NASCIO 2019 **STATE IT**
RECOGNITION
AWARDS

Award Recipients

Title: JobNet – Road to the Future

Category: Business Process Innovations

State: Michigan

Sponsor: Tricia Foster, Director
Department of Technology, Management and Budget

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Project Initiation: January 2013

Project End: January 2017

JobNet has revolutionized core transportation-related business processes for MDOT and for partners at all levels, providing true value to Michigan citizens and all who travel within our state.

Executive Summary

The Michigan Department of Transportation (MDOT) was faced with a huge and multi-faceted challenge. MPINS (MPINS is "MAP Project Information System" and MAP equals "MDOT Architectural Project"), a critical tool central to the business processes for planning and programming jobs and projects accounting for billions of dollars in annual road and bridge work, had become increasingly inadequate, unwieldy, and expensive. It had not been significantly modernized in more than 20 years. MPINS was a main contributor to a database intricately bound to more than 40 other applications and any changes carried risk of downstream damage to the department's operations as a whole. Since the legacy tool was not web-based, access was limited and communication or collaboration with MDOT partners (including federal and local levels of government, metropolitan and regional transportation advisory groups) was severely restricted.

JobNet is transforming the way we do business. It introduces innovative, streamlined, and technically up-to-date functionality, including a dynamic Geographic Information System (GIS)-based map to locate jobs. Significant accomplishments include **allowing our local partners to directly participate in the job programming process, eliminating other IT systems, allowing data to be entered from the source, and eliminating errors associated with re-entry of data**. JobNet assists the transportation professionals at MDOT in making the best decisions possible, while optimizing limited funding and keeping Michigan's transportation system running smoothly. JobNet electronically facilitates the [Statewide Transportation Improvement Program](#) (STIP) required by federal agencies. At MDOT a project must be identified with a specific job number and programmed through JobNet in order to be considered for inclusion in the Five-Year Transportation Program. Jobs are scoped and precisely located in Michigan's Geographic Framework (MGF), attached to a typical process template, and provided with preliminary designations of state, local, and federal funding sources, to name a few. The creation of JobNet was a very complex project. Using a tailored variation of Lean Process Improvement (LPI), MDOT staff met over several years to understand and suggest improvements to the entire project scoping and design process. JobNet is a major contributor to a centralized database integrated with a very large number of other key MDOT applications, exponentially increasing project difficulty. The system interacts via interfaces and applications with the newly implemented financial tool, the Statewide Integrated Governmental Management Application (SIGMA).

With an in-house development cost of $5.5 million, this was **the largest IT project using an agile approach thus far at the State of Michigan** and is a model for future projects. Agile Scrum methodology involved the business staff throughout the project life-cycle, ensuring the system meets the business needs and allowing the business to re-prioritize throughout the project as initial functionality became available for testing. Collaboration among MDOT, DTMB, local and federal governments and advisory groups, was essential for project success. **More than just a software upgrade, JobNet has transformed and improved the business processes used by each of these entities.**

Former MDOT Director said, "In creating this complex, modern system, JobNet is an example of what superior vision, leadership, teamwork, and collaboration can lead to. This project supports all of MDOT's Values: Quality, Teamwork, Customer Orientation, Integrity, and Pride."

Concept

Replacing the MPINS legacy application, which was one of MDOT's cornerstone applications, was an immense undertaking. The replacement had impacts to all of the 40-plus underlying/related systems that rely on MDOT's corporate data. The JobNet web application is built using Java EE (Enterprise Edition) infrastructure with Enterprise Frameworks (Spring, Apache) and JavaBeans Open Source Software (JBOSS) Service Oriented Architecture (SOA) Enterprise Application Server. It utilizes technology such as business rules engine (Drools), Object Relational Mapping tools (Java Persistence API (JPA), Hibernate), GIS mapping (Esri), and document management (ProjectWise).

The goal for JobNet was not just to re-platform MPINS, but to accomplish a complete re-write into a modern web-based application with more efficiency, improved statewide connectivity and partnering. **Revisiting and improving business processes and including the needs of local governmental agencies and federal agencies were crucial to project objectives, along with accessibility and information security.** This was a major enhancement to the existing application and included making the STIP process electronic. The team had the vision for including an integrated GIS mapping with transportation asset data. A **comprehensive communication plan was developed and executed, in order to address all needs of internal and external stakeholders.**

MDOT dedicated full-time business experts (product owners) to this project who surveyed departments of transportation in all 49 other states to determine if any had an in-house or Commercial Off-The-Shelf (COTS) application similar to MPINS and that would meet the vision for the new application. When there were no promising leads, it was determined to build a system in-house. The product owners met with all business areas within MDOT, local governments, Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) to gather requirements. **Every business process related to managing scope, schedule, and budget of jobs, and creation, review, and approval of the STIP was reviewed and efficiencies recommended**. The JobNet project started in January 2013 with readiness, lean process improvement sessions, and initial requirements gathering. The in-house application development started in March 2014 and ended in January 2017 with a total cost of $5.5 million.

Significance

JobNet is one of MDOT's most widely used IT systems, being brought up to date in a phased manner to use current technology. Just as importantly, the implementation of JobNet represents a **significant modernization of business processes, which led to significantly improved government operations.**

MDOT and federal and local government personnel (including Metropolitan Planning Organizations (MPO) and Regional Planning Agencies (RPA)) use JobNet to manage scope, schedule, budget, and proposed funding for road, bridge, and multi-modal projects as well as the STIP. This web-based system enables both users in the field and executives in offices or at meetings to access the system using mobile devices. JobNet also provides data to facilitate obligation of funds in three other centralized and integrated applications. In July of 2018 the MDOT STIP was approved by federal agencies via JobNet. JobNet has automated the draft job

and change request approval process. For example, local jobs were previously entered in a two-step process in which local entities sent spreadsheets that MDOT staff used to enter the needed information. **Now locals enter their own information, increasing data integrity and accuracy, and shortening the overall timeline.** Previously, it could take up to two months and sometimes longer to process one amendment for one MPO. With JobNet, this amount of time is greatly shortened. JobNet also allows locals to view their jobs along the way to approval. This improves communication among MDOT and their partners in a very efficient and effective way. Resource reallocation enables cost avoidance and strategic assignment to tasks with more value added.

The JobNet team had the **innovative vision to move to a dynamic map interface to display project information along with transportation related asset features**. In order to do this the team employed standardized GIS map services that are built from MDOT data and ultimately serve as decision support tools which allow for the planning and programming of transportation jobs. The GIS map services are produced through a collaboration between the MDOT GIS Unit and the DTMB Center for Shared Solutions (CSS). These services can be used by other MDOT applications.

Communication and collaboration within the agency and especially with MDOT's business partners was greatly improved. JobNet facilitates the electronic STIP which is a federally mandated document and was approved by FHWA and FTA partners electronically via JobNet. Very few state DOTs currently have this capability. This part of the system was created in close partnership with local governments, FHWA, and FTA, to ensure all parties would receive benefit. As with other partners listed above, these federal business partners now can enter their own data in a shared repository, further eliminating chances for data errors. They are also able to view the data as it progresses through the system. JobNet considered the needs of various business areas across MDOT and local governments to add functionality that would support their business processes. This was a great collaboration between MDOT, DTMB, and local and federal government partners including MPOs, RPAs, FHWA, and FTA.

JobNet provides data to financial applications such as Phase Initiator (PI) to facilitate obligation of funds in SIGMA and the Financial Management Information System (FMIS). This allows MDOT and its partners to create reports and answer questions using data from many systems, increasing transparency, better decisions and improved confidence at all levels.

Project management and process innovations were tightly woven into the JobNet project. DTMB implemented this project using an Agile approach. This was a first for MDOT on a project of this magnitude. The development team used Scrum methodology including daily stand-ups, sprint planning, story board, backlog, and sprint retrospectives. Application demonstrations were shared as functionality became available. This allowed stakeholders to see the new functions and provide suggested changes to improve the application. As part of the re-write, extensive restructuring of MDOT's Planning database was made to improve efficiency and access.

JobNet aligns to Michigan gubernatorial priorities, policies and strategies.

NASCIO 2019 priorities supported by JobNet include:
- ✓ Fortifying security and lowering risk through MILogin, Michigan's single-sign-on tool, and the use of Michigan's Virtual Datacenter secure cloud services
- ✓ Strengthening the role of centralized data
- ✓ Using internet/cloud technologies to provide scalable capabilities as a service
- ✓ Centralizing, consolidating, and optimizing services, operations, and business processes
- ✓ Cross-agency collaboration and shared services between MDOT and DTMB
- ✓ Introducing statewide connectivity using internet and mobile-accessible technology
- ✓ Data management and analytics through data architecture restructuring improving efficiency and access
- ✓ Facilitating strategy and business intelligence through greatly-improved reporting
- ✓ Improving partnering and inter-jurisdictional collaboration among stakeholders at levels from local advisory groups and governments, to state agencies, and federal entities
- ✓ Enhancing customer relations and collaboration using Agile and incremental software delivery to provide iterative designs and solutions, allow for flexible and responsive modifications, and incorporate business-owner feedback as an ongoing and integral part of the development process.

Impact

The vision for JobNet was far larger than just to re-platform the legacy MPINS application. New functionality was introduced based on a hard-won in-depth understanding of previous business processes used by all stakeholders, and how they could be improved. Foundational business process improvements for delivering MDOT's transportation program were the basis for building a web-based application with more efficiency, improved statewide transparency, and better partnering with local and federal agencies. This was a major re-write of the previous application. Making the STIP and MPO Transportation Improvement Program (TIP) process electronic, streamlining and redistributing data entry, broadening access, restructuring storage, and eliminating redundancies, all contribute to a much-improved JobNet tool bearing little resemblance to its MPINS predecessor.

With a budget of $5.5 million, JobNet is the largest IT project using an Agile development approach thus far at the State of Michigan and there were many lessons learned that will be used in future development projects. In the course of development over 1,000 user stories were identified by product owners, resulting in 4,800 user story points. These were addressed by a technical team of 11 different developers, a business analyst, a tech writer, and a testing coordinator.

JobNet transforms business processes by introducing innovative, streamlined and technically up-to-date functionality, including a dynamic GIS-based map to locate jobs, and cloud-based internet-accessible mobile functionality. JobNet also replaces the manual process of the creation, review and approval of the STIP document by federal partners, FHWA and FTA. **Data can now be collected at the source, saving time and improving data accuracy and integrity by eliminating re-entry. Local partners directly participate in the job programming process using JobNet.** This includes staff members from all 14 metropolitan planning organizations, and all 22 of the regional planning agencies throughout Michigan. These local agencies can now enter their own jobs into

JobNet during the assembly and amendment phases of the TIP/STIP development. With the regional planners doing the initial programing, there is considerable time savings for MDOT staff. In turn, local partners gain a greater sense of ownership in the programming and tracking process. They also benefit from the improved transparency of seeing and monitoring their jobs at all points in the process, versus waiting for periodic reports. Data entry is put in the hands of the agency responsible for the implementation of the project, and which is the most knowledgeable regarding project details. This includes the corridor, project limits, work type, funding levels, funding source, project phase, and fiscal year. Regional planners can be more efficient because they are familiar with the jobs in their area and they will not have to communicate job information to MDOT for programing. Previously, miscommunication of job information often required extra time for verification of facts in the Excel e-files.

With MPINS, MDOT's Statewide Planning Section (SPS) was responsible for programming the MPO local projects. There are about 500 local projects a year and it took 30 minutes to program one job. This was mostly because looking up the Physical Roadway (PR) number, a reference used to pinpoint locations in the Michigan Geographic Framework, was very time consuming. Users usually had to use a PR table. A few limited users had license to use a very basic map tool as an add-on in the application, or they had to access PR Finder (a separate application) and search manually. Then if there were any changes to the project, MDOT's SPS was again responsible for making that change. A change to location or project boundaries is quite common and would require re-referencing one of the above labor-intensive tools. Regardless of type, there were many changes and it would take at least another 5-10 minutes to process each one. With JobNet, the MPOs are now responsible for programming their own projects and changes. It only takes 5-10 minutes to program a job in JobNet and finding the PR number is very efficient since it is done on an accurate interactive map with layers displaying existing assets for easy selection. MDOT is no longer responsible for programming these 500+ local projects from the start.

JobNet provides data to reporting applications that provide the most current information related to MDOT's transportation program. Since the JobNet Planning database houses more data in one system than ever before, the reporting options are extensive. The implementation of shared services provides consistency and reduces the cost of system maintenance. Reporting and data retrieval is another area where noteworthy time savings are being realized. The reports below are only three good examples of information that is now instantly available in the JobNet application, saving the amount time indicated:

- **Data extracts for MPO amendments** (100 hours/year): A full-time employee previously spent about 5% of their time writing Infomaker queries, Excel macros, and troubleshooting MPO TIP Excel documents whenever the equations/macros did not work.
- **Snapshot reports for all MPOs** (240 hours/year plus lengthy reviews): Snapshot reports compared what was on the database with the current Excel E-file TIP. The snapshot reports were produced 6 times a year with a laborious manual process. It took a week just

to run all the comparisons and compile them into one report. Then SPS would take these snapshot reports to all 14 MPOs and they would spend hours going over all the changes. Now MPOs can quickly and easily run their own snapshot reports without Infomaker or Excel macros or waiting for a report from SPS. The cost savings in the overall process for each MPO is quite substantial.

- **Financial constraint reports** (120 hours/year): Three times a year the largest MPO, the Southeast Michigan Council of Governments, does their amendment. Each time another week was spent preparing the financial constraint report for FHWA. JobNet now does it.

JobNet absorbed the functionalities from the Electronic-STIP (ESTIP) application and eliminated some redundant interfaces, making future maintenance more efficient. It used to take several programs to do what JobNet does. ESTIP to program a job (enter the information into the data base) and generate a job number; MPINS to review job information in the data base and edit it (through change requests) if necessary; Administrative Customizable Reporting System (ACRS) to review aggregate data and produce reports on various programs and to review which jobs have been programed into the database verifying any that need to be added to the S/TIP. MAP Financial Obligation System (MFOS) was used to obligate jobs but now Phase Initiator (PI), linked to JobNet, fulfills that function.

JobNet assists MDOT staff in making the best decisions possible, while optimizing limited funding, and keeping Michigan's transportation system running smoothly. The system automates federal approvals, manages and tracks approx. $10 billion in federal-aid and matching funds over a 5-year span, invested on trunkline, local road, bridge and other transportation asset projects, passenger transportation, freight and passenger rail projects. Mistakes and inaccuracies could put large sums of those dollars at risk; JobNet significantly safeguards against loss of this revenue.

The transition to JobNet has been very successful. When JobNet went live at the end of January in 2017, 3100 existing jobs were converted to the new system. Since then, 7,109 new jobs have been added, proving a smooth and productive tool. JobNet's expanded access for MDOT business partners is demonstrated by the number of users. There were 217 users in MPINS, mostly MDOT staff, who had ability to create or modify jobs. Today, there are nearly 1,000 users, including local and federal personnel, with ability to create or modify jobs in the JobNet application, plus many others with read-only access. System scalability ensures there is no practical limit.

Users were involved throughout the development process, resulting in exceptional system usability. This also minimized the amount of training required and led to a high degree of user satisfaction and engagement. A post-implementation survey showed 87% overall satisfaction and included positive comments.

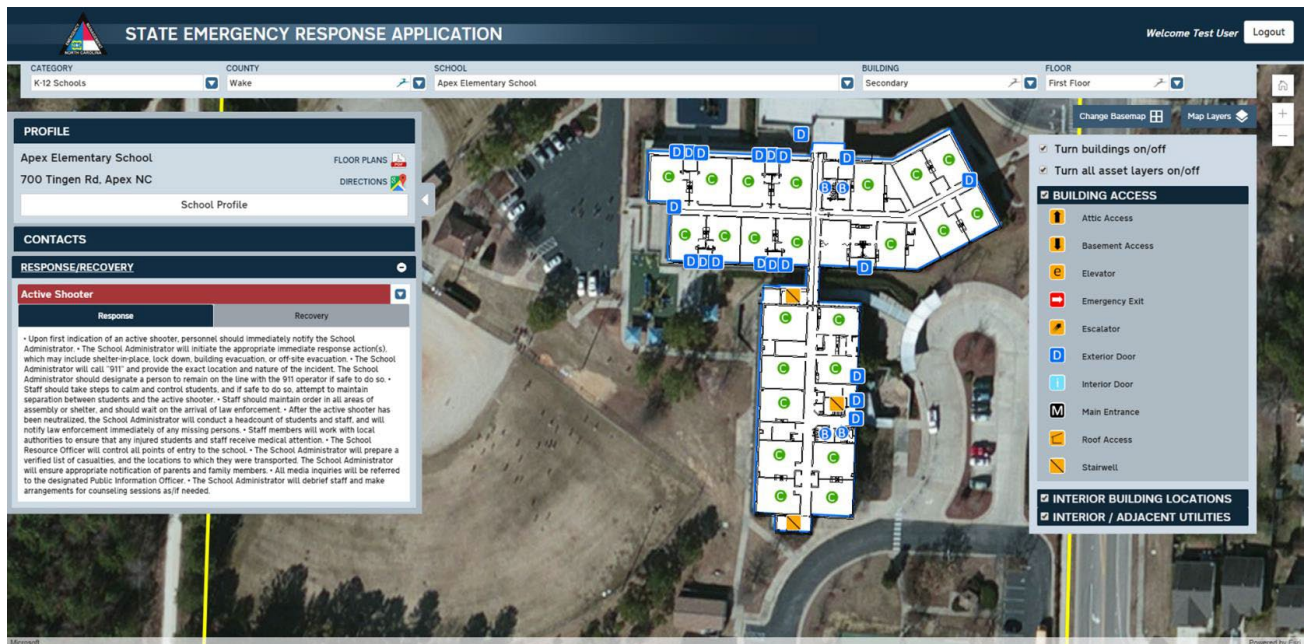**State Emergency Response Application Implementation**

Cross-Boundary Collaboration & Partnerships

North Carolina

Initiated: August 2016

Completed: May 2018

Contact: Hope Morgan, NC DPS Division of Emergency Management (919-825-2336, hope.morgan@ncdps.gov)

EXECUTIVE SUMMARY

There are 1.5 million k-12 public school students and nearly 237,000 students at public universities in North Carolina. The state is responsible for providing them with safe learning environments, which requires collaboration between state and local governments, local county and state law enforcement, and educators.

The General Assembly passed Session Law 2015-241, requiring a statewide School Risk and Response Management System with two foundational components: a Digital School Risk Management Planning Tool (SRMP) and a School Emergency Response Application (SERA).

