise data sharing agreement and operating protocol.

This agreement is designed for use between agencies that may choose to share data across agencies, contribute data to a project or participate as a co-sponsor or participant in a data analytics project and ensures protection of that data as required by applicable state and federal laws (e.g., HIPAA, FERPA, IRS1075, CJIS, PHI/PCI etc.).

OIT provides an "industry first" service to assist agencies in sourcing and loading data into the state's on-premise data analytics platform and to correlate multiple datasets and anonymize sensitive data in an encrypted/traceable manner as to facilitate confidential sharing of data within the state's data analytics processing platform located in the SOCC.

Identity and Access Management

Ohio ID and Ohio Digital Experience (ODX)

The protection of user identities, personal information and financial fraud origins and defenses are central to the state's digital strategy. The state has implemented core set of capabilities as an enterprise framework to allow individual citizens and businesses and state agencies to utilize secure, efficient, easy-to-use, and interoperable identity solutions to access state online services and applications in a manner that promotes confidence, privacy, choice, and innovation.

The state completed several agency projects, including Taxation's identity proofing, the Ohio Business Gateway (OBG), and the myOhio portal, to establish enterprise capabilities and services for state systems that maintain sensitive data as well as identity and financial fraud protection. Based on the merits of the state's approach, the National Institute for Standards and Technology (NIST) awarded the state a \$2.97M grant to defray enterprise costs associated with the effort.

Over the course of 2017-18, the state has implemented the Ohio Digital Experience (ODX) foundation as an enterprise platform of standard software, development toolkit, policies and implementation standards and has been successful in the deployment of multiple full-production systems that utilize the platform.

Protecting
Vital Login
and
Password
Information

Cloud First

In 2012, the state established an aggressive strategy to begin the migration to the public/private cloud. This strategy had three key goals:

Goal #1: “Cloud first” is a state standard, not a guideline. By the end of FY 2020, 100% of all new state IT workloads that can run in the public/private cloud will be created in the public/private cloud.

Goal #2: The state will shift the capital cost of buying data center equipment to operating costs of creating business processes in the cloud. By the end of FY 2023, the state will reduce investments in new data center equipment by 60% because agencies have shifted business workloads into the public cloud.

Goal #3: State applications will achieve maximum agility, scalability, and reliability by taking full advantage of cloud platforms. By the end of FY 2023, 30% of all state IT workloads currently running on a legacy server/IaaS model will instead be running as a PaaS or SaaS model.

Platform as a Service: Salesforce and Microsoft Dynamics

The state has developed and deployed a variety of public and internal use applications using the Salesforce platform and has recently commissioned a variety of development projects with go-live events during FY 2017-2018.

- ◆ A Salesforce center of excellence was established to support agencies in this process. Ohio’s Development Services Agency is the lead as DSA was the first agency to adopt the Salesforce platform. A Salesforce architect is also available for all agencies to leverage on their journey.
- ◆ In FY17, the state acquired a managed service and established a pool of pre-contracted vendors to assist state agencies in the development, deployment and ongoing operations and maintenance of Salesforce-based applications. Enterprise systems based on Salesforce include eLicensing, the Ohio Business Gateway and Enterprise Grants Management. In addition, more than two dozen agency-specific applications have been deployed on the Salesforce PaaS solution.
- ◆ In FY17, several state agencies leveraged the Microsoft Dynamics platform. This platform has proven highly robust in managing ERP requirements for agencies with specialized business models.

The OIT Enterprise Service Cloud Platform applications:

- ◆ Are provided high degrees of availability – agency customers and users will be able to use this service 24 hours a day, 7 days a week less any scheduled maintenance windows;
- ◆ Drive multi-application, multi-agency efficiency – via a delivery capability that requires fewer resources to meet the operational demands of the customer; and
- ◆ Drive common enterprise processes – across all agencies that utilize a common technology and process framework for complex and routine IT service requests, integration with enterprise and agency systems, management, operations and maintenance functions.

IT Service Management as a Service: ServiceNow

OIT offers an enterprise cloud-based IT Service Management (ITSM) platform based on ServiceNow, which provides user support through an automated service desk workflow application that provides flexibility and ease-of-use. The platform provides workflows aligning with Information Technology Infrastructure Library (ITIL) processes such as incident management, request fulfillment, problem management, change management and service catalog, allowing customers to manage their internal IT environments and processes and services they consume from OIT. Nineteen agencies currently leverage this platform with agency-specific content to monitor IT operations and services.

Transforming State Government

Ohio Data Analytics

In support of the statewide data analytics program, OIT has implemented a data sharing / analytics platform. This platform supports sharing of columnar, non-structured, spatial, textual, and other data structures for both internal (to the agency) analytics as well as cross-agency sharing of data and supports the use of data as part of broader policy- and business-driven uses of data – a key state asset. As part of the initiative, OIT has established:

- ◆ Both SOCC based private and public cloud compute and storage for analytical projects to take advantage of a hybrid cloud/on-premise strategy;
- ◆ A periodically refreshed pool of pre-qualified firms (70+ as of May 2018) with expertise in data analytics and machine learning across 14 functional domains via competitive sourcing;
- ◆ A highly secured hosted analytics platform inside the state data center, featuring industry leading tools for secure data sharing and analytical workloads; and
- ◆ Visual analytics and interactive dashboards through an enterprise service based on Tableau software, tools, and a hybrid data platform, including data staging and curation as well as scope and data anonymization and protection services.

OIT partners with agency sponsors, subject matter experts, and policy experts to perform research into past projects as well as to develop solicitation documents for agency approval and to support data analytics projects from a technical and program perspective.

Artificial Intelligence (AI) and Robotic Process Automation (RPA)

OIT launched an Ohio Benefits Process Automation pilot project with Hamilton County Job and Family Services (HCJFS) to automate processes performed by HCJFS case workers. This project expedited the addition of newborns to their mothers' Medicaid cases and automated Social Security interface alerts that counties must address. DAS, along with HCJFS and the Ohio Job and Family Services Directors' Association, are exploring options for statewide implementation so all counties may benefit from this process automation.

Interactive Voice Response is driving a more citizen-centric model with self-service capabilities, empowering citizens to actively manage Medicaid, SNAP, and TANF cases. Currently, 50 counties utilize the County Shared Services (CSS) platform, representing 70% of Ohioans, with 75 counties committed to participating in the initiative. County collaboration is focused on improving operations, deliver a common client experience, and one-touch processing. CSS answers over 50,000 calls a month and has a 67% success rate for Medicaid and 41% success rate for SNAP in addressing issues. Enhancements are focused on the support of citizens' real-time access to case data and inbound/outbound reminders of Medicaid renewals and discontinuances.

OAKS is leveraging RPA to monitor operational status, saving 520 hours per year and allowing staff to focus on other high priority issues.

DAS OIT is leveraging artificial intelligence in its Customer Service Center through the IBM Watson tool. Watson's cognitive abilities now perform the email ticket analysis and assignment. OIT conducted a proof-of-concept in which Watson reviewed months of tickets to learn how to automatically assign tickets to the appropriate group. Watson successfully processed approximately 500 tickets with more than 96% accuracy. Watson is processing an average of 8,000 tickets per month using an API connection, saving at least 30 hours of labor a business day and enabling analysts to focus on value-added work. Watson is being considered for other state needs.

Simplifying
Processes
with Modern
Systems

Ohio Business Gateway (OBG)

The OBG is an online destination where 750,000 business users submit transactions and payments for 23 different service areas. Last year, \$18B in state and municipal revenue flowed through the OBG via approximately 5.5M transactions. Multiple state agencies and 500+ local municipalities operate on the OBG.

In 2015, OIT commissioned a study to focus on the needs of the OBG’s two core constituent groups: business end-users and state agencies. We learned that end-users desire a more seamless user experience across service areas, easier navigation, and modern features found on best-in-class ecommerce sites (i.e., improved user interface, responsive web, shopping cart, payment, and account management). For state agencies, the study found a need for a more flexible architecture, enabling a “plug and play” model, and an expanded set of shared services.