The SRMP application is a web-based, wizard-style tool that guides school officials, in concert with first responders, law enforcement, and emergency management, through the creation of a digital school risk management plan required of all North Carolina k-12 public schools.

SERA is a web-based, secure application designed to assist first responders, law enforcement, and emergency managers in efficiently responding to emergencies, hazards, and threats at school facilities. Leveraging data and information documented in SRMP, SERA efficiently presents profile and process information and spatially displays school floor plans, key assets, and vulnerabilities.
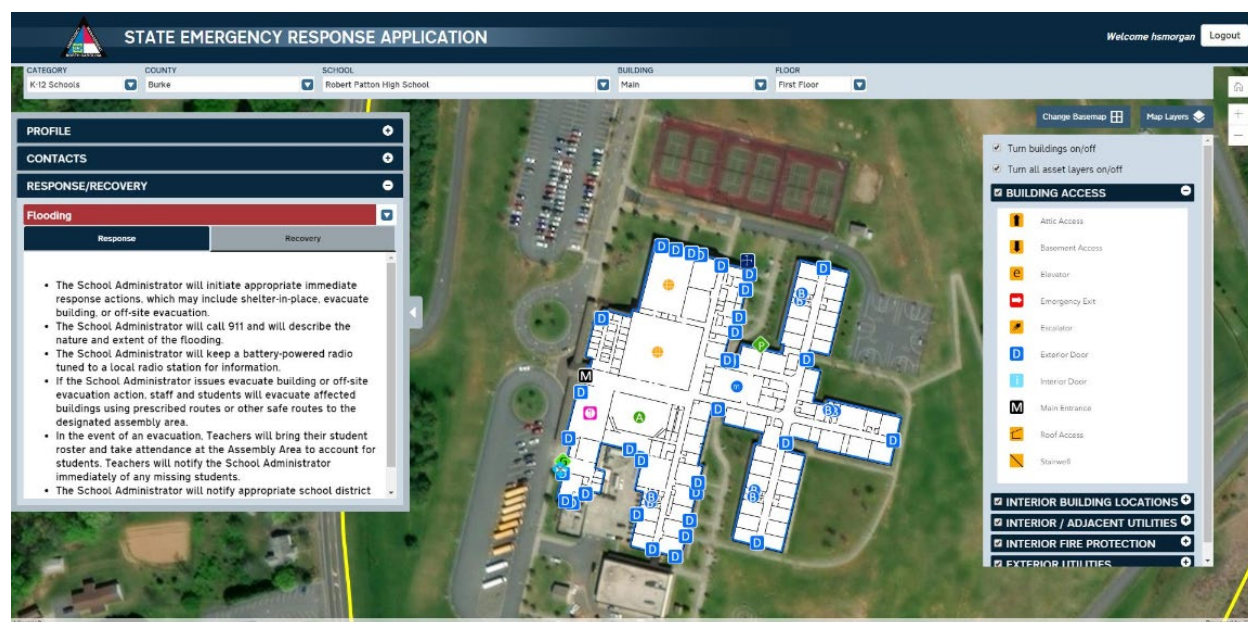
The North Carolina Department of Public Safety Division of Emergency Management (NCEM) worked closely with the North Carolina Department of Public Instruction (DPI) and local school districts to create these applications. Members of law enforcement, emergency management, and local education authorities all participated in work sessions to establish what should be included. These sessions ensured that each group was ultimately getting the information they needed out of the system and knew how to share, communicate, and collaborate going forward. This was critical when trying to ensure a faster and safer response to the wide variety of emergencies that can occur in our schools.

When there is an emergency, every second counts. Through the collaborative efforts of NCEM, DPI, and local entities, North Carolina can now provide first responders with crucial, real time information about facilities including floor plans, campus landscape, and the location of key assets.

CONCEPT

North Carolina is working hard to provide resources to ensure the safety of our schools. In recent years North Carolina has established grants for local school districts to increase the number of resource officers and mental health workers. While we believe that these additional resources will help to promote safer learning environments, we must also prepare for worst-case scenarios.

"When parents send their kids to school, they expect them to be out of harm's way, and we owe it to these kids and their families to make sure our schools are safe environments for learning."

- NC Governor, Roy Cooper

School safety is a multi-jurisdictional issue; in order to better manage safety concerns, the state needs to empower schools, local emergency management, and law enforcement entities by creating tools through which they can share and collaborate. With this in mind, the General Assembly passed Session Law 2015-241, requiring a statewide School Risk and Response Management System with the following components:

- Digital School Risk Management Planning Tool (SRMP)
- School Emergency Response Application (SERA)
- Anonymous School Safety Tip
- Panic Alarm Application

While each of these components will play a critical role in the success of the overall system, SRMP and SERA are foundational to the overall success. The North Carolina Department of Public Safety Division of Emergency Management (NCEM) worked closely with the North Carolina Department of Public Instruction (DPI), 115 local school districts, local governments, and law enforcement agencies to create these applications.

When all four components are implemented, the system will provide a seamless, digital solution that will allow first responders to handle emergency situations more effectively and efficiently, ultimately enabling them to save more lives.

What is the School Risk Management Planning Tool (SRMP)?

Per S.L. 2015-241, all North Carolina public schools (approximately 2,400) are required to create a school risk management plan. These plans are created and stored in the SRMP application. The system interface was designed to walk users through various steps and categories to create a comprehensive risk management plan for their facility. SRMP allows the upload of floor plans as well as building and campus information graphics. SRMP also allows users to document a school's profile, pertinent assets and vulnerabilities, and procedures for managing various natural hazards, threats, and emergencies, and archive all materials for future audits. Authorized users access the tool using the state's centralized identity and access management service, ensuring security and accountability.

**What is the State Emergency Response Application (SERA)?**

The School Emergency Response Application (SERA) is a secure, web-based application accessible on multiple devices (phones, tablets, computers). It is designed to assist first responders, law enforcement, and emergency managers in effectively and efficiently responding to hazards and threats at school

facilities. While originally designed for public schools, the state quickly recognized the power of this application and expanded it to include community colleges, universities, and dams. The application was subsequently renamed the **State Emergency Response Application (SERA)**.

SERA relies on data from a several risk management systems, including the SRMP application and the Higher Education Risk Management Plan (HERMP) application. The HERMP application is used by community colleges, technical institutes, and universities to input their risk management plans. HERMP includes slightly different information from SRMP, specific to institutes of higher education (for example, full campus versus individual building views). Information in both of these applications is entered and managed by institute administrators (principals or their designees, chancellors or their designees, etc.).

SERA presents profile and process information and spatially displays school floor plans, aerial imagery and oblique imagery, key assets and vulnerabilities. SERA is updated in real-time when changes are made to risk management plans, ensuring the information remains accurate.

Currently SERA contains floor plan schematics for all k-12 public schools (more than 2,400 facilities), all 16 state universities, and 70 percent of the community colleges.
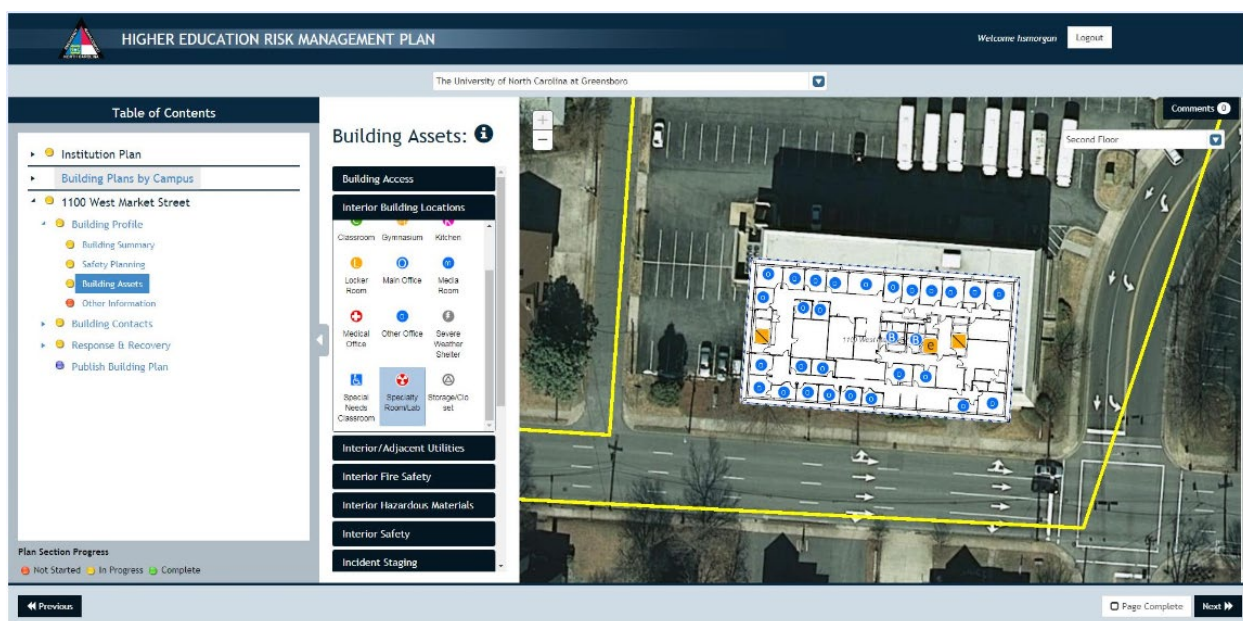
Collaboration is key.

SERA can be successful only with the complete cooperation and willingness of all entities to come together with a unified approach. NCEM has established partnerships with DPI, the University of North Carolina system, the NC Community College system and the NCDPS Division of Adult Correction and Juvenile Justice to add floorplans from all public schools, state universities, community colleges, adult and juvenile correctional facilities.

NCEM worked with all 115 school districts, local law enforcement, and DPI to create these applications. The partnerships with the school districts and local governments were especially important. Members of law enforcement, emergency management, and local school districts all worked together to determine

what should be included. All stakeholders worked to ensure that the system would provide them with the information they needed, and established strong channels of communication and collaboration.

Rolling this initiative out to all public schools, universities, and the community college system is an extremely large endeavor. All public schools are required to have a School Risk Management Plan, but NCEM had to conduct training sessions so that each school knew how to develop and input their plan into the system. This training was also held for the universities and community colleges. In addition, local law enforcement across the state had to be trained on the SERA application so that it could be used correctly in case of emergency.

SIGNIFICANCE AND IMPACT

Using the data collected through the SRMP and HERMP applications, SERA provides local law enforcement with information on all public school facilities, all 16 public universities, and currently 50 out of the 68 public community colleges. This required comprehensive collaboration between schools, law enforcement, and emergency management for public schools and university risk management plans. Below is a list of the items that are currently active in SERA:

North Carolina Public Schools

- All 2,400 North Carolina public schools have submitted floor plans to be stored in SRMP as part of the risk management plan; law enforcement and first responders can access the floor plans through SERA.
- There are more than 240,000 assets documented in the risk management plans.

Universities and Community Colleges

- All state-supported university facilities use HERMP, which populates SERA. SERA uses the UNC system's Data Additions Validations Edits (DAVE) system for validation.
- The community colleges and technical institutes are in the process of adding their facilities. To date, 50 of the 64 entities have provided data.
- At the college or university level, users can access external gathering points, procedures for outdoor locations, and contacts for the outdoor locations. Users can also access building-level information, including assets, and building-specific procedures and contact information.

In order to prepare information for SERA, public school leaders must develop and regularly update their individualized school risk management plans. This requirement has forced school administrators to collaborate and plan with school personnel and community leaders, think through what they would do in emergency situations, and plan accordingly. As a result, school administrators and teachers are more prepared in case of an emergency.

This project has created the opportunity for true collaboration between state and local entities in both public safety and public education. This collaboration will only increase as the program expands. The more we communicate and share information, the more we will be able to prepare for and prevent emergencies. Based on the success we have seen with public schools, community colleges, and universities, we have begun implementing SERA for the state's dams and correctional facilities, and will incorporate other public buildings going forward.

Ohio Digital Identity Program
Providing a Secure Digital Customer Experience for Ohio's Workforce & Citizens

Category: Cybersecurity

State: Ohio

Project initiation: January 2017

Project completion: September 2018

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Executive Summary

Ohio's digital identity program includes user lifecycle management, identity proofing, strong authentication, coarse-grain authorization, fraud analytics, and threat monitoring. Once deployed, users who log in with their respective identity enjoy single sign-on to onboarded applications, as well as a safer, more secure experience.

Ohio's digital identity program provides an end-to-end solution that fosters a simpler, more trustworthy, and secure experience between the State and its constituents by:

- Developing a single proofed identity for citizens, businesses, or internal users than enables access to all required state resources with the assurance that the individual is who they say they are
- Automating privacy and security laws and policies compliance, including NIST, HIPAA, IRS 1075, accessibility standards per section 508 of the Rehabilitation Act, and the State of Ohio's standards for data retention
- Hosting in the cloud on a highly available and highly resilient redundant infrastructure
- Offering three levels of assurance, as well as multi-factor authentication with the level and frequency of identity authentication chosen by the individual content owners
- Delivering a set of identity services for consumption by all agencies, boards, and commissions that will simplify, decrease cost, and enable delivery of a better experience for the end user

With the successful completion of Phase 1 in September 2018, Ohio's digital identity program has brought to life its vision to provide a more secure and intuitive digital experience through enterprise identity tools and capabilities. Adoption of the state's enterprise digital identity capabilities during this initial phase yielded significant value through approximately $65M in cost avoidance, exceeding the program's expectations.

Beyond these financial benefits, Ohio's digital identity program has delivered value through increased security, operational efficiencies, centralized regulatory compliance, higher productivity, and an enhanced user experience. In addition, the program's scalable platforms and repeatable processes enabled efficient agency on-boarding and lowering barriers to and cost of adoption, resulting in adoption above and beyond the initial scope for Phase 1.

Ohio's Phase 1 pilots demonstrated the program's ability to integrate its capabilities with both high-profile / high-volume applications requiring legacy integration and an emerging class of business applications. As agencies and programs onboard to this enterprise platform, they avoid ongoing and redundant costs associated with security, privacy, and ADA solutions that would otherwise be maintained at the agency and program level while also allowing quicker reaction to policy or cyber events. In an ever-evolving digital security landscape, Ohio's enterprise identity program provides agencies and state organizations an opportunity to proactively identify and manage treat risks, produce enterprise cost savings and support a more seamless user experience all while allowing the business to maintain control over the level of authentication required.

Phase 1 Accomplishments

- **$65M** in cost avoidance

- Cost of application on-boarding reduced **85%**

- Integration of **180+** business applications

- **350,000+** citizen user accounts established

- All state agencies, boards, commissions & counties have on-boarded to identity, including **80,000+** state workforce users

Concept

As the number of customers preferring digital interactions increases, states must be diligent in keeping vital data from falling into the wrong hands. Failure to enact strong security practices is costly. On average, a security breach costs an organization $225 per record (per breach), and that is even before considering the cost to reputation and loss of customer confidence[1]. The risk for government agencies is even higher, and yet, 78% of customers indicated that the government is not sufficiently prepared to handle a cyberattack[2].

In this environment, proactive defense against security threats is key. Ohio's enterprise digital identity program focuses on leveraging digital identity as the fabric supporting an end-to-end digital user journey. The program's goal is to provide a secure and private digital identity and an intuitive and interactive user experience for Ohio's citizens, businesses, and workforce.

Ohio's digital identity platform centralizes security and compliance, allowing the organization to be holistically responsive to new threats. Security measures can be assessed and monitored by a dedicated team, and threat patterns across the enterprise can be identified. No longer is there a weak link in an underfunded, outdated or overburdened agency or departmentally-managed security protocol.

By utilizing a single set of credentials and a centralized access platform, Ohio's enterprise identity program is not only more nimble and secure, but also reduces costs. In Ohio, onboarded agencies no longer need to maintain separate security systems, reducing the overall need for infrastructure and maintenance investments.

In addition, Ohio's digital identity program helps agencies and state organizations provide a better customer experience. Through single sign-on, customers – from the State workforce to businesses to citizens – can access onboarded agency and department applications from a central location after logging in just once. Customers do not need to remember multiple usernames and passwords or navigate to multiple websites to get the information they are looking for or need.

All of this is done without constraining the ability of the business to choose the "right fit" level of authentication or security required for their customers and data. Ohio's digital identity program has implemented a variety of user authorization options, from two-factor authentication to identity proofing, depending on the level of security the agency and data requires. This allows customers to quickly and easily access their data but ensures the organization can validate the identity of the user to the level of certainty required.

Ohio's Digital Identity Guiding Principles & Capabilities

Ohioans expect their information to be secure and private. Ohio's digital identity program provides an enterprise solution that equips agencies to safeguard customer data and maintain compliance standards. Digital identity goes beyond security by also meeting customers' expectations for personalization, self-service account maintenance, and single sign-on access across state systems. The state formalized these concepts into two guiding principles:

- Security and privacy come first; securing data and information entrusted to the State is of foremost importance.
- Provide self-service and choice for customers to manage their own interactions.

Ohio

Concept Con't

The state's digital identity program provides state agencies and organizations with capabilities that ensure that state resources and information are accessible to every Ohioan and simplifies interactions with state systems while keeping information secure and private.

Single Sign-On
Sign in once to get to everything

2-Factor Authentication (2FA)
Secure assets with second factor

Multi-Factor Authentication
Increased identity security when needed

Privileged Access Management
Greater controls for sensitive accounts

ADA-Compliant
Built-in accessibility compliance

Real-Time Analytics
Monitoring and analysis

Self-Service Portal
For integrations and users

Identity Proofing
NIST-compliant proofing

Access Logging
Full logging and history

Access Management
Control Access by roles and groups

Just-In-Time Provisioning
Add users where and when needed

User Management
Manage all users

Each user's identity is centrally maintained within a controller infrastructure managed by leading practices across a host of NIST, federal, state, and accessibility regulations and standards so agencies can focus resources on services to their constituents. This solution provides the following capabilities and key security and privacy benefits:

- Provides Single Sign-On (SSO) to internal and external applications
- Automates provisioning and de-provisioning of users in near real-time
- Expands automated user provisioning and consolidation via industry standard endpoint adapters
- Mitigates security risks associated with human intervention through self-service password reset
- Provides Multi-factor Authentication (MFA)
- Provides validation of citizen identities using Experian Identity Proofing
- Closely integrates with State SIEM for real-time threat monitoring
- FedRAMP moderate certified infrastructure
- Deploys ID as a common security platform that follows State and Federal guidelines like 800-53 and 800-63-2
- Complies with NIST FIPS 140-2 and State's ITS-SEC-01 for data encryption and cryptography
- Adheres to user accessibility standards in Section 508 of the Rehabilitation Act
- Complies with IST 800-88 standard for data destruction

These capabilities are scalable and delivered through a self-service enablement approach, meaning agencies can quickly onboard applications, portals, websites and intranets. Capabilities such as single sign-on and built-in ADA compliance mean all Ohioans can access the critical information and services they need from anywhere and on any device. The platform's adherence to NIST, federal and state security and privacy standards means citizen interactions with on-boarded applications and portals are always supported with the latest security standards, eliminating the need for individual agencies to monitor and maintain compliance on their own.