In 2017, the OBG3.0 modernization project was initiated to address these needs and create a consolidated hub for business activities in the state with a strong focus on the end-user experience, while providing the flexibility to serve state agency partners in a more efficient way.

OBG3.0 is designed to implement a clear customer journey for starting, managing, and growing a business; establishing a unified front-end OBG experience across agencies and partners; decreasing the amount of time business users spend on compliance with the state; and extend value-additive tools and information to businesses operating in the state. OBG3.0 went live on July 2, 2018, allowing 225,000 users to access, file and pay tax liabilities reaching nearly \$4B in the first six weeks.

Going Paperless through Digital Processes

Enterprise
Services
Based on
Common
Standards

Paperless Government

There are over 66 million paper transactions that require a signature and more than 1.3 billion pages printed by the state (printer, photocopier and high speed) that present an opportunity to both save money in printing, mailing, processing and storing paper.

Statewide, more than 1,881 processes report high annual transaction volumes, including more than 200 million electronic transactions and more than 90 million paper transactions. This amounts to more than 290 million transactions that lend themselves to a “digital engagement” approach to eliminating paper and better serving constituents.

Over the past eight years, both the private and public sectors have seen a dramatic drop in printing and mailing as customers have increased their expectation of digital engagement and consumption of information, mailings, statements, and notices. Ohio is in a unique position to eliminate print and mail in lieu of a solution that is delivered digitally and supported transactionally. Implementing these transactions electronically will require language changes in the Ohio Revised Code.

IP Enabled Public Safety for a 21st Century Digital Constituent

Public Safety/First Responder Network: MARCS

In 2014-2015 the state upgraded the Multi-Agency Radio Communications System (MARCS), its Land Mobile Radio System, to be P-25 compliant and focused outreach to local law enforcement, fire fighters and first responders to leverage this shared service. MARCS was extended into schools to provide vital linkages between school systems and first responders.

Next Generation Network: FirstNet

In 2017 Ohio elected to participate in the national FirstNet plan to deliver a wireless broadband network to the state's public safety community. FirstNet will bring advanced tools to help Ohio's first responders save lives and protect communities. FirstNet is a national network designed to transform the capabilities of public safety networks to provide a modern, digital and high-performance capability to first responders across the state and across the nation. FirstNet is a seamless, interoperable network to put cutting edge tools in the hands of those charged with securing and protecting the State. This initiative builds upon the state's existing commitment to emergency communications through MARCS, which has been the essential backbone for enabling the state's first responder communications for the past two decades.

Next Generation 9-1-1 (NG911)

In 2017 the state initiated a project to modernize its 9-1-1 capability to a Next Generation (NG) service. NG911 is an internet protocol (IP)- based 9-1-1 system that will replace the existing analog 9-1-1 infrastructure. NG911 allows 9-1-1 callers, through mobile and digital devices, to communicate with 9-1-1 call centers, also known as Public Safety Answering Points. This includes the ability to share richer data such as videos, images and texts. It also enhances the ability of 9-1-1 call centers to better communicate with each other and improves 9-1-1 system resiliency.