Concept Con't

Phase 1 Overview

The goal of Phase 1 of Ohio's digital identity program, launched in January 2017, was to implement a meaningful set of pilots that would demonstrate the program's ability to integrate its capabilities with both high-profile and high-volume applications requiring legacy integration and an emerging class of business applications. Through Phase 1, Ohio's digital identity program:

- Enabled single sign-on and a single user identity/experience across state systems
- Ensured compliance with NIST, federal and state security and privacy standards
- Provided self-service for customers to securely maintain their accounts and profiles
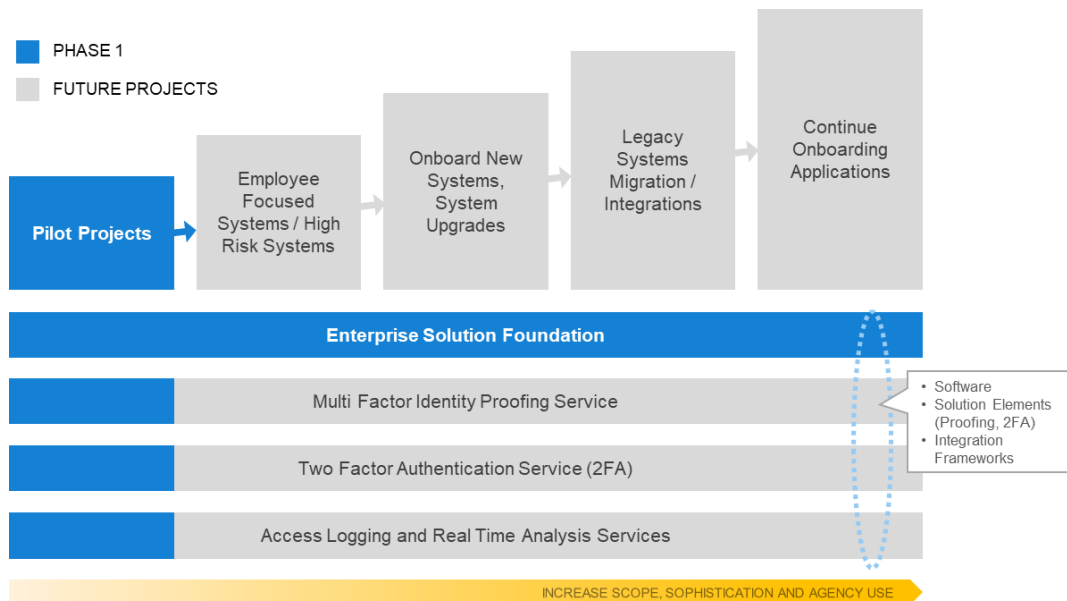
Four pilots were planned to establish the enterprise solution foundation and implement core identities and frameworks. However, due to the success of the program, at the end of Phase 1, more than 180 applications had been onboarded within the Phase 1 timeline and budget.

Significance

The state delivered the first pilot release, a partnership with the Ohio Department of Taxation (ODT), within 6 months of program mobilization. This release established the state's enterprise digital identity foundation while simultaneously standing up the program's 24x7 fully-operational cloud-based infrastructure and service organizations. The implementations that followed built upon this foundation, resulting in a catalog of enterprise digital identity capabilities.

Releasing digital identity enterprise services

The ODT pilot marked the first wave of Ohio digital identity enterprise services and established the architectural foundation for integrating with other agency systems and applications.

The release helped ODT maintain adherence to all state and federal security and privacy standards for digital identities, as well as enabled future deployment of additional ODT capabilities and applications through the State's digital identity program.

Significance Con't

With a focus on fraud detection for Personal Income and School District tax returns, the release included capabilities aimed at benefiting citizens, taxpayers and ODT, including:

- Identity proofing for taxpayers – both through a batch process and at the individual level through an online Identity Confirmation Quiz
- Redesign of the Identity Confirmation Quiz – a responsive mobile user interface aligned with the look and feel of the State of Ohio's online presence
- Single sign-on (SSO) for employees and external workers

Launching an enterprise workforce identity solution

Through the release of the new myOhio, OH|ID Workforce established the foundation for protecting Ohio's 80,000+ internal user accounts and modernized that state's intranet portal. When the transformed myOhio was unveiled, OH|ID Workforce was launched as the state's enterprise identity solution for state and county employees, contractors, and external workers.

OH|ID Workforce delivers a secure and private digital identity to protect the state against potential data breaches. Sensitive data exists everywhere, including infrastructure, middleware and applications. Because not all data breaches are equal, OH|ID Workforce also protects against breaches to internal accounts and privileged-access accounts – high-value targets for attackers.

The launch of the new myOhio and OH|ID Workforce enhanced the security of the State's internal user accounts. The new state intranet features intuitive navigation, simplified access to on-boarded applications, and a modernized, mobile-responsive design. With OH|ID Workforce, 54,000 state employees, 15,000 contractors, and 25,000 external workers can now securely access what they need to do their jobs through one portal and one single identity.

Introducing a single citizen identity

During the Phase 1 period, Ohio launched the state's digital identity solution for citizens, requiring users to shift from a business-based to user-based identity. This change aligns with security best practices and allows for verification and tracking of individuals interacting with the state's business applications.

As a result, 350,000+ business owners, CPAs and other service providers can access and file transactions through a simplified and more secure platform, accessed via OH|ID. This also resulted in enhanced security and ability to verify and track individuals interacting with the state's business applications.

Members of Ohio's business community have been able to successfully navigate the modernized platform and file their transactions in a timely and efficient manner. As new applications are added, the ability of Ohio's businesses and citizens to access the services they need from a single, secure location increases and improves the quality of their interactions with the state.

Providing identity and access management capabilities

Through a partnership with the Ohio Department of Job and Family Services (ODJFS), Ohio's digital identity program enhanced the digital experience for users accessing the agency's online services.

Significance Con't

Through the Identity and Access Management (IDAM) initiative, ODJFS leveraged the digital identity program's core OH|ID Workforce services and the Identity Platform-as-a-Service to provide their internal and external users (customers, counties, and service providers) with a more secure, private, intuitive, and interactive experience. This included:

- Self-service password reset functionality available to more than 24,000 ODJFS state/county users
- Delegated administration enablement for more than 320 county technical points of contact deployed statewide in all 88 counties; functionality replicated across 6 Active Directory domains and 2 LDAP directories
- Automated access provisioning for two applications
- Integration of account creation between the state's HCM system and digital identity platform's ISIM Console

As a result, ODJFS now have single sign-on access for critical business applications. Users are also able to take advantage of self-service password resets through the new myOhio.

Impact

With the successful completion of Phase 1, Ohio's digital identity program has brought to life its vision to provide a more secure and intuitive digital experience through enterprise identity tools and capabilities. Adoption of the state's enterprise digital identity products during this initial phase yielded significant value through approximately $65M in cost avoidance, exceeding the program's expectations. In addition, the cost of application on-boarding was reduced by 85%, and by deploying self-service on-boarding to accelerate application integration, costs will be reduced even further.

Beyond these financial benefits, Ohio's digital identity program has delivered value through increased security, operational efficiencies, centralized regulatory compliance, higher productivity, and an enhanced user experience. Releases beyond the planned pilots for Phase 1, completed in partnership with the ODJFS, Office of Budget and Management (OBM), and other state agencies and organizations resulted in:

- On-boarding of **80,000 state workforce users**, including employees, contractors, and county workers
- Access to applications for **350,000+ constituents**
- Integration of **180+ business applications** beyond the scope for Phase 1
- On-boarding of all **88 counties**

Agency adoption of the state's digital identity capabilities suite above and beyond the initial scope for Phase 1 demonstrates the effectiveness of the program's scalable platforms and repeatable processes for both identity and user experience, enabling efficient agency on-boarding and lowering barriers to and cost of adoption. As agencies and programs onboard to this enterprise platform, they avoid ongoing and redundant costs associated with security, privacy, and ADA solutions that would otherwise be maintained at the agency and program level while also allowing quicker reaction to policy or cyber events since changes can be rolled out globally.

Title: **Winning against Tax Fraud with Data Analytics**
Category: Data Management, Analytics & Visualization
State: Illinois [Illinois Department of Revenue]
Contact: Marty Johnson, IDOR, Chief Economist (Acting)
Debbie Price, IDOR, Chief Information Officer
Kevin Richards, IDOR, Accounts Processing Program Area
Kendra Banning, IDOR, GenTax Business Lead
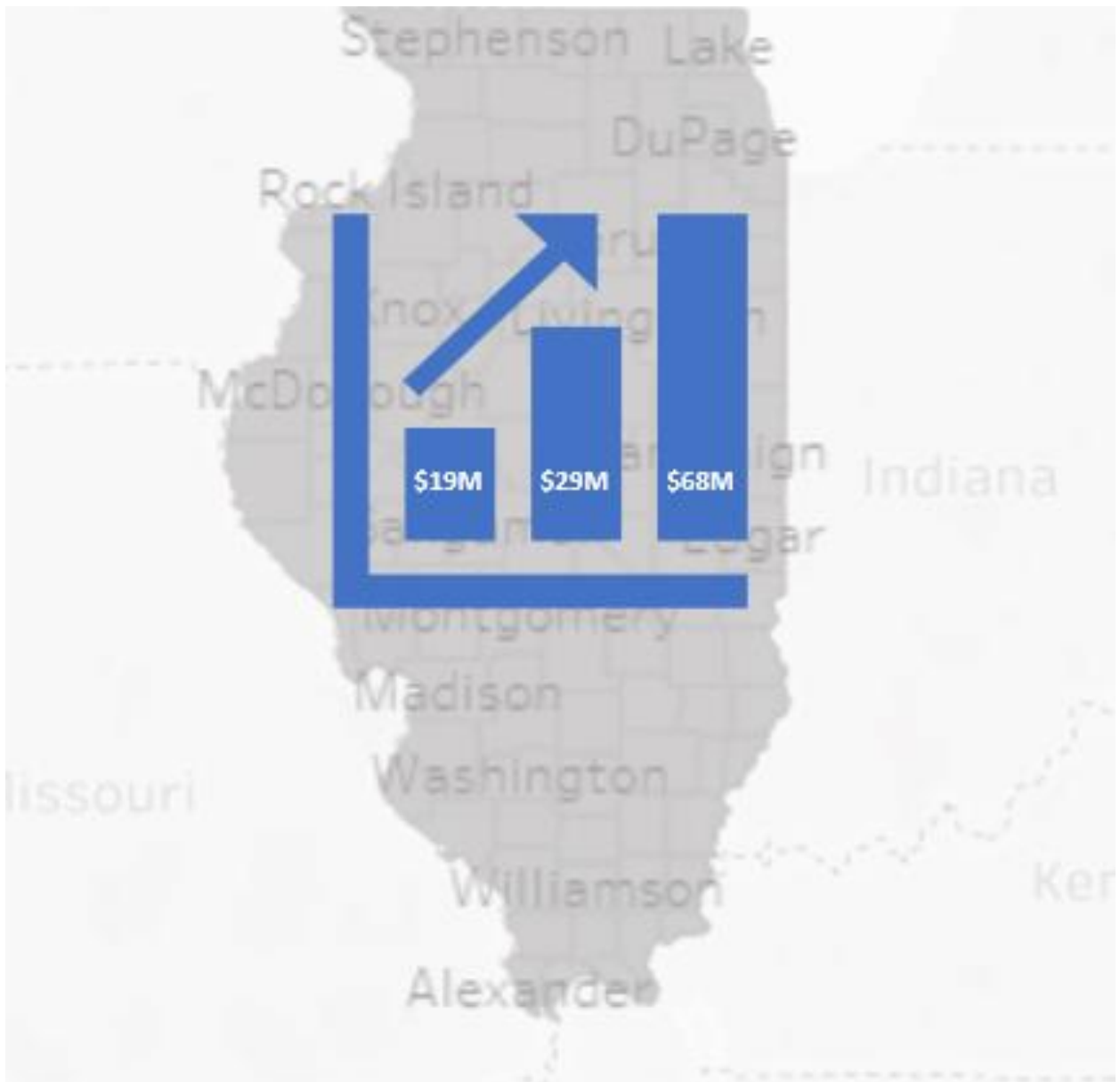
Project Initiation Date: 1/01/2017
Project End Date: 12/31/2018

EXECUTIVE SUMMARY

State government agencies are increasingly asked to "do more with less", as pressures on expenditures and resources require them to use every tool at their disposal to make efficient, effective, and meaningful decisions. Data and advanced analytics have emerged as cornerstones that enable agencies to achieve higher performance across their organizations while reducing operational costs. Effectively using data and advanced analytics allows agencies to make the right decisions the first time by using a sophisticated, data-driven understanding of behaviors and predicted outcomes to guide more accurate decisions. For revenue agencies, the need to enhance operational performance is also coupled with the imperative to increase revenue collections as much as possible.

The Department of Revenue of the State of Illinois [IDOR] is a 1,500+ person agency that services more than six million individual taxpayers and collects over $46 billion in total taxes. The Department administers more than 70 tax types; annually, it processes over 18 million returns, of which 6.1 million are individual income tax returns. IDOR currently uses Fast Enterprises' GenTax system to accept, process, store, and analyze tax returns. GenTax is used by approximately 30 states and US municipal tax agencies.

In 2017, IDOR undertook a major data analytics initiative with the express purpose of increasing revenues and improving compliance with the state tax laws. The vision was to increase efficiency within taxpayer services, to instill a culture of data-driven decision-making. A cross-functional, cross-agency team assembled to convene the effort drawing from the areas of informational technology, business processing, fraud, taxpayer compliance, and research; it involved subject matter experts from IDOR, data scientists and programmers from DoIT, and programmers from our in-house tax administration software firm, FAST Enterprises.

The roadmap for IDOR's data analytics effort was informed by the fact that FAST Enterprises had recently developed an analytics module with the hope that IDOR would be an 'early adopter' of the new technology. In addition, senior leadership at IDOR had expressed commitment to standing up a data analytics practice. The rollout was expected to span three phases. Phase 1 entailed working in tandem with the programming team from FAST to assimilate their knowledge and develop a full understanding of the tool's capabilities and their supporting product offerings. This initial phase, underway in early 2017, extended thru December 2017. Phase 2 – completed in December 2018 – involved supplementing the Analytics Manager tool with algorithms developed by the Data Analytics Practice to augment the tool, including implementing and evaluating the predictive models crafted during Phase 1.

Results from the predictive models developed at IDOR have exceeded expectations: in a press release from February 2019, it was noted that "Since 2015, Illinois has stopped more than $120 million in attempted identity theft and tax refund fraud thanks to increased data analytics and partnerships… 2018 anti-fraud and identity theft detection and prevention efforts led to an increase of $37.2 million in verified savings when compared to 2017."

CONCEPT

Data analytics is a high priority agenda item for the State of Illinois. Sophisticated, leading edge analytical techniques and applications can help increase Illinois state revenues and close the tax gap. Increasing tax revenue can be accomplished by applying advanced analytics to both preventing non-compliance and promoting compliance. These analytical opportunities can be implemented in areas across the value chain - prior to tax return filing, during return filing, and after return filing.

The seeds of this new initiative were planted more than four years ago, sparked by a need for a more data-driven, accurate fraud detection process – a way to root out questionable tax returns and refund requests. Historically, erroneous – and even fraudulent – refund requests were typically detected and acted on only after refund checks had been sent. On top of being time-consuming and costly, efforts to recover those refunds often proved fruitless.

How could the Department catch and rectify such refunds before they went out the door? The answer lay in the sophisticated business rules the Department had already employed for the processing and perfecting of tax returns. Previously, the analytics had only been used well after returns were processed and refunds had been issued.

The use of predictive intelligence to dynamically determine when to process a refund request and when to set it aside for further analysis was enabled by a new component embedded in the GenTax software dubbed the Fraud Manager.

Beginning in 2017 (baselined in 2016), the GenTax Fraud Manager fundamentally repositioned the role of business analytics in the tax return process. Because the Fraud Manager embedded business rules directly into the mainstreamed return process, the Department was able to automatically review each of the 6 million personal income tax refunds it receives annually. The rollout of the Fraud Manager positioned IDOR to identify an additional $19 million in fraudulent or erroneous refunds, which tripled the previous years' fraud prevention efforts.

However, it was recognized early on that, despite the accelerated progress made possible by the automation within the Fraud Manager, manual processes dominated the workloads of the fraud investigators. Data analytics could be better leveraged to simplify the laborious manual processes with both predictive capabilities and automation.

In early 2017, IDOR established within the Research Office a Data Analytics Practice [DAP], charged with working hand-in-hand with the FAST Enterprises data team in the rollout of a new GenTax platform. This platform, called the Analytics Manager, operates within the GenTax environment, and was customized to meet the requirement of IDOR's existing infrastructure and design. The Analytics Manager taps into the SQL Server Analysis Services, providing underlying statistical tools such as regression, decision trees, association rules, and neural nets.

This foray into the world of analytics was truly a partnership involving IDOR, Fast Enterprises, as well as the State Data Practice, which is a bureau within the State's Department of Innovation & Technology [DoIT]. IDOR subject matter experts within the Accounts Processing bureau and the Fraud Prevention unit played a major role in identifying the potential 'quick wins' and business use cases; the newly-formed DAP contributed a data analyst and the Chief Economist; the State Data practice provided the data scientist, as well as programming support. Throughout the spring and summer of 2017, the assembled team met on a regular basis to uncover the most critical business questions, and to identify those areas ripe for the greatest return on investment. This joint effort yielded two key use cases, both involving individual taxpayer noncompliance.

The focus of the first model, dubbed the 'K-12 Education Credit Model', was to identify the predictive characteristics of taxpayers claiming the education credit who do not respond when supportive documentation is requested. By Illinois statute, taxpayers with dependents are allowed a credit against individual income taxes paid, based on a portion of education expenses paid for the taxpayer's dependents. Historically, IDOR tax processors have been expected to manually review the education credits claimed on a tax return, a laborious process subject to much guesswork. In the event of a suspicious return – identified because the credit claimed appeared outside an acceptable range – the taxpayer received a letter requesting support for the claim. The ensuing back-and-forth between the taxpayer and the IDOR employees was time-consuming, stressful, and frequently concluded with no ultimate change to the taxpayer's awarded education credits. The 'K-12' model found that certain taxpayer characteristics correlated with suspected misuse of the education credits; a taxpayer's adjusted gross income, earned income tax credit amounts, and the ratios among the credits vs. claimed education expenses were the most predictive variables.