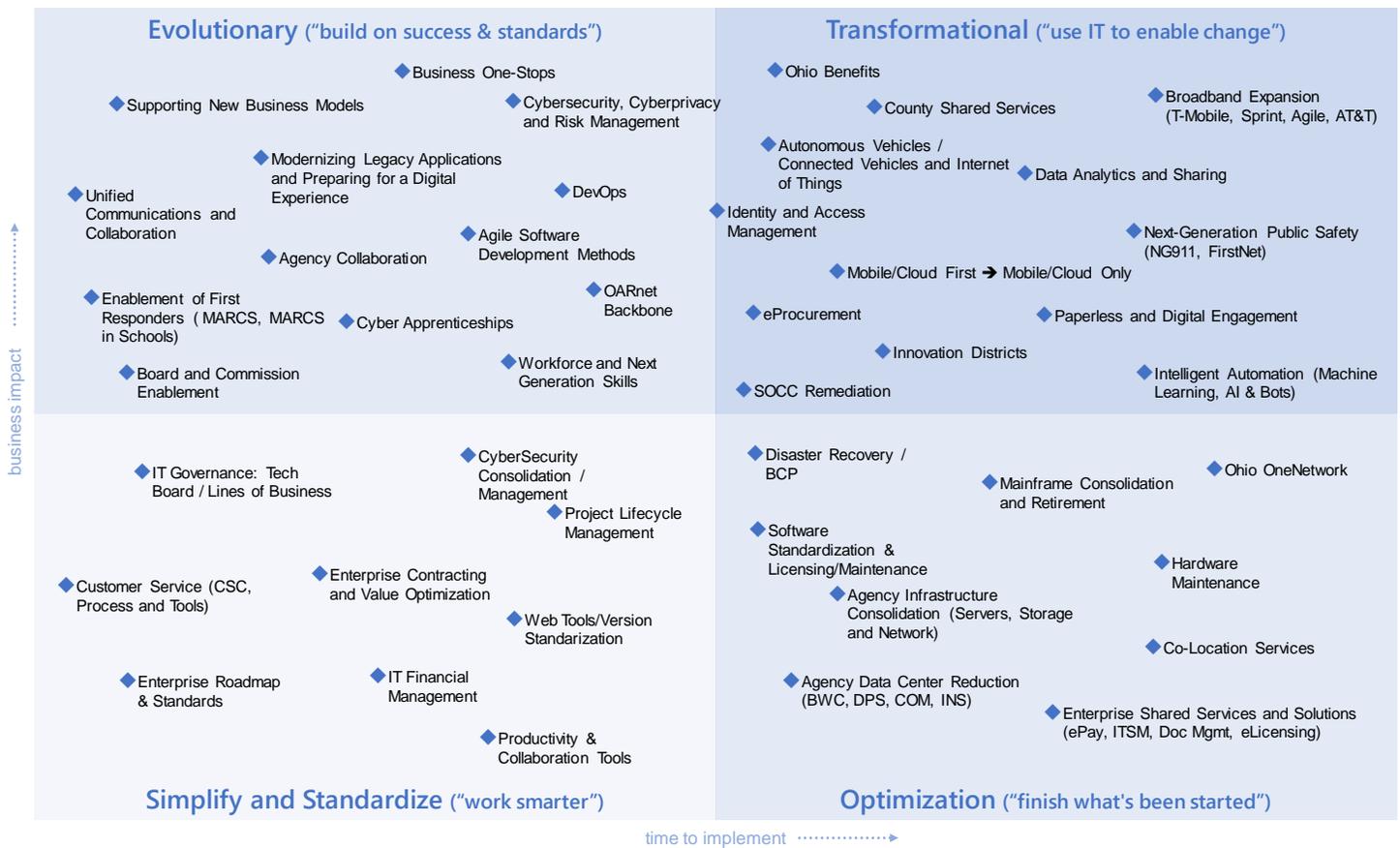
In Summary

IT Optimization has been a resounding success that included the collaboration of the entire state IT community. It is a multi-faceted initiative that included:

- ◆ **Simplification and standardization** of the state's IT operating model to work smarter and drive better decision-making;
- ◆ **Evolutionary** initiatives that leveraged collaboration across agency boundaries, governmental entities at the state, education and municipal level to build on the standards and successes of the program;
- ◆ **Optimizing** the delivery model of the state to not only drive standardization, but also to protect state assets and data and provide vital, mission-critical services to all participants; and
- ◆ Position the state for truly **transformational** initiatives that are designed to use IT to enable change in the way government does business and how it serves its constituents.

A "bird's eye view" of all of the initiatives discussed in this document, and the accomplishments of the state over the past eight years, highlights the depth and breadth of the IT Optimization program.

IT Optimization Program 2011-2018 – "Bird's Eye View"



The state is well positioned for its next step, which is a future that embraces new technologies such as the cloud, artificial intelligence, robotic process automation, internet of things and digital citizen engagement. Read more about these and other futures in the companion to this document entitled "**Ohio Enterprise IT Statement of Direction**" to be published in the early fall of 2018.