The Anti-Fraud Team at IDOR worked with FAST, DoIT, and the DAP team to create a second model designed to detect and prevent fraud associated with the earned income tax credit (EITC). The focus was to create a model showing the predictive characteristics of taxpayers and tax preparers who fraudulently report business income or loss in order to manipulate adjusted gross income – which in turn potentially maximizes their credit and refunds. As with the 'K-12' model, the IDOR fraud investigators had, before 2017, pursued these cases manually, reviewing each tax return one-by-one and initiating correspondence with the taxpayer. Through an intense, months-long process, the Analytics Team, using various datasets spanning several tax years, winnowed down the list of predictive variables, which among other indicators included having a professional license, receiving nonemployee compensation, and a taxpayer's adjusted gross income.

Implementation of these models was underway by January 2018, to astounding effect. The 'K-12' model was migrated into the production environment of GenTax, and though IDOR was appropriately cautious in evaluating the impact of false positives (which could run as high as 37% in pre-testing), once in production, the false positive rate was just over 17%. As an additional 'boost' attesting to the efficacy of the model, of the nearly 12,000 taxpayer letters sent throughout calendar year 2018 requesting support for the claimed credit, only 18% of this group could corroborate their initial claim.

Results for the 2018 calendar year were an additional money savings of $4 million from the 'K-12' model, with a corresponding reduced burden on the taxpayer customer services team (in the form of reduced times for telephone conversations as well as reduction of written correspondence).

Regarding the earned income tax credit model: by late 2017 it was determined that this model could not be adequately migrated into the production environment for the 2018 tax season. Instead, the predictive data elements we learned from modelling were incorporated into the Fraud Manager as a series of business rules. These business rules were in place by January 26, 2018 – the start of the 2018 filing season.

The results for the initial 12 months of implementation, once again, exceeded expectations: of the 84,000 letters issued to taxpayers requesting further documentation supporting their business income (or loss, in certain cases), 84% of the notice recipients either did not respond or could not support the originally claimed credit amount. The translated into real savings for the 2018 calendar year: predictive analytics led to an increase of $37.2 million in verified savings when compared to 2017.

SIGNIFICANCE

The Internal Revenue Service has estimated that over the last 30 years, the tax gap, or the difference between total taxes owed against taxes paid on time, has fluctuated between 15% to 18% of total tax liability at the federal level. The tax gap arises through the underreporting of tax liabilities, underpayment of taxes due or "nonfiling" of required tax returns. Taxpayer error (or misinformation) drives a portion of this noncompliance; however, fraudulent activity is the primary contributor, and takes the following forms: deliberately underreporting or omitting income, overstating the amount of deductions, keeping two sets of books, making false entries in books and records, claiming personal expenses as business expenses, claiming false deductions and hiding or transferring assets or income. The latest estimate from the Internal Revenue Services suggests that, at the federal level, the tax gap is upwards of $458 billion.

While the tax gap at the state level is more difficult to pinpoint, curtailing it can pay huge dividends to state coffers, which can then reduce the need to raise taxes. One important method for reducing the tax gap is data mining, which is the process of extracting information from large sets of data in order to analyze relationships in the data. Data mining models come in two general forms: descriptive models summarize patterns and properties in a dataset, and predictive models create a model based upon data in order to make predictions.

The impetus for undertaking the data analytics initiative at IDOR was three-fold:

1. Make better decisions based on the data IDOR already has.

The Department of Revenue has invested in information systems that now contain a significant volume of digital data going back over thirty years. The data analytics initiative has pushed IDOR to take the next step by leveraging data collected within its tax administration platform, GenTax, as well as synthesizing data from legacy systems, to enable agency-wide strategic decision-making through data mining to reveal information that leads to new collections and revenue opportunities.

2. Do more for less.

Insight derived from analytics promotes greater impact with fewer resources, targeting resource allocation on what the data can tell us, enabling a potential recalibration of investment priorities based on specific program impact and effectiveness.

3. Minimize Illinois' exposure to fraud, waste and abuse.

The opportunity to perpetrate fraud is a reality that IDOR is confronting directly, armed with the proper resources: people, processes, technology, and data. Tax fraud in Illinois is of special concern because of the potential scale of the problem and ability of those intent on perpetrating an abuse of the system can operate if countermeasures were not in place to prevent such activity.

The result is an undermining of the public trust and a substantial loss in revenue, exacerbating the state's budget problems and further compromising the state's ability to effectively serve its citizens.

IMPACT

The operationalization of Fraud Analytics ignited a watershed transformation for the Illinois Department of Revenue. It provided cross-functional recognition, proving that data can be used to drive real dollar savings, meaningful changes in policy and procedure, and ultimately that data can be used as a foundation to better serve our citizens.

Real Year-over-Year Dollar Impact
Instead of sending 'refunds' on fraudulent claims, the following dollars were stopped before leaving the department:

- 2016 Anti-Fraud Results (baseline, ahead of full-blown analytics initiative)
  Verified Money Savings: $19,164,454

- 2017 Anti-Fraud Results: Total of the 2017 Verified Money Savings: $28,815,559

- 2018 Anti-Fraud Results: Total 2018 Verified Money Savings $68,461,457

Improved Modeling Effectiveness
The Year-over-Year outcomes are a tribute to the improved effectiveness upon which the data analytics models were applied. The complex modeling includes the MeF (modern electronic filing), uncashed/undelivered past refunds, ID theft alerts, business income, earned income credit, business loss data, questionable dependents, education, property, and other data points. The initial model was successful, but the team continued to evolve the model. It was operationalized in 2018, producing the substantial real dollar return above.

Cross-functional Team Growth
The data points utilized in the Fraud Analytics model are managed by multiple areas within the Agency. To create and evolve the model, data discussions and sharing broke down many silos and created new understanding and teamwork throughout the Agency and even outside of the Agency, including: the data warehouse team and the Department of Innovation & Technology.

Enhanced Taxpayer Experience
The implementation of Fraud Analytics embraced a deliberate effort to move from an enforcement culture to a service-oriented culture. 'Return Correction Notices' (RCNs) did not emphasize legal language and cite law, instead, they simply stated that the refund was on hold until further information was received. Compliant taxpayers could easily follow-up with the documentation. Non-compliant or fraudulent taxpayers could not – halting dollars and leading to the annual verified savings above.

Foundational Impact - Modeling the Future
Using data to improve outcomes at the Illinois Department of Revenue, especially reducing fraud and abuse of taxpayers,, has proved fruitful and promising. The success of the original model, now operationalized, along with an enlightened staff who thoroughly embrace data-driven decision making, has created an optimal foundation for the State of Illinois to drive outcomes that all its citizens deserve.

Minnesota's Medical PreCheck & Locator App: Preparing for Emergencies

State of Minnesota — Minnesota IT Services

CATEGORY:
Digital Government to Business

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INITIATION DATE:
December 2016

END DATE:
August 2017

MINNESOTA IT SERVICES

Executive Summary

The Point of Dispensing (POD) PreCheck and Locator application suite prepares Minnesota for rapid response to biological or pandemic emergencies. In such a public health emergency, rapid distribution of medications to an exposed population, potentially a very large population, can prevent illness and loss of life.

Minnesota IT Services (MNIT) and our partners at the Minnesota Department of Health (MDH) collaborated to develop a suite of applications that bring this service to our stakeholders and all Minnesotans. It also meets requirements from the Federal government to provide countermeasures to 100% of our identified population within 48 hours of the Federal decision to declare an emergency.

The POD PreCheck and POD Locator automated, self-service tools meet the needs of individual Minnesotans, and have transformed the delivery of this essential emergency preparedness service into an organized process that is clear, understandable, and maintainable.

These tools are available online and on mobile devices, on resilient cloud-based systems. They use HTML5 to provide access when no internet or WIFI is available to ensure that every Minnesotan will have access. Future plans are underway to develop public kiosks to make the apps even more available.

Using a computer or mobile device, individuals complete online pre-screening forms to be sure they receive a safe medication given their existing medical conditions and history. Next, they can use the POD Locator tool to find the nearest point of distribution site, and valuable additional site information (bus route, parking instructions, etc.) to improve access and traffic flow. They can also find information on a dynamic web page that lists all open Point of Dispensing (POD) medication distribution locations. People arrive at dispensing sites pre-screened and ready to receive their medications.

The Centers for Disease Control has identified a lack of screening staffing as a critical gap in POD planning nationwide. The self-service nature of the POD PreCheck tool addresses this by reducing the total screening staff needed at point of distribution (POD) sites. It also increases accuracy because people are entering their own information in a non-stress environment where they have access to the information they need.

After the launch of these two applications, Minnesota is better positioned to save lives in a catastrophic situation. We are confident in the technology that will support our emergency response.

Long term impact is that these products are available if needed for emergencies, and are available for exercises to help Minnesota's emergency preparedness. These products will be used/tested during our June 2020 statewide full-scale exercise. Some local and tribal health departments have already used the tools in exercises and given them good reviews, and provided suggestions for enhancements. The products were featured on a national CDC Webinar.

Exemplar

POD PreCheck uses **modern digital technology** to address emergency preparedness for Minnesota's 5.5 million residents. During a public health emergency, such as an anthrax bioterrorism attack, when public service systems are being overrun, time is critical to prevent illness or death. State, tribal, and local public health must direct the public to point of dispensing (POD) sites to receive medication to prevent illness. Many tribes and counties in statewide Minnesota would not have the resources to create a similar product for their citizens to use, nor the public information mechanisms to communicate any tools to their population as broadly.

Depending on the size of the event, POD sites may need to distribute medicine to tens of thousands of people in a matter of hours, medicine that is safe for them given their medical history. Simply put, those services could not be efficiently delivered manually. **Without modern technology and these applications**, dispensing rates for medicines and medical countermeasures would slow to a crawl and Minnesotans would have a difficult time finding active dispensaries.

By developing an automated, self-service approach to meet the needs of the individual, MNIT and our partners at the Minnesota Department of Health have **transformed the digital delivery of services** into an organized process that is **clear, understandable and maintainable**. For those people without access to a computer or mobile device, we envision future development of public "kiosk" stations to assist those affected.

As far as we are aware, no other state has implemented similar POD locator functionality, which, in conjunction with PreCheck completes medication delivery by directing the user to the most conveniently-located dispensary. Though a handful of other states have versions of electronic screening, **Minnesota's POD PreCheck has some unique features:**

- HTML 5 allows POD PreCheck to operate in an online/offline manner, which is essential in a geographically dispersed state like Minnesota. This means that POD sites without internet connections can still use the POD PreCheck tool, including areas where internet connections are spotty or nonexistent.
- POD PreCheck is unique because it screens for one additional medication, amoxicillin, and calculates the appropriate pediatric dose, reducing the injury rate amongst child patients.
- Having POD PreCheck and the POD Locator hosted on Amazon Web Services (AWS) means that during an emergency, when user demand may suddenly peak into the tens of thousands, it is more likely the applications will demonstrate greater resiliency and will be more accessible to the public.

Concept

Beyond a best practice, the Federal government dictates that MDH must be able to demonstrate its capability to receive, stage, store, distribute, and dispense material during a public health emergency. The requirement benchmark states: "As part of their response to public health emergencies, public health departments must be able to provide countermeasures to 100% of their identified population within 48 hours of the Federal decision to do so." Tribal and local jurisdictions also recognized the need for a response system and that such incidents

are inherently cross-jurisdictional. Some had already started their own projects, but had encountered significant issues that halted or delayed them. It was clear that a statewide response was in order.

The **key success factors** for an emergency response of this kind were built into the requirements:

- Maximizing distribution rates at dispensaries.
- Tailoring treatment and dosage to individual needs.
- Minimizing time required to locate a dispensary.

MNIT's project manager, developers, and Office of Geospatial Information Services collaborated with MDH staff throughout the project. **Requirements were gathered** by MDH through meetings with **stakeholders**, including local and tribal public health representatives, and the statewide Medical Countermeasures Workgroup. They identified the functionality that would be needed for both the point of distribution staff, and the general public using the applications. Among other things, specific requirements included:

- POD PreCheck: Create a tool that allowed for accurate and rapid screening, while protecting the public's private information. Add a QR code so public health can rapidly input data to improve efficient data management.
- POD Locator: We wanted to use the CDC's IMATS (inventory management and tracking system) database export as the data source for the POD Locator to eliminate the need for data entry during an emergency response (and associated data entry errors).
- POD Locator: Local and tribal public health agencies will identify their POD sites and get them ready to receive the public, then communicate the information to MDH. MDH staff will populate the POD Locator application, and make any "in the moment" changes needed as they arise.

While MDH had built similar applications in the past, availability of **new technical development** approaches, and the **high system resiliency** offered through cloud-based hosting created the basis for a **next-generation** solution.

The total cost of development for both applications was $88,000. While other solutions existed for the PreCheck portion of this initiative, the technology was outdated. However, by gaining some information from existing systems and the sharing of medication algorithms, the MNIT project team was able to create a robust and supportable solution in-house for reasonable costs.

This solution is not part of a larger technology project. The applications are designed to operate independently, even when the state computing infrastructure has been disabled. However, the project was completed alongside an **agency-wide migration of all applications to hosting in AWS**. The AWS platform provides the exact kind of **automatic scaling** needed for an application of this nature, which will be almost dormant at most times and in extremely high demand at a moment's notice.

Agile methodologies were used through the life of the project. MDH business partners were able to work with the developers to understand the direction the developers were taking, and correct course quickly. It also allowed the technical staff to share new ideas with the business team to create new possibilities and a better product. The MDH business team credits this approach for the excellent quality of the application delivered.

Ideally, we will never use this product! It would only ever be used during the response to a bioterrorism event, or during emergency preparedness exercises. We will have a **statewide full-scale exercise** in June of 2020. Local and tribal public health agencies across the state will test the application and provide feedback about their experience. That feedback will be incorporated into future enhancements.

As with all agency projects, a thorough review of **accessibility** was conducted to ensure 508 Compliance. For security considerations, no data on individuals is actually stored in the system or in the database, further protecting individual data. Because it is likely that public computers would be used in this type of response, a conscious decision was made not to include certain data.

This project was entirely state-run. MNIT staff provide ongoing maintenance and technical support.

Communications about these programs is provided on **MDH Emergency Preparedness** website, via agency newsletters and to local and tribal public health via webinars during an annual update (attendance was required by grant duty). The tools were featured on a Centers for Disease Control webinar (attended by public health agency staff from around the country, including territories) as a best practice innovation.

MDH conducted a public information exercise with **Twin Cities Public Television**/ECHO and their new **emergency information channel** (2.5) in the fall of 2018. They were able to develop **multilingual messaging** in Spanish, Hmong, and Somali about POD PreCheck and the POD Locator. This information could be pushed to the community during this type of emergency.

Significance

Emergency response support to ensure maximum positive outcomes for the dispensing of medicines and countermeasures in the event of widespread population impacts from biomedical agents.

Beneficiaries of this project include all Minnesotans within all jurisdictions (including tribes) and residents of states within travel distance of Minnesota dispensaries.

This project has **innovative and distinct** characteristics:

- Higher levels of automation and the ability of the public to access emergency information.
- Prescreening results are accurate – human screeners make mistakes.
- The use of AWS ensures higher resiliency and improves potential for widespread adoption.
- This Minnesota application contains automated dosing calculations, which results in significantly less human error in dosages. This translates directly to a reduction in harm as a result of a medication error, especially for children.
- The Minnesota application allows for the off-line option which can be used in more remote areas or when internet service is disrupted.
- Our application supports an especially broad list of medical countermeasure medications available for dispensing during an emergency.

Successful implementation includes:

- The public can access these PreCheck processes from anywhere via the internet or from specified locations when no internet access is available.
- Users are effectively pre-screened and correct dosages calculated.
- The public can quickly identify the closest dispensing site to receive the necessary medication.
- The PreCheck process is available for anything that would require a POD, including pandemic incidents as well as bioterrorist attack.
- It is built on a modern technological base, deployed on the AWS cloud consistent with other applications. This ensures high availability and the ability to scale up from zero users to thousands within minutes.

The POD Locator program **supports the Minnesota Department of Health responsibilities** as outlined in the Governor's Executive Order (19-22, section 6.b) and the Minnesota Emergency Operations Plan. It helps our partners at MDH meet their business mission to protect the health of all Minnesotans. This application allows the local public health organizations to accomplish *more* with declining resources. These applications also align with the Federal Centers for Disease Control Public Health Emergency Preparedness grant requirements to be able to dispense to citizens in response to bioterrorism. Specifically, Capability 8 of the PHEP grant. This project aligns with **MNIT's priorities** to modernize government services, and to partner with agencies to achieve their missions. It also aligns with **NASCIO's State CIO Top Ten Priorities** of Cloud Services and Digital Government.

Impact

After the launch of these two applications, we are better positioned to save lives in a catastrophic situation. We are confident in the technology that will support our emergency response.

The benefits and impacts of the effort have been stated several times in the preceding responses to questions. A benefit that has not been explicitly mentioned is **increased level of confidence** in public health staff and constituents in government services, and reduced anxiety around emergency response. Other benefits include:

- Reduced staff training cost in public health organizations statewide.
- Reduced harm by minimizing human error in screening.
- Improved communication to all Minnesotans citizens during an emergency.
- Improved likelihood of getting medications to all people impacted by bioterrorism, reducing injuries and deaths.
- Increased access statewide where internet access may be limited.
- Meeting public expectation by not just relying on paper screening forms.
- Improving public information about the emergency.

Long term impact is that **Minnesota is ready** for emergencies, and these tools are available for exercises to help Minnesota's emergency preparedness. These applications will be used/tested during our June 2020 statewide full-scale exercise. Some local and tribal health departments have already used the tools in exercises and given them good reviews, and they have provided suggestions for enhancements.

The **qualitative benefits** are in lives saved, reduced injuries. In the event of an emergency, these tools will reduce confusion and improve outcomes. We may never use them, but if we do they will be critical. This project is an investment in human life.

In an ideal world, such an event will not occur. In the worst-case scenario, this initiative could save thousands of lives and prevent injury to many more by improving the accuracy of the medicine dispensed.

North Carolina WIC Electronic Benefits Transfer (eWIC) and Bnft™ Application Implementation

Digital Government: Government to Citizen

North Carolina
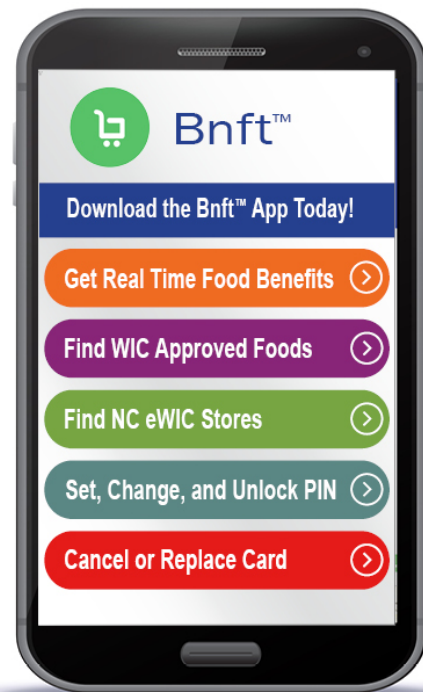
Initiated: October 6, 2016

Completed: May 11, 2018

Contact: Kim Lovenduski, NC DHHS Division of Public Health (919-707-5750, kim.lovenduski@dhhs.nc.gov)

EXECUTIVE SUMMARY

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is a public health nutrition program administered by the United States Department of Agriculture, Food and Nutrition Service, through North Carolina's Department of Health and Human Services (DHHS), Division of Public Health (DPH). WIC is designed to increase the health of low-income pregnant, breastfeeding, and postpartum women, infants, and children under the age of five by providing nutritious foods, education for breastfeeding and nutrition, along with medical and social service referrals. Eligibility requirements for participation in the WIC program include residency, categorical eligibility, household income, and nutritional risk.

The North Carolina WIC Program contracted with 85 local agencies at over 175 clinic sites across the state to provide services to approximately 240,000 WIC participants each month during the planning and implementation phase of the project. In addition to local agency partnerships, the WIC Program has over 2,000 authorized WIC grocery and retail pharmacy locations where participants may shop for approved items.

The Healthy, Hunger-Free Kids Act of 2010 mandated that all state WIC programs replace paper-based food instruments with WIC electronic benefits transfer cards (eWIC) by October 1, 2020. Public health officials in North Carolina saw this requirement as an opportunity to provide even greater benefit to WIC participants and introduced a mobile application, Bnft™, with the eWIC implementation. After completing an in-house planning process, on October 6, 2016, DHHS signed a contract with Solutran to transfer the state's paper voucher system to an automated system with debit cards, and to develop a website for users as well as a smart phone app for Android and Apple devices called Bnft™. Statewide rollout of the eWIC program and Bnft™ app was completed on May 11, 2018.
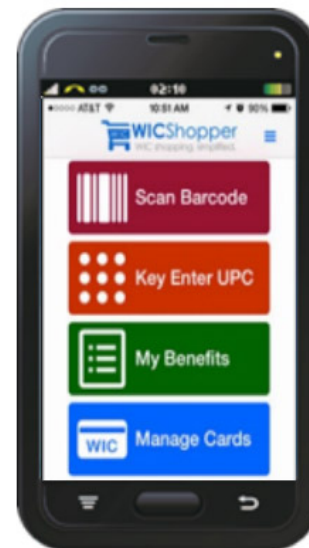
To date, the majority of eWIC participants have downloaded the Bnft™ app which allows them to scan Universal Product Codes (UPCs) on items in the store to see if it is eligible for purchase. The app is also programmed to highlight the least expensive item in each category as the preferred item for purchase, which allows DPH to more efficiently manage the allocated funds. WIC staff can also send push notifications through the app, which proved to be very useful during Hurricane Florence in the fall of 2018, as well as during the federal government shutdown (December 2018 – January 2019).

eWIC has streamlined the WIC participant experience by eliminating the need to keep track of paper vouchers and lists of approved items, as the food prescription is electronically recorded on the Electronic Benefit Transfer (EBT) card, and participants can use the Bnft™ app to scan items in the store to determine if they are eligible for purchase. eWIC participants' shopping experiences are now almost exactly like any other shopping experience, resulting in less stigma and potential embarrassment at the checkout. Cashiers are no longer required to make on-the-spot decisions as to whether an item is allowed under the WIC rules. Checkouts are faster and more pleasant for eWIC participants and cashiers. In part, this is due to a Retailer Integration Incentive Initiative that the State offered to allow vendors to integrate their systems. All benefit information is stored electronically, so an eWIC participant can easily check their balance and review which items they have left to purchase during a given time period.

The United States Department of Agriculture, Food and Nutrition Service was so pleased with North Carolina's eWIC implementation that they are using our program as a model and best practice.

CONCEPT

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is a federal program to safeguard the health of low-income women, infants, and children up to age 5 who are at nutrition risk by providing nutritious foods to supplement diets, information on healthy eating, and referrals to health care. The grant-based program is managed at the state level and provides eligible participants supplemental foods benefits for the purchase of items like fruits and vegetables, breakfast cereals, milk, cheese, whole grains, and infant formula.

The Healthy, Hunger-Free Kids Act of 2010 mandated that all state WIC programs replace paper-based food instruments with WIC electronic benefits transfer cards (eWIC) by October 1, 2020. Public health officials in North Carolina saw this requirement as an opportunity to provide even greater benefit to WIC participants and incorporated a mobile application, Bnft™, into the eWIC implementation.

In 2017, the North Carolina WIC Program began the eWIC implementation project to replace WIC paper food instruments with online eWIC using a magnetic stripe card. The eWIC implementation project involved numerous internal and external stakeholders including 240,000 WIC participants served each month, 2,000 retailers, 1,300 corporate stores, and 85 County and Health Center Local Agencies with 175 sites. The eWIC implementation also required changes to the state's existing WIC management information system, called Crossroads, and to vendor cash register systems to process WIC EBT transactions. The project was fully funded by the US Department of Agriculture, Food and Nutrition Service and cost $6,173,614 to implement.

North Carolina WIC partnered with Solutran to develop a mobile application called Bnft™ to further improve the WIC participant shopping experience. Bnft™ was released to the Apple App Store and Google Play Store in 2017. North Carolina WIC maintains a database of over 14,500 authorized WIC foods that WIC participants can purchase with their eWIC card, referred to as the Approved Product List (APL). Prior to the eWIC implementation, the North Carolina WIC team visited approximately 1,300 stores across the state to collect the WIC food data via Universal Product Codes (UPCs). The UPCs are used to identify eligible food items and can be scanned in the Bnft™ app for confirmation.
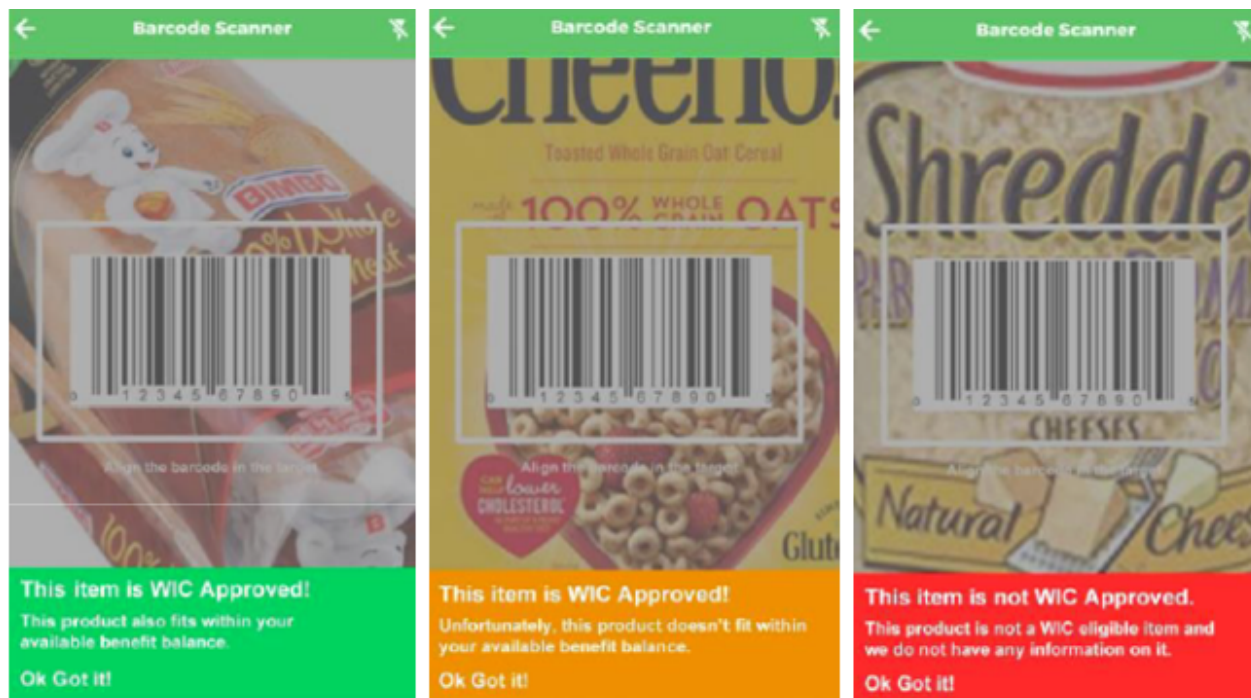
The Bnft™ app is the first of its kind to provide functionality to reduce food costs by featuring the least expensive brand of each food item carried by retailer. In addition, a color-coded system is used for UPC Code lookup: red if the scanned item is not WIC-eligible, yellow if the item is eligible but has already been purchased during the benefit period, or green if the item is eligible and still available for purchase during the benefit period.

The contract for the eWIC and Bnft™ implementation was awarded on October 6, 2016. North Carolina WIC established an aggressive timeline for the project to ensure that it was completed and fully rolled-out well in advance of the 2020 transition deadline and within a single State Fiscal Year and Federal Fiscal Year. Careful planning went into building the schedule, which remained constant from the time the RFP was issued and took into consideration requirements such as retailer locations as well as weather patterns across NC. Contingency weeks for each rollout group were built into the plan.

When selecting a contractor for WIC EBT, North Carolina paid particular attention to system uptime in each proposal reviewed to ensure optimal performance and continuous service to participants. Due to the active-active architecture provided that guaranteed a fully redundant system with an uptime of 99.999%, Solutran was able to exceed the 99.5% minimum uptime which other contractors stated they would meet. This translates into potentially 44 additional hours of uptime, which ultimately results in better service to WIC participants statewide as their transactions are not impacted at the grocery store. In 2018 Solutran's downtime for the year was only 16 minutes, well below the established threshold and industry average. Solutran is the only EBT service provider with an active-active system.

North Carolina WIC worked closely with each integrated WIC vendor to ensure that eWIC transactions met the USDA FNS standards. Teams from North Carolina WIC completed in store testing including balance inquiries, purchases, and voids to validate that POS systems functioned as expected, receipts were accurate, and data transferred properly to the EBT system. Monthly conference calls were held with the Retailers Association to keep them apprised of the program's progress. Additionally,

presentations were made at the annual North Carolina/South Carolina Retailer Association Conference, webinars were created for retailers, and an email account was established for retailer questions.

To prepare for the move and ensure that participants and vendors were informed about both the cards and the app, DHHS staff mounted a statewide educational campaign for all stakeholders, including participants, WIC staff and vendors. Colorful posters and handouts were created in English and Spanish for prominent display in WIC offices and in mailed notices to participants and vendors. DHHS leadership held a meeting with WIC staff in the pilot counties to solicit project buy-in. During rollout weeks, there was some friendly competition to see which clinic site could issue the first eWIC card in the region. In addition, the requirement to positively promote the eWIC program to participants and retailers was written into each State WIC staff member's annual work performance plan as well as identified as a deliverable in the local agency consolidated agreement addenda and contracts.

Rollout of the eWIC program and Bnft™ app was completed on May 11, 2018.

SIGNIFICANCE AND IMPACT

North Carolina's WIC program serves approximately 240,000 recipients across the state every month.

Prior to the introduction of eWIC, benefits were provided in the form of paper vouchers for specific quantities of specific foods. Vouchers were issued on a rolling month basis and were single use, meaning that a participant would need to purchase all items on the voucher in one visit to the grocery store, or forfeit the benefits they were not redeeming at that time. This meant that participants were not always receiving the full benefits to which they were entitled, making the program less effective.

In addition to the unused benefits, shopping using the paper-based WIC food instruments was often an embarrassing process. For example, when using the paper vouchers, WIC participants had to keep track of the food lists for each member of the family, either in their head or written down. Often this meant bringing a folder containing food lists to the store, just one of many parts of the old WIC shopping experience that was inconvenient and drew attention to the fact that the participant was shopping with a supplemental nutrition program.

At the checkout, WIC participants had to keep all WIC items separate from non-WIC items to allow the cashier to confirm that the items are the exact items allowed on the voucher, and the exact allowed amount. This again drew attention to the fact that the shopper was using an assistance program. Additional potential for embarrassment arose if the cashier was not properly trained and required management assistance to confirm WIC product eligibility, or if the participant had accidentally picked up too much of an item or included items that were not WIC eligible.

Even with eWIC, when retailers use stand beside equipment vs. having integrated systems, participants are still required to separate their non-WIC items from their WIC items. To ensure that NC participants are able obtain the best service possible, NC initiated a retailer integration incentive project that provided financial incentives for retailers to move to integrated systems. This resulted in 196additional retailers becoming integrated in NC.

The eWIC program provides significantly more flexibility to WIC participants. The average benefit redemption value with paper food instruments was $63.32. As of March 2019, now that food instrument redemption no longer exists, the average redemption for each eWIC transaction is $34.17. While the average redemption per transaction has decreased significantly, the average number of store visits in a month has increased to 4, indicating that participants are shopping more often and purchasing less per visit given the greater flexibility. Now, recipients can mix WIC items with the rest of their groceries and

pay for them in a single transaction, first using the eWIC card and then a regular payment method. This allows recipients to maintain their privacy while expediting the checkout process.

There are three ways that participants can manage their benefits and get customer support: through the Bnft™ app, the Bnft™ online website, and Solutran's Interactive Voice Response (IVR) system.

Participants are leveraging the Bnft™ app to maximize their benefits at extraordinary rates. To date, the majority of NC participants have installed and are using the app, which allows participants to:

- Find stores that accept WIC;
- Scan UPC codes to confirm products are WIC approved;
- Receive notifications when food benefits are added onto the card;
- Check their available balance;
- Review their transaction history; and
- Report lost or stolen cards and request replacements.
- When a participant scans the UPC on an item the app will show them one of the following messages:

    Green: the item is WIC approved and the participant has balance available to purchase it

    Yellow: the item is WIC approved but the participant does not have balance available to purchase it

    Red: the item is not WIC approved
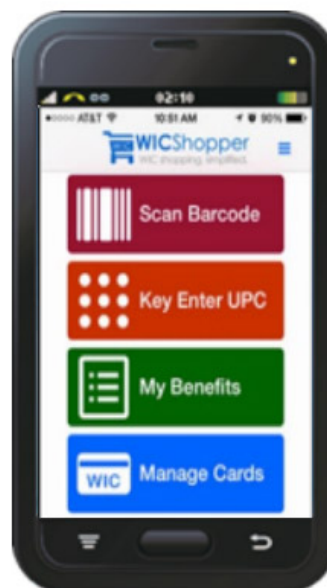
The majority of eWIC cardholders are using the Bnft™ app to find out about their WIC benefits prior to shopping. Cardholders are using the app to manage their benefits five times more than the interactive voice responses system and ten times more than Solutran's cardholder web portal. The app usage has been directly linked to the frequency of shopping trips to redeem benefits at the store, which indicates that participants are using the app to review their available benefits prior to shopping.

Participants are using the app in the following ways:

- Benefit Balance (75%)
- Store Locator (15%)
- Transaction History (7%)
- All other (3%)

The rollout of the app coincided with hurricane season, presenting an additional use case that North Carolina WIC had not originally considered. Hurricane Florence required the evacuation of thousands of North Carolinians from our coastal counties. Issuance and redemption using an EBT system proved to be invaluable during Hurricane Florence as the North Carolina WIC program was able to remotely issue benefits to participants that were affected by the natural disaster. In addition, the participants who had to evacuate were able to use the store locator function to find WIC vendors in the counties to which they had evacuated.

Based on their experience during Hurricane Florence, and due to the large scale messaging capabilities of the Bnft™ app, North Carolina WIC was able to send a push notification to participants to reassure them that the program was still operational, and their benefits were available, during the federal government shutdown.

5

In addition to the reduced stigma and increased redemption flexibility for participants there are some distinct benefits for North Carolina government, including:

Primary Benefit	Sub-Benefit
Improved fraud identification	Automated electronic transaction records substantially reduce opportunities for fraud
Cost containment	Bnft™ app is programmed to highlight the least expensive item in each category as the preferred item for purchase, allowing WIC staff to more efficiently manage allocated funds
Improved local health department operations	Improved efficiency of clinics by reducing time spent printing paper food vouchers Increased time to spend on nutrition education activities Improved utilization of clinic space by eliminating large MICR printers
Reduced training required for retailers	Cashiers no longer need a detailed knowledge of WIC eligibility, so WIC staff do not need to spend as much time training retailers
Reduced costs associated with benefit issuance	eWIC implementation has reduced NC WIC program costs by reducing the need for paper, printers, and ink now that paper vouchers are not used.
Reduced call center volume	Overall call center volume has reduced as participants now use the app, web portal, or IVR system to look up information about their accounts

Title
Using UAS Technology in Collision and Crime Scene Reconstruction

State
Washington

Category
Emerging and Innovative Technologies

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Project Initiation Date
April 27, 2017

Project Completion Date
December 31, 2018

Executive Summary

The law enforcement profession is always looking for ways to do our jobs better, faster, safer, and improve the quality of life for the citizens that we serve. In many instances, the use of new and emerging technology allows us the opportunity to do exactly that. Progressive law enforcement leaders are willing to "think outside of the box" and leverage technology to meet their agency's goals and objectives.

Leveraging technology within state government often provides additional obstacles and hurdles that are challenging to overcome. It takes a high level of perseverance and patience to develop new policies and procedures, gain support of internal and external stakeholders, secure requisite funding, conduct proper research and development, and to complete adequate testing to prove the concept.

The Washington State Patrol's Criminal Investigation Division (CID) had been looking for ways to reduce road closure time associated with the investigation of collisions and crime scenes on State Route and Interstate roadways. Traditional methods of detectives using hand measurements, total stations, and 3D laser scanners resulted in lengthy road closures, often hours long, at each of these investigations. The challenge of reducing road closure time and congestion, especially along the I-5 corridor, was an issue of constant complaint and discussion at the highest levels of state government. The question, "What are you doing to reduce road closure time and congestion?" led to an evaluation of emerging technology.

In January 2016, the CID leadership began evaluating the use of Unmanned Aerial Systems (UAS), often referred to as "drones", as a tool to expedite the forensic mapping of collision and crime scenes in Washington state. Washington had issued a moratorium on all UAS use by state agencies; however, that moratorium was set to expire on June 30, 2016. Once the moratorium was lifted, CID leadership began meeting with the Governor's staff, internal and external stakeholders, the American Civil Liberties Union, the Washington Association of Prosecuting Attorneys, and others to refine our draft UAS policies and procedures and clearly define the scope of our UAS program. In January 2017, a set of CID policies and procedures had been approved by all stakeholders and we were approved to move forward with the next steps. On April 27, 2017, Chief Batiste approved the agency's CID to initiate a UAS pilot project within the metropolitan counties along the I-5 corridor. The goals of the UAS program were:

1. Reduce road closure time associated with collision and crime scene investigations
2. Improve the quality of forensic mapping capabilities within CID
3. Improve officer safety

The agency's UAS program has proven to be a resounding success! All program goals were achieved through the pilot project and the use of UAS technology was deployed throughout the agency statewide. The pilot project resulted in a significant reduction in road closure time and congestion associated with investigations, greatly improved CID's forensic documentation

products, and improved officer safety as investigations were conducted from the air rather than in the congested roadways.

The initial pilot project concluded on December 31, 2017 and Chief Batiste authorized an expansion of the UAS program statewide. CID trained and equipped all of its 42 detectives and expanded the program statewide. In addition, Chief Batiste authorized a further expansion of the UAS program to include 15 Field Operations Bureau (FOB) line troopers.

From January through September of 2018, CID detective and FOB troopers used the UAS technology in 126 investigations resulting in a combined 75 percent reduction in road closure time (a total of 200.5 hours). The Washington State Department of Transportation estimates that each minute of State Route and Interstate road closure time has a negative economic impact of $350. The success of the UAS program not only reduced road closure time and congestion, it also reduces negative economic impact to the State of Washington.

Key Results- 2018 Road Closure Time Reduction
January-September, 2018

CID Results
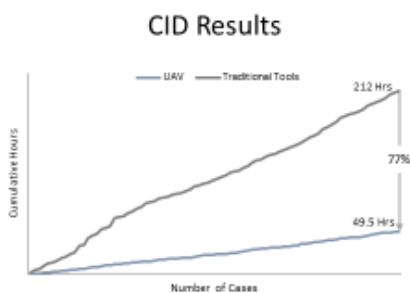
- 91 investigations
- 162.5 hours road closure time saved (77% reduction)
- At $350 per minute- saved $3,412,500

FOB Results
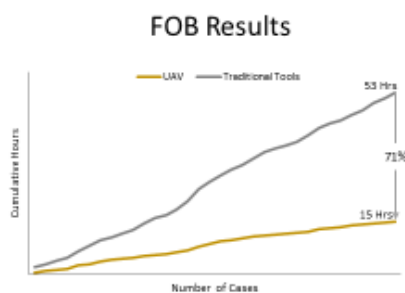
- 35 investigations
- 38 hours road closure time saved (71% reduction)
- At $350 per minute- saved $798,000

Concept

Initially, the concept behind using UAS technology to forensically document collision and crime scenes seemed to be fairly straight forward. Detectives could mark the collision or crime scene as they traditionally do, fly a UAS over the scene to take high resolution digital photographs, and then use commercially available software to generate a data point cloud. Using the UAS would seemingly take far less time than traditional methods of scene documentation which included baseline-coordinate hand measurements, total stations or 3D laser scanners.

During the initial pilot project we quickly learned that bringing this program to fruition would require a comprehensive look at our complete IT infrastructure and making significant changes and improvements. The following includes highlights of each piece of that puzzle:

Standardizing Equipment
The agency's CID is divided into 13 regional offices staffed with detectives. Since IT purchases were previously not well planned or coordinated, each of the 13 regional offices used slightly different hardware (total stations and 3D laser scanners), computers, software, cellular phones, etc. One of our first steps and accomplishments was to standardize our technology platforms in each of the 13 offices.

UAS Evaluation
The CID leadership and detectives evaluated numerous UAS platforms before finally making the decision to purchase DJI Mavic and DJI Matrice UAS platforms. We purchased one DJI Matrice for each of the 13 regional offices and also purchased one DJI Mavic to be personally issued to each detective. The idea was that all detectives are trained and qualified to use one standardized platform for efficiency.

Cellular Phone
The CID leadership and detectives evaluated various types of controllers used to operate the UAS hardware. All CID detectives were issued iPhones and we activated the Wi-Fi hotspots on each device. The DJI UAS platforms allow the iPhone to double as the navigation screen for the flight controller. Additionally, our agency's IT department loaded specific applications onto each iPhone which allowed detectives to quickly and efficiently communicate flight requests and plans with the FAA and local air controller towers.

Software
Detectives standardized their software to include Trimble Forensics Reveal, Trimble Realworks, and Pix4D. This software package was used by 42 detectives statewide but proved to be expensive to purchase software dongles for that many detectives. With the assistance of our agency's IT personnel, we were able to establish a system to network these software licenses and reduce the number that we paid for annually by 75 percent.

Computers
The computers issued to detectives were not capable of providing the processing power necessary to allow the software packages to process the data point clouds generated by the 3D laser scanners and UAS platforms. We tested and ultimately purchased Dell Precision 5820 Towers for each of the 13 regional offices. Those computers were designed for this type of work and reduced our processing time by 80 percent compared to the standard issued computers.

Training
The CID leadership created a new position of a "Technology Liaison" detective. This position became the technology expert for CID and was instrumental in creating training curriculum for all software applications, UAS flight operations, FAA Part 107 training and certification, point cloud data merging and manipulation, and working with software developers to create and modify current software that is already currently on the market. This position provides all required training to detectives and troopers throughout the evolution of the program, to include updated training as new software updates are released.

Data Storage and Transfer
The point cloud data created by the Trimble and Pix4D software typically exceed 5GB in size. It quickly became apparent that we needed to develop additional secured server space that allowed us to store these large case files for years moving forward. Additionally, detectives needed to share these files amongst themselves and with prosecutors in a secure and efficient way. Our agency's IT personnel worked with detectives to design a secure server that allows them to securely store and share the files.

Merging Data Point Clouds
One challenge that was overcome was the ability to merge two point clouds that were created from our laser scanner and UAS. The laser scanner is able to create detailed point clouds at the expense of time, while the UAS is able to map large areas quickly at the expense of finer detail. The Washington State Patrol was able to take advantage of both by merging their respective point clouds together using common or overlapping points of the area. This allows large scenes to be quickly documented while still capturing the important details. Although multiple hardware is being utilized, used together we are able to save time and open roadways faster without sacrificing evidence.

Significance

As of December 31, 2018, the Washington State Patrol has taken the UAS program from idea to reality. With standardized hardware, software, computers, training and interoperability between all equipment, detectives can respond to collision and crime scenes and complete their forensic mapping and investigation 75 percent faster and produce higher quality final products for prosecutions. The UAS policies and program development have received positive accolades within Washington State and nationally. Several law enforcement agencies are currently in the process of developing UAS programs using Washington State Patrol's model.

CID leadership have been invited to speak about UAS program development in numerous Washington state and national conferences and professional panels over the last year.

The success of CID's UAS program has resulted in positive ripple effects within other divisions and programs within the Washington State Patrol. The agency's SWAT team has recently been approved to begin using UAS technology in Special Weapons and Tactics (SWAT) team activities. The CID leadership and detectives are assisting SWAT leadership with similar policy and program development. In addition, other divisions have begun initial UAS program evaluation for the use of UAS technology in the management of wildland fire fighting operations.

Impact

The original pilot project goals for the UAS program were as follows:
1. Reduce road closure time associated with collision and crime scene investigations
2. Improve the quality of forensic mapping capabilities within CID
3. Improve officer safety

Goal 1
The data collected during the pilot project shows that this goal was achieved (see chart in Executive Summary). When used by detectives, use of UAS technology resulted in a 77 percent reduction in road closure time. When used by troopers, UAS technology resulted in a 71 percent reduction in road closure time. Combined, detectives and troopers reduced road closure time by more than 200 hours which greatly reduces traffic congestion, secondary collisions, and the need for lengthy detours.

As mentioned in the Executive Summary, traffic congestion on State Routes and Interstates result in a negative economic impact to Washington State. Based on research and studies, it is estimated that each minute of State Route and Interstate road closure time has a negative economic impact of $350. Saving 200 hours of road closure time, or 12,000 minutes, eliminates a negative economic impact of $4.2 million to Washington state.

Goal 2
Goal 2 has been achieved in several ways. Using the UAS technology in conjunction with 3D laser scanners allows for a higher quality final product and advancements with the applicable software programs allow for great capability. 3D laser scanners are great for producing detailed data sets but are not ideal for capturing details that are higher than the scanner and out of direct line of sight. UAS technology is ideal for producing top-down data sets but is not ideal for capturing side profiles. Using both technologies and merging the data point clouds together allows our detectives to produce excellent data sets that cover all angles of the scene. Using both technologies together allows detectives to provide higher quality products to prosecutors and involved stakeholders.

Additionally, the UAS technology and software enhancements allows detectives to provide various high-quality "fly-through" animations of collision and crime scenes. These options did

not exist for detectives prior to the UAS program. The "fly-through" animations are extremely valuable for prosecutors when presenting cases to judges and juries.

Using UAS technology has allowed detectives to capture a much larger portion of the overall collision and/or crime scene for illustrative purposes. Prior to the UAS program, forensic documentation was largely limited to the immediate collision or crime scene. With the UAS technology, detectives can capture hundreds or thousands of feet out from the actual scene in order to provide illustrative perspective to judges and juries. This larger perspective is extremely beneficial in complex investigations involving criminal and civil liability, time over distances analyses, high rates of vehicular speed, sight obstructions, etc.

Goal 3
Although difficult to quantify, we believe that Goal 3 was achieved. When using baseline-coordinate hand measurements, total stations, and 3D laser scanners, detectives are required to spend large amounts of time in the roadway collecting evidence and data. When using the UAS technology, detectives can stand in a position of safety, outside of the roadway, to collect evidence and data. The safety of our personnel are always of the utmost importance and every minute that we can get them out of the roadway, where they are exposed to the dangers of passing motorists and other hazards, improves their level of personal safety.

Additionally, lengthy road closures and the congestion that results, often result in secondary collisions. Each year, several Washington State Patrol vehicles are struck by impaired or inattentive motorists at collision investigation scenes and traffic stops. By reducing the amount of road closure time by 75 percent at collision and crime scene investigations, we believe that we are reducing the vulnerability of our WSP first responders.

Sample UAS point cloud from a vehicular homicide

Shared Services Transformation of Information Technology and Human Resources

Category: Enterprise IT Management Initiatives

Project Initiation Date: January 2017

Project Completion Date: June 2017

Contact:

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717.787.5440

Executive Summary:

In January 2017, Pennsylvania Governor Tom Wolf announced that information technology (IT) and human resources (HR) for commonwealth agencies would transition to a full shared service delivery center model. The goals of this transformation were to enable shared decision making through an integrated governance process and to realize operational efficiencies through a redesigned financial model that allows agencies to better focus resources on delivering programs and services to the public. The effort is part of the administration's strategic focus on transforming government and improving services through collaboration, innovative process redesign, and data-driven decision making.

Historically, service delivery was a mix of centralized services provided by the Office of Administration (OA) and decentralized services provided by IT and HR staff dedicated to a single agency. This model resulted in duplication of services, inconsistent processes, varying levels of resources and capabilities, and little incentive for agencies to work together on common challenges.

The new model adopted in July 2017 groups agencies with similar missions and functions into delivery centers supported by dedicated teams of IT and HR employees, while enterprise IT and HR delivery centers provide services common to all or most agencies. An industry-aligned governance model brings senior executives from all agencies to the shared decision-making table for prioritization of investments, projects, and strategic initiatives. This approach encourages investments that can benefit multiple agencies. It also aligns services with performance metrics that are reported on a regular basis to the agencies and the delivery center steering committees.

Historical spend for IT and HR services were evaluated and new cost apportionment methodologies were developed to support the new organizational model. The financial model provides a practical, strategic, and phased approach for investments, and allows for the sharing of resources across delivery centers based on priorities and business needs. Additionally, the new model supports federal requirements and chargeback mechanisms for IT and HR services.

Pennsylvania used a highly collaborative and employee-driven approach to implement its transformation. Employee workgroups defined the major services and aligned the structure to support these services. They also developed a phased transition plan to move to the future state over a period of time. A pilot delivery center served as a proof of concept and provided lessons learned to be shared with the other delivery center leaders. Finally, matrixed employee relationships were created for cybersecurity and technology operations to break down hierarchical structures where high-touch, but consistent, delivery was required.

Planning and implementing in phases helped to make the workload manageable for project teams and less overwhelming for employees and agencies. Similarly, phasing-in the cost apportionment model allowed Pennsylvania to stabilize the structure and service delivery prior to cost recovery changes. The phased approach also provided the opportunity to analyze individuals in "shadow" IT and HR; namely, non-IT or -HR positions that may perform IT or HR functions, to determine if they should be consolidated or maintain their current activities.

The shared services initiative has saved over $83 million since January 2017, primarily through the reduction of personnel costs by attrition, organizational restructuring, service process standardization and technology convergence opportunities. IT and HR staff now support multiple agencies and resources can be more easily shared beyond traditional agency boundaries.

While savings are important, the most critical efficiencies created are the natural working alliances and sharing of information and resources that are occurring as the employees blend into the organization.

Concept

Pennsylvania sought to comprehensively transform organizational design, financial design, and governance for IT and HR through a project led and managed by IT and HR employees within OA and agencies. The scope and approach taken for the initiative make it both noteworthy and unique among states.

The ability to effectively deliver IT and HR services and support to agencies has a direct effect on their ability to serve the public. As such, the impact of the shared services transformation goes far beyond the commonwealth's 2,200 IT and HR professionals to include every program, bureau and office in the enterprise. Pennsylvania transformed its IT and HR functions simultaneously and took a strategic and comprehensive look at all aspects of both, rather than transforming HR or IT one at a time.

Pennsylvania used a largely employee-led approach to plan and execute the transition. Their many years of experience working in the commonwealth's IT and HR organizations gave them first-hand knowledge of how we currently operate, the challenges that exist, and where we could best improve service delivery through reorganization and restructuring based on industry-aligned processes. This approach also gave employees a voice in the future direction of IT and HR and a personal stake in the success of the initiative.

There were two major components to the project: a planning phase and an execution phase. During planning, a central project team comprised of IT leaders from each agency focused on developing the processes, organizational support model, governance model, metrics, and implementation approach. Bi-weekly reports and calls with the cabinet members kept executives apprised of the status and next steps as the initiative moved forward. All new delivery center leadership positions were posted, interviews were conducted and offers were made between mid-April and early May so managers could be in their new roles to lead the next phase of the project. The execution phase was broken into three subcomponents: consolidation, standardization, and optimization. During consolidation, approximately 2,200 IT and HR employees moved to OA's complement but remained in the same agency hierarchy within each delivery center and funded by their previous agency. The pilot delivery center was also launched during this phase. During standardization, each delivery center developed plans to transition from agency IT and HR organizational structures to shared service delivery structures, implement the matrixed organizations, implement critical standardized services such as help desk, project intake, prioritization and tracking, and implement the cost apportionment and recovery model. Optimization is currently underway and consists of further examination of contracts, technology, and processes to leverage across the agencies for improved service delivery.
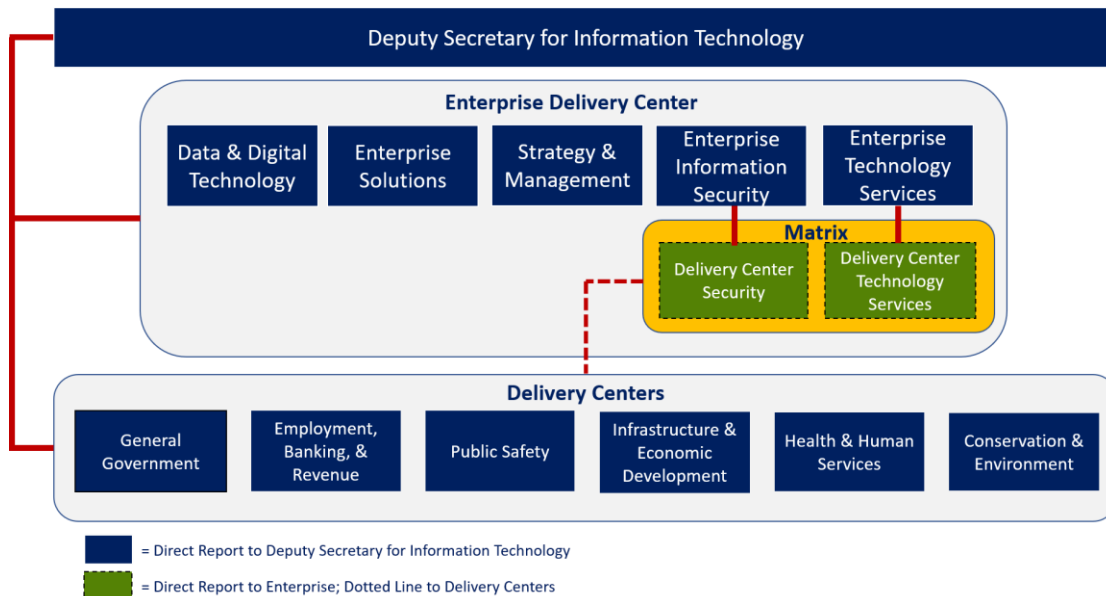
Core components of innovation:

1. Employee-driven future state services and organizational support structures
2. Transformation of IT and HR service delivery occurred at the same time in a consistent manner to establish a consistent approach for our customers
3. Implementation of a matrix reporting structure for cybersecurity and infrastructure and operations to break down siloes
4. Using the Conservation and Environment IT and HR Delivery Centers, which support the Departments of Environmental Protection, Agriculture and Conservation and Natural Resources, as the pilot to lead the way in identifying lessons learned early
5. The use of an interagency team to develop the cost apportionment and recovery strategy
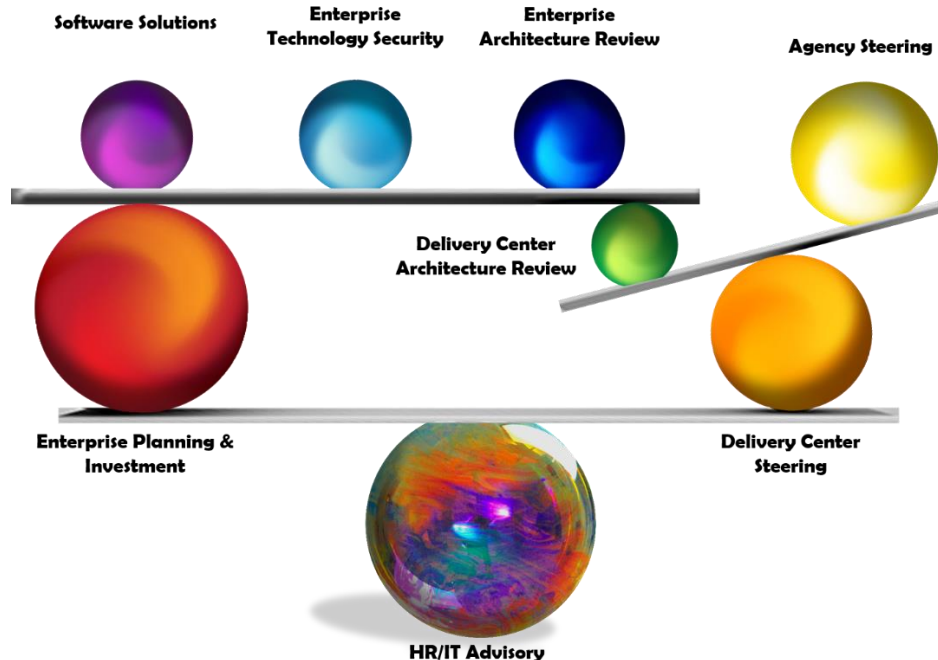6. A risk based maturity approach for continuous improvement

The new delivery model is represented below:
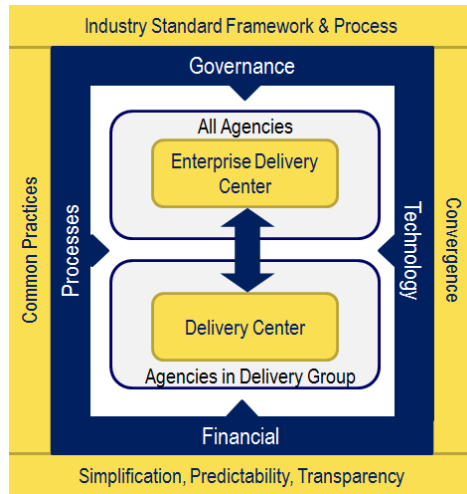
The following organizational structure was established as a result of the transformation:

The following governance structure was established as a result of the transformation.

Software Solutions

Enterprise Technology Security

Enterprise Architecture Review

Agency Steering

Delivery Center Architecture Review

Enterprise Planning & Investment

Delivery Center Steering

HR/IT Advisory

Significance

Many states are moving towards the shared service delivery model to support functions such as IT, HR, finance, and procurement. Pennsylvania achieved its IT and HR shared services transformation with existing employees and leveraged industry standard frameworks to make it more appealing to stakeholders. Time was spent communicating the benefits of the model to IT and HR employees, as well as agency leaders and customers.

Through research and contact with national associations and groups, Pennsylvania reached out to its counterparts in other states to understand their approaches and lessons learned. Pennsylvania then used these insights to inform its approach to transformation. This information also helped OA to make the case for transformation to the cabinet and General Assembly.

The team approached this as a bottom up/top down initiative with a core dedicated project team and leaders from each agency. In Pennsylvania, this proved to be a very effective way to develop solutions that were specific to our unique challenges. By focusing first on process and service delivery, the team was then able to determine the best structure to support the future state. Also, giving employees impacted by the transformation a voice in the future direction helped to foster support for implementing change.

Key transition planning activities included gathering data about current and future state processes and services, staff, physical locations, allocation of work, technical inventories, current initiatives and issues, and risks. This data allowed leadership to prioritize transition activities and define a new organizational structure focused on eliminating duplicative functions, processes, and toolsets, and identify opportunities to achieve savings through cross-agency collaboration. With the design in place, the team developed a transition plan with execution phases for consolidation, standardization, and optimization.

Pennsylvania's model included a mix of enterprise services and delivery centers to govern service delivery. The ability to matrix staff so they line report to the enterprise (e.g. cybersecurity), but are in a functional delivery center team, allows for both standardization and flexibility. The ability to move resources where they are needed, when they are needed, based on the changes in cost apportionment also can be replicated.

Pennsylvania launched an informational website for IT and HR employees, agencies, and other states, including timelines, frequently asked questions, meeting information, and status updates. Additionally, the team established a resource account to respond to questions from employees and determine if new or additional communications were needed to clarify key facts and messages.

Given the initiative's impact on IT and HR employees – which included becoming employees of OA and potential changes to roles, responsibilities, and reporting relationships – OA staff conducted town hall meetings across the state to brief them on the initiative, answer questions, and listen to their concerns. In total, the project team spoke with over 1,000 employees several times to educate them about the initiative. Culture pulse sessions were held to gauge the level of organizational change readiness so communications and stakeholder adoption techniques could be altered to gain consensus. Meanwhile, agency leadership, program staff, and the Governor's Office were kept informed through in-person briefings, conference calls, and frequent messages.

Through regular engagement and communication, the shared services leadership and project teams monitored and responded to the concerns of stakeholder groups, provided opportunities for input and feedback, and helped solidify support for the proposed changes. As each delivery center implemented the governance structure, the meetings became key decision-making and communication channels for cross agency initiatives and IT investments. Additionally, status reports and calls to the cabinet continued on a monthly basis to provide key updates on transition activities. The model, project team structure, phased approach, and issues/risks are all replicable and transferrable to other states or initiatives.

Impact

Pennsylvania realized direct dollar cost savings of $83 million through complement management, attrition, and technology convergence, with additional operational saving and efficiencies anticipated as delivery centers continue their transformations.

Additionally, Pennsylvania established an industry standard governance framework for IT and HR services that has accountability from the agency business executive level to the IT and HR operational level. This results in better ability to balance business demands with service provider supply that promotes collaborative decision-making, shared accountability, and incremental innovation to encourage desirable behavior.

The shared services team established and implemented metrics to baseline performance and provide a means for governing body membership to monitor results on a regular basis and identify opportunities for achieving greater success. Metrics are now standardized for IT and HR across all delivery centers.

A new financial model took effect in FY 18-19 that provides consistency across agencies and transparency into the cost recovery of services.

Within the delivery centers, the consolidation of staff and resources is creating new opportunities for efficiencies and operational improvements.

Conservation and Environment Delivery Center

- Agencies are sharing hardware and software (firewalls, core switches and SQL clusters) to eliminate the costs of each agency buying and maintaining their own.
- DEP and DCNR will share specialized GIS equipment, such as printers and plotters, reducing future replacement costs, in addition to sharing GIS applications created within the individual agencies.
- Three agencies are now sending one recruiter to job fairs to represent all of them, rather than each agency sending its own person to the event.
- One agency's training system will be expanded to serve several others, allowing them to eliminate inefficient processes without having to build or buy their own modern system.

Infrastructure and Economic Development Delivery Center

- Three agencies now supported by one IT help desk instead of three.
- The PA Emergency Management Agency is working to share data from 911 centers with the Department of Transportation to improve response to traffic incidents.
- All three agencies in the delivery center share cybersecurity expertise with each other.

Public Safety Delivery Center

- DOC and PSP IT staff are working together on mobile device support, including enrollment, purchasing, planning, configuration, and deployment. They are also sharing details on operational support and processes for desktop services, resulting in the sharing of scripts and deployment information for a system upgrade. They are also sharing processes and queries for System Center Configuration Manager (SCCM).
- HR staff from State Police (PSP) and Department of Corrections (DOC) were able to assist the Board of Probation and Parole in hiring a new class of parole agents, a task that would have previously overwhelmed the HR staff in the agency and created a backlog.

The commonwealth was able to leverage lessons learned from prior consolidation efforts, the experience of executive leadership and the talent of its employees. New insights and knowledge were also acquired throughout the shared services transformation journey, such as the need to cultivate new behaviors and beliefs, along with finding incremental innovations for creating momentum.

The accomplishments of the Pennsylvania team yielded positive feedback, not only from agency business executives and customers, but also from commonwealth employees and other states that are looking to leverage work products and learn from the Pennsylvania Shared Services Transformation initiative. The future looks bright based on the collaboration, teamwork, planning and execution that went into this initiative. Pennsylvania knows now that things are getting better.

Emergency Management Innovation Project

Category:
Information Communications Technology Innovations

Contact:
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Jennifer.Benson@dtsc.ca.gov

Initiation Date:
October 2017

Project Completion Date:
Multiple Production Iterations

Last Production Iteration Release:
December 2018

Executive Summary

The California Department of Toxic Substances Control (DTSC) has a mission to protect the people, communities and environment of California from harmful chemicals. In support of this mission, DTSC performs household hazardous waste (HHW) assessments and hazardous material debris removal after major disasters such as wildfires to reduce exposure to hazardous waste and materials that can threaten public health and the environment. Improper disposal of hazardous waste also poses an immense risk to workers involved in restoration efforts, so DTSC's HHW assessments are critical to ensure that recovery efforts can be performed safely and effectively.

It's also important that the data collected during these recovery efforts are effectively managed and properly communicated. Faced with a series of tragic wildfire events that swept California beginning in late 2017, DTSC's Office of Environmental Information Management (OEIM) and Emergency Response Unit began collaborating to prototype, pilot, and deliver an innovative Emergency Response Solution. Employing an Agile systems development framework, OEIM created a series of geospatial dashboards, mobile field-ready applications and web-based mapping tools to replace its outdated, unwieldly paper-based checklists and inventory forms. Using an iterative approach powered by ESRI's ArcGIS Enterprise products, OEIM designed, configured, deployed, and continuously improved the tools we developed.

DTSC's Emergency Response Solution:

- Afforded efficiencies in HHW assessments and cleanup processes
- Improved data capture and quality
- Provided detailed operational data to field teams
- Allowed counties to effectively communicate with community members
- Empowered partner agencies to plan complementary recovery operations, and
- Provided streamlined access to information for public transparency

This Emergency Response Solution evolved and improved repeatedly, with each iteration advancing DTSC's workload management, data capture, information exchange, and geospatial mapping, ultimately resulting in faster emergency response HHW assessment and cleanup.

Concept

The California Department of Toxic Substances Control (DTSC) assists local, state, and federal agencies after wildfires, floods, and other major disasters in the removal of household hazardous waste (HHW) and other harmful substances. Contaminated debris—from automotive and household batteries, bulk pesticides, fertilizers, compressed gas cylinders, and pool chemicals to paints, thinners, aerosol cans, asbestos siding, pipe insulation, and consumer electronics—must be cleaned up and contained quickly to minimize the risks posed to human health, animals, and the environment.

DTSC's HWW inspection and removal is Phase 1. Property owners and local officials caught up in these disasters can't begin to remove other debris and clean up their damaged properties until Phase 1 is complete, so those people rely on DTSC's prompt and effective action to allow them to start to rebuild their lives, homes, and communities.

As California wildfires have become increasingly destructive in recent years, these HHW cleanups have added to the workload of DTSC's Emergency Response Unit (ERU), which was already burdened by constrained resources. The ERU had depended on a labor-intensive process using paper parcel maps, checklists, and inventory forms that were easily damaged by rain and wind. ERU staff who were often exhausted after a long day in the field had to spend their evening hours putting the information they'd developed into a format that other agencies involved in these emergency response, could use. The ERU staff also struggled to coordinate their daily schedules, and they lacked a consistent means of tracking property cleanup and completion status.

ERU turned to DTSC's Office of Environmental Information Management (OEIM) for help developing an Emergency Response Solution. Building on an analysis of ERU's HHW assessment and cleanup processes that was already underway, they identified areas where technology could be leveraged for further improvements. The team targeted three main areas:

- Data capture and transfer during removal efforts
- Phase 1 parcel status reports
- Public transparency

Internet of Things (IoT) Devices and Geospatial Data Collection Application

OEIM worked closely with ERU to analyze existing processes and understand procedural impediments and the challenges faced by field staff. The team quickly realized that ERU's paper-driven data collection could be done better with electronic forms, using an Agile methodology for solution design, development, and implementation. OEIM focused on IoT devices and geospatial solutions using ESRI's ArcGIS Enterprise products and mobile devices.

During the cleanup that followed the October 2017 Tubbs Fire in Northern California, ERU staff in the field entered data and tracked HHW removals using wireless, handheld devices equipped with ESRI's Collector for ArcGIS App. Just two months later, lessons learned in that pilot effort were put to

use after the Thomas Fire in Ventura County. OEIM continued to improve the data capture process by leveraging ESRI's Collector App, and provided teams with improved devices, rugged iPads, and 4G hot spots.

Improved Data Exchange, Partner Collaboration, Web Mapping, and Transparency

As California's deadly and destructive wildfires continued, communications between emergency response agencies become even more vital. OEIM has continued to pursue improvements in ERU's information collection and sharing. The next iteration of ERU's Emergency Response Solution involved developing data exchanges with other emergency response organizations. Partners that DTSC must keep apprised of progress in post-disaster cleanup can range from the county level to the state's Office of Emergency Services (CalOES), Department of Resources Recycling and Recovery (CalRecycle), and other agencies, and even up to the U.S. Environmental Protection Agency (U.S. EPA).

With ERSI's Collector App, OEIM was soon able to leverage data captured in the field and establish data exchanges with CalOES and CalRecycle. Detailed operational data feeds were shared to assist with recovery planning efforts, providing the time-sensitive information needed for coordinated emergency response and debris removal. OEIM also turned to ESRI's Application Programming Interface (API) framework to improve the timeliness of information shared with partner agencies and stakeholders.

The innovations continued, and recognition of their value broadened. OEIM leveraged ERSI's ArcGIS to provide ERU and local emergency responders with an online map of parcel-by-parcel HHW cleanup status, giving all involved a visual update on status and progress and greater efficiency in daily work assignments. The online mapping tool became an essential asset for the emergency team's operations.

Its value in public information and transparency and stakeholder engagement also quickly became evident, and the map was soon posted on DTSC's website. In addition, online data dashboards provided real-time parcel cleanup status information and critical operational information. The improved business process and innovative technology delivered by the DTSC team provided a new means to keep field crews, the public, and other organizations appraised of the work each day.

Above: Workers inspect a property for hazardous waste in Paradise, CA.

Below: DTSC field staff use a handheld device to record information.

Significance

The ecosystem of applications benefited several different stakeholders by allowing real-time access to data. The public was informed of operational information through live geospatial dashboards. Counties had direct access to underlying data that helped them resolve property access issues and communicate additional information to the property owners. Cloud-based standardized data storage facilitated communication with other state agencies through a centralized data hub operated by CalOES, enabling data-driven, transparent, and standardized messaging about the recovery efforts' progress. Agencies whose operations could benefit from DTSC's information were able to access real-time data through ESRI's API framework, and integrate the information into their own applications and processes.

Cloud-based sharing

The figure below illustrates the variety of users that are empowered by cloud-based Software as a Service (SaaS) technology.

Increased Engagement with the Public

On several occasions, property owners encountered field staff on site because they had access to our information dashboard and were able to estimate when we would reach their property. This demonstrates the increased engagement the public has when useful information is easy to access.

Agile Applications Design and Delivery

Business partners were at first skeptical of OEIM's ability to deliver through the iterative application development approach, but Agile development practices helped build trust as valuable prototypes were delivered.
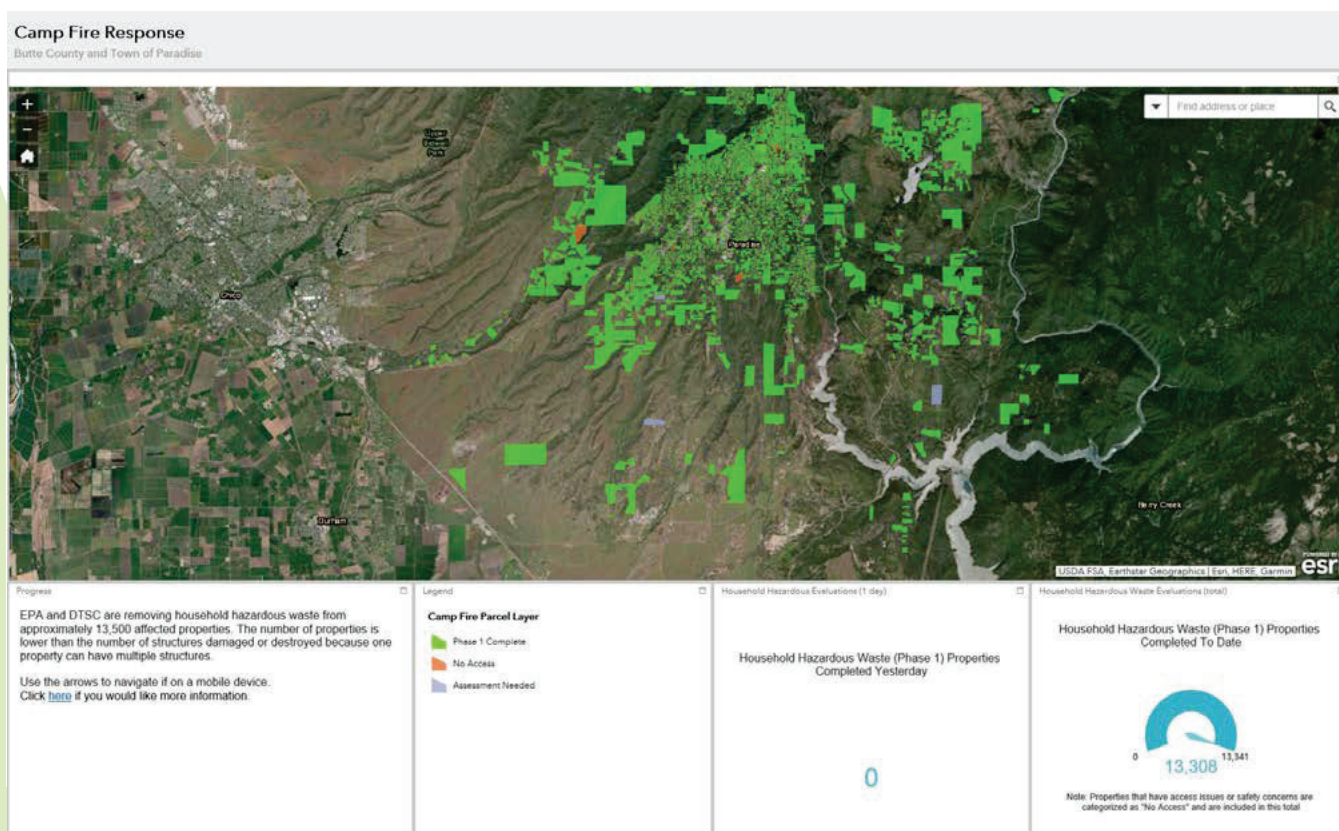
The iterative application development approach leveraged an Agile framework to better support its business and encourage IT professionals to work closely with their business partners to understand their needs and deliver value faster. To enable this approach, OEIM adopted a cloud-based architecture model using the ESRI mobile application stack. The SaaS model allowed easy modification of the Emergency Response Solution as conditions changed, and it provided a framework to enable data management best practices.

Butte County Camp Fire Dashboard

County Empowerment

In one case, DTSC noticed that parcels still needing assessment after initial recovery efforts were not being communicated efficiently. We prototyped a map-based application to enable county officials to notify DTSC, allowing field staff to integrate the information immediately into their planning process, bypassing inefficient email and phone communications.

Empowered Government

One key tenet of emergency response is to have enough resources at your disposal to handle the immediate situation without external assistance. DTSC relied heavily on the U.S. EPA's help as recently as the Thomas Fire cleanup; with the mobile application and improvements in our business process, though, we only needed the federal assistance for a week—and we were able to complete our assessment ahead of schedule. Similarly, counties call on DTSC for help in emergencies because they lack the capacity or expertise required. We try to enable our county partners to independently leverage these tools, and we freely share our methodology to assist them in their efforts. By empowering the local officials with the tools they need to do their job, they can quickly focus on handling other aspects of the emergency.

Impact

Over the last two years, DTSC has been mission-tasked for seven major wildfire responses, and we have accessed over 25,000 properties for assessment and removal of hazardous household materials and debris. Our Emergency Response Solution has been operational for a little over a year, and we have deployed an ecosystem of innovative products in that time, incrementally improved business processes and response time while empowering collaboration and transparency with state and local agencies and the public.

The results are evident even in the aftermath of the Camp Fire that broke out in November 2018—California's deadliest and most destructive. Our efforts were projected to require nine to 12 months to complete, an aggressive target involving hundreds of workers and close coordination with U.S. EPA and the Butte County Environmental Health Department. ESRI's ArcGIS Enterprise solutions helped us increase our efficiency and improve communication and data exchange with our partners. The result: Our crews completed their mission approximately two months ahead of schedule.

The figure below demonstrates the scope and magnitude of work accomplished by DTSC in that time.
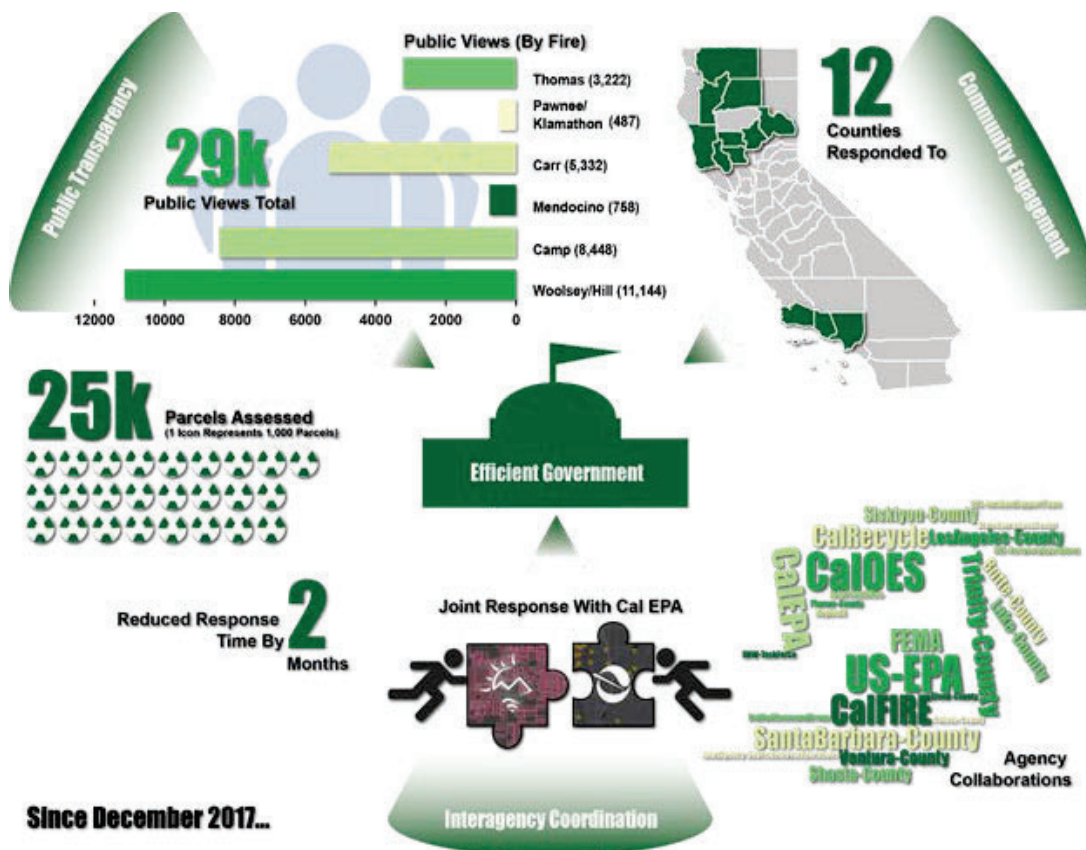
Our adaptation of ESRI's Collector App and the corresponding geospatial dashboard we developed have generated very positive feedback from the impacted communities. Since the implementation of this iterative Emergency Response Solution, we have improved our HHW cleanup efforts by approximately 20 percent. The information products that we have developed are now the standard that our partners and the public expect.

NASCIO 2019 State IT Recognition Awards

Title

Category
State CIO Office Special Recognition

State
Washington

Contact

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Project Initiation Date
June 2016

**Project Completion Date**
December 2018

Executive Summary

After a person has survived a sexual assault, they may undergo a forensic examination for collecting any evidence left behind during the assault. The doctor or nurse conducting the examination collects and preserves the evidence using a sexual assault examination kit (SAK), also referred to as a rape kit.

When the examination is complete, the evidence is packaged and a law enforcement agency (LEA) may take custody of the SAK for use during an investigation and subsequent criminal prosecution. The kit could contain deoxyribonucleic acid (DNA) evidence that may be sent to the Washington State Patrol (WSP) Crime Laboratory for testing. The DNA test results may help potentially identify the perpetrator. After the Crime Lab conducts their analysis, they provide a report to the Law Enforcement Agency who subsequently forwards this information to the prosecutor along with their findings.

Prior to the Statewide Sexual Assault Kit Tracking System project, the survivor had no way of tracking their sexual assault kit through the criminal justice process. The SAK Tracking System is designed to track the location of the SAK in the process and provide visibility and metrics regarding the overall status of processing SAKs. The system is accessible from the public internet and hosted in the Microsoft Azure Government Cloud.
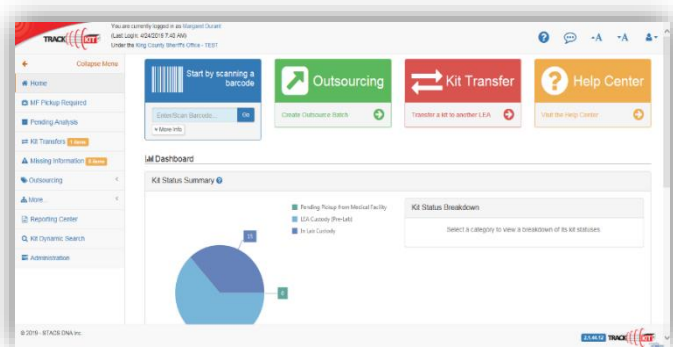
This project was initiated in response to Second Substitute House Bill 2530 (2016 Legislative Session), which created Revised Code of Washington (RCW) 43.43.545 – Statewide sexual assault kit tracking system. Washington was one of the first states to provide a statewide system that gives sexual assault survivors the ability to anonymously track the location and status of their sexual assault kit from the point of collection through forensic analysis, to final storage location or possible destruction. Per the enacted legislation, *"The system will be designed to track all sexual assault kits in Washington state, regardless of when they were collected, to further empower survivors with information, assist law enforcement with investigations and crime prevention, and create transparency and foster public trust."*

The process of undergoing a sexual assault examination can be emotionally painful and exhausting for survivors, often taking hours and in some cases, the sexual assault kit may be the only piece of evidence. To not know where that kit is throughout the process sends a disheartening message to sexual assault survivors. Providing a system to anonymously track their kit and hold others accountable gives survivors hope and transparency.

Concept

The Legislature passed the SAK Tracking bill with many expectations. The legislation was more than a project, requiring a long-term business program for SAK tracking. Multiple budget notes, provisos, and legislative opinions regarding the project and the desired outcome required thorough review and consultation with both WSP staff and external Legislators to ensure a mutual understanding of the intent and realistic objectives within the expected delivery schedule and budget. For example, this included a cloud solution, an architecture WSP needed to evaluate for this project (e.g., new contract form, security, technology, etc.). Further, WSP's technology team was not fully prepared to use the Cloud and did not have a model contract for a cloud vendor solution. This resulted in a slight delay to negotiate a model cloud based contract.

Business Ownership and Advisory Committee

Sponsorship is the most important factor associated with project success or failure. Recognizing this critical factor, WSP named the WSP Crime Laboratory Division Commander as business owner and executive sponsor in May 2017. One of his first, and most important decisions,

ASSEMBLING THE ADVISORY COMMITTEE PROVIDED INSTRUMENTAL INSIGHT ON DESIGN AND IMPLEMENTATION OF THE SYSTEM

was to assemble a representative group of stakeholders as the Advisory Committee, and facilitate their project input and buy-in. This Advisory Committee, with the Business Sponsor as the Chair, represented key stakeholders involved in the community of interest, and provided critical insight and resulting buy-in on the design and implementation tasks for the SAK Tracking System.

The Business Sponsor also provided an ongoing business policy and process perspective as well as opening and maintaining communication channels with reluctant stakeholders. He reinforced the project objectives throughout the duration of the project engaging WSP, the primary stakeholder groups, and other third party organizations critical to the project's success.

Stakeholder participation and buy-in

Stakeholder participation and buy-in was a critical success factor in establishing a system and associated processes. The Advisory Committee provided essential input from our customers and stakeholders in design, implementing, and using the SAK Tracking System. Each of the members provided invaluable insight as to what their represented population would need and expect from the Tracking System, making it possible for the team to connect all the pieces in respect to the project.

The project had to navigate extremely sensitive survivor social norms, particularly related to access security, safety, and anonymity. This made development of policies, procedures, and software access difficult. With the help of diverse input and resulting buy-in, including survivors and other Advisory Committee members, the Project Manager, System Administrator, Business Sponsor and the Independent Quality Assurance contractor, a system was defined using a private survivor log-in without requiring personal identifying information (PII).

High-level approach

As soon as a SAK is collected, a nurse logs it into the Tracking System Portal and enters the tracking number into the system. This entry starts a workflow that notifies law enforcement a kit is ready to be picked up. Once the kit is picked up, law enforcement personnel enter the kit tracking number using the agency portal site. When the kit goes to the WSP Crime Lab, the Property and Evidence staff enter the kit into their lab portal site, now marking the kit as 'in process' at the lab. All users can access inventories and view at any moment where kits are in the process and prepare for incoming kits. Time bound workflows are built into the system throughout the process, which can notify staff when critical deadlines are nearing or have passed. Survivors, with their own secure login, can view the location and status of their kit at any time to make sure their evidence is being handled in a timely manner.

WA SAK Tracking System

Survivor → Medical Facility → Law Enforcement → WSP Crime Lab → Law Enforcement → Prosecution

Phased implementation

WSP utilized a phased implementation approach defined by region and population, beginning with a pilot program. The pilot program began on February 2018 and statewide implementation was completed on October 2018.
- Phase 1 - Project Planning
    - Create Project Management Plan
    - Define Business Requirements
    - Initiate Procurement
- Phase 2 - SAK Tracking System Development
    - Define Concept of Operation
    - Begin Construction and Configuration
    - Perform Testing and Acceptance
- Phase 3 - Implementation
    - Phase 3.1 – Pilot SAK Tracking System Implementation
        - Pilot Implementation
    - Phase 3.2 - Statewide SAK Tracking System Implementation
        - Tacoma Crime Laboratory Region
        - Marysville Crime Laboratory Region
        - Vancouver Crime Laboratory Region
        - Spokane Crime Laboratory Region
        - Seattle Crime Laboratory Region
- Phase 4 – SAK Tracking System First Year of Operation
- Ongoing Operations
    - Support and Maintenance

Operations

The project team had to address how to ensure that all SAKs throughout the state would be compatible with the Tracking System. This meant that all medical facilities would need to order a standard SAK box that met the standards and guidelines set forth by the WSP for forensic testing, as well as the medical facilities requirements. It was decided a standard SAK was necessary with a unique barcode to track the location of each kit. Because WSP does not keep personal identifying information about survivors, maintaining and accessing a unique identifier was critical. The team created Washington Administrative Code (Chapter 446-95 WAC) to standardize kit submission, address kit standardization, and maintain a unique barcode for newly created kits.

Statewide implementation

The project team created a Statewide Implementation and Training Plan for the Medical Facilities and Law Enforcement Agencies, organized by counties and regions associated with Crime Lab service areas. Each region had specific milestone dates associated with the project management plan, e.g., initial contact, training, user registration, and go-live. The team also included scheduled dates for anticipated feedback and refresher training sessions after each area's respective go-live. The Sponsoring legislator, Representative Orwall, attended a Steering Committee briefing in October 2017 and supported the implementation schedule extension past the legislatively mandated date of June 1, 2018.

The project staff sent an initial email, then followed by offering a preliminary Q&A phone conversation with the Chiefs, Sheriffs, and Medical Facility staff to notify them about forthcoming rollout in their area, as well as who in their command would be the best candidate(s) to enroll in the Statewide SAK Tracking System.

Statewide training

The project team effectively used live web-based training whenever possible. This reduced the number of trainers needed and allowed the project to provide statewide training in a timely manner, without stretching the budget of the project. STACS DNA, the vendor of the tracking system, hosted training sessions while the Project Manager and System Administrator sat in on each one to introduce themselves to the attendees and provide logistical information regarding the system.

WSP has extensive law enforcement experience, but historically limited interaction with healthcare providers. The project team created online training after understanding their needs, particularly from the initial requirements definition and subsequent Advisory Committee input. This innovative training approach worked very well, particularly with contract Sexual Assault Nurse Examiners (SANE). The project team used Pierce County Hospitals and Police Departments as the pilot training sites, who provided valuable feedback to refine the training. The team also provided live training for the WSP labs' Property and Evidence Custodians at a previously scheduled meeting.

STACS DNA provided supplemental online training resources and assistance, and provided curriculum for deployment training. The team continuously created updates to the training program, using lessons learned from the sequential deployment, which earned positive approval of the Advisory Committee. The sessions included a scribe to record questions and answers, used to tailor and supplement the training, and create the Frequently Asked Questions (FAQ) guide. This also included the project team compiling a list of questions and addressing each of them in subsequent training curriculum updates. All necessary training is now found within the System itself and includes FAQ's, self-paced videos, and full user documentation on the different tasks users can perform.

Significance

By technology, significant planning, organizing, and strategic implementation, the Washington State Patrol has fully implemented the statewide SAK Tracking System, Track-Kit, as of October 2018. The internet accessible application provides the ability to track SAKs throughout their lifecycle, assist law enforcement with investigations and crime prevention, and create transparency, which fosters public trust. As required by the Legislation, the Tracking System utilizes barcoding technology to track SAKs in the State of Washington from the point of collection through the analysis process and final storage. Sexual Assault Nurse Examiners, law enforcement, crime lab personnel, and others access the system. Survivors may also anonymously login to access the system and identify the status and location of their SAK.

The Washington State Patrol has become a national pioneer in regards to its SAK Tracking System Program as many states have used Washington's model for their own SAK tracking programs. Not only nationally, but the WSP SAK Tracking System Program has received worldwide recognition having recently provided a presentation to the World Affairs Council and the Latin American delegation.

Impact

"The (WA state) legislature recognizes the deep pain and suffering experienced by victims of sexual assault. Sexual assault is an extreme violation of a person's body and sense of self and safety. Sexual violence is a pervasive social problem. National studies indicate that approximately one in four women will be sexually assaulted in their lifetimes. Survivors often turn to hospitals and local law enforcement for help, and many volunteer to have professionals collect a sexual assault kit to preserve physical evidence from their bodies. The process of collecting a sexual assault kit is extremely invasive and difficult.

The legislature finds that, when forensic analysis is completed, the biological evidence contained inside sexual assault kits can be an incredibly powerful tool for law enforcement to solve and prevent crime. Forensic analysis of all sexual assault kits sends a message to survivors that they matter. It sends a message to perpetrators that they will be held accountable for their crimes. The legislature is committed to bringing healing and justice to survivors of sexual assault.
The legislature recognizes the laudable and successful efforts of law enforcement in the utilization of forensic analysis of sexual assault kits in the investigation and prosecution of

crimes in Washington State. In 2015, the legislature enhanced utilization of this tool by requiring the preservation and forensic analysis of sexual assault kits. The legislature intends to continue building on its efforts through the establishment of the statewide sexual assault kit tracking system. The system will be designed to track all sexual assault kits in Washington state, regardless of when they were collected, in order to further empower survivors with information, assist law enforcement with investigations and crime prevention, and create transparency and foster public trust." [2016 c 173 § 1.]

The system improves the tracking and availability of sexual assault information to survivors. The new system gives survivors the ability to anonymously access and track the location and status of their sexual assault kit online, from the time of collection through analysis at the crime lab, to final storage location and possible destruction. The Tracking System also offers survivors resources and contact information to the hospital and law enforcement agency that handled the kit.

In early 2019, the SAK Tracking Team was contacted via email from a survivor who was sexually assaulted and wanted to know the status of her kit. At the time of her assault, the SAK Tracking System did not exist and therefore her SAK did not have a barcode on it. The SAK Tracking Team was passionate about helping the survivor and acquired the necessary information from the survivor to assist her. We gathered certain information from the survivor, e.g. the law enforcement agency (LEA) that took the report, date, case number. We then contacted the LEA with the information we obtained from the survivor. The LEA was able to locate the SAK from the information we obtained. Again, the SAK did not have a barcode on it. The SAK Tracking Team was able to take a barcode to the LEA and asked the LEA to place it on the kit. We then asked the LEA to contact the survivor to give her the barcode number and explain to her how she can now track her kit by using the SAK Tracking System.

Prior to this legislation, survivors had no way of knowing the location or status of their kit. The Tracking System provides start-to-finish SAK inventory tracking to deliver accountability, transparency and information sharing among all stakeholders, and most importantly provide the survivor with peace of mind. Through the extended use of this system, it will create more efficiency and accountability in SAK evidence workflows, thereby preventing the accumulation of un-submitted kits.