Preserving Applications for Healthy Cybersecurity

State of Minnesota — Minnesota IT Services

CATEGORY:
Cybersecurity

CONTACT:
Emily Shimkus
Director of Communications
emily.shimkus@state.mn.us
(O) 651-201-1011
(C) 651-485-1354

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Executive Summary

The Application Preservation Program is a **cybersecurity initiative** for the Minnesota Department of Transportation (MnDOT) aimed at keeping their agency-specific applications in good technical health. Applications that fall into disrepair and run on obsolete, unsupported technologies quickly become cybersecurity risks. Even the stable applications can deteriorate over time as the technologies they run on age and become unsupported. Application preservation reduces risk by proactively resolving technical health issues.

Minnesota IT Services (MNIT) mapped out a strategy and set up an ongoing program to identify technical health issues, prioritize resolution, engage business partners in investment decisions, and then staff full-time, permanent teams to complete technical renovations.

The greatest hurdle in this effort was to help our partners at MnDOT understand the priority and staff needed to protect its applications. In the past, applications were renovated only when necessary. Application components, such as operating systems and databases, were handled on an as-needed basis, almost always in crisis mode, which is inefficient and disruptive. Most of the renovation efforts involved small armies of expensive consultants, who first had to learn the application and environment, only to walk out the door at the end of the project with valuable security-related knowledge. The greatest gain of hiring permanent, full-time employees is in staff knowledge retention. With every application they work on, they better understand the business practices, and the application technologies and environments. This is a great investment in the future as ongoing efforts get more and more efficient. Hiring full-time staff is also dramatically cheaper than consulting help. Most importantly, by staffing and planning the work, MNIT's process is much less disruptive to MnDOT.

Application Preservation Program is based on the concept of a three-year review cycle. Every application has similar components – operating systems, databases, middleware, etc. There are many flavors (Windows, Linux, Oracle, Microsoft) and they all have different support cycles. By comparing a matrix of the components and their end of support dates, MNIT and MnDOT identified three years as the least common denominator. Each application is then added to a current "stack" at the beginning of the three-year cycle. The application gets basic maintenance during that cycle. Server stacks are standardized to avoid having to be on the "latest and greatest," versions of products which all too often are buggy and problematic. Staff get to work in a well-supported, well-resourced space.

On the staff side of the Application Preservation Program, rather than forming a dedicated team, most new hires were added to existing service teams. For example, new employees in Quality Assurance, Infrastructure, Database, Middleware were added to those corresponding teams. Adding to the capacity of these existing teams has multiple benefits. MNIT is adding entry level staff who can take load off the more seasoned staff to work on Application Preservation efforts and create succession paths. Someday, MNIT's new, entry level hires will be the seasoned veterans of the groups. Most importantly, by making Application Preservation part of every service, MNIT and MnDOT achieve an agency-wide model that engages everyone in the effort.

Exemplar

The Application Preservation Program promotes a process of **planned maintenance** which reduces downtime and consolidates maintenance efforts to provide more secure, available, and useful systems. Where MNIT previously had to update several components of an application individually, now we **renovate the entire application** at one time, and do basic maintenance (patches and updates) until the next cycle.

In the past, systems were viewed as tools to accomplish specific goals, and the maintenance of those tools was obscure, often neglected, and undervalued. These systems are now stitched into all business workflows, as everything MnDOT does depends on a seamless suite of technology solutions. Keeping that entire machine working means treating application maintenance as a **planned, coordinated program**.

Maintaining systems is not a new concept, but it is all too often left unaddressed. Business leaders (and even IT leaders) will almost always invest in new functionality and features before they invest in maintenance. By investing in this program, MnDOT showed **commitment and foresight**.

The Application Preservation Program **integrates IT and business practices** to achieve a priority and resourcing level that is as efficient as possible. All applications have Business Value and Technical Health rankings, which are considered when MNIT and MnDOT plan priorities and work schedules. The teams working on the Application Preservation Program gather input from MnDOT and its stakeholders to make sure that preservation work is not scheduled for an application that will soon be retired, replaced, or have major functionality enhancements made. Whenever possible, application preservation work is also grouped by business function, so multiple disruptions to MnDOT are consolidated and scheduled during non-peak seasons/times.

Concept

State and local governments are notorious for being **under-staffed, and behind schedule** on application maintenance. This is a troubling cybersecurity risk and, while IT staff work hard to get the job done, without investment at the business level this problem only gets worse. The Application Preservation Program puts the focus on applications that are important to MNIT's business partners. That helps everyone make a direct connection between the **investment in staff**, and the health, longevity, and security of their applications.

In the past, most application maintenance was done only when there were significant security or operational risks to select components of the application. These efforts were often done on tight schedules, and they were costly and disruptive to the business. By approaching this maintenance from the perspective of preserving applications, MNIT was able to highlight the high cost of working in crisis mode while demonstrating a **lower ongoing cost with less disruption** by making a business investment in IT staff.

By calling attention to the increases in efficacy and cost effectiveness of a planned, appropriately staffed program, MNIT was able to help MnDOT prioritize the effort and resourcing it needed. The primary investment is staff. MNIT hired 17 full-time staff, placed in all areas of IT operations—the largest single increase in MNIT staff partnering with MnDOT.

In 2016, MNIT began using **Cybersecurity Risk Scorecards** to present a picture of agency information technology in a way that made sense to business leaders and to create an accurate inventory of their IT assets. The Scorecards use a foundational framework, common business software, color coding, and plain business language to bridge the gap of understanding between business and information security. Business leaders see a **dashboard** that shows exactly what information and technology they have, the security risks and application maturity scores, and how their business decisions and investments impact those risks. The team used the Scorecards to **help business make decisions about IT**.

To **measure effectiveness,** the team produces regular reports showing MNIT's progress in working through the portfolio of applications at MnDOT. The team has also been able to **demonstrate results** via the Cybersecurity Risk Scorecard. Specifically, the number of servers running current operating systems has increased measurably as a direct result of this effort.

Despite the staffing investment, the program still has several challenges. To assure continued support and funding, MNIT and MnDOT need to **communicate clearly and frequently**. The team meets regularly with MnDOT senior management and executives to review successes, challenges, and status. In addition, MNIT informs the MnDOT Technology Investment Management (TIM) Office to let its business partners know that MNIT will be working with their applications. The TIM Office also helps business partners understand the process and need for testing and engagement. By approaching business partners from two angles the team has found an improved rate of success.

Significance

This program is one of the **first of its kind in Minnesota state government IT** to involve a holistic approach to application maintenance, and to address security and risk management by doing so. The scope and scale of MnDOT applications is vast and historically very distributed in nature. The Application Preservation Program addresses almost 600 applications in the MnDOT Application Portfolio. These applications serve 5,000 employees, contractors and business partners in 30 office buildings, 200 rural truck stations, dozens of construction sites, and 100 unmanned instrumentation sites. These applications do everything from managing billions of dollars of state and federal investment in transportation to the depth of frost under Minnesota roads.

Not only are MNIT and our partners at MnDOT striving to **consolidate and minimize disruptive maintenance**, but the team is also working toward a **regular cycle**. In the past, a few applications had some maintenance cycles but those were rare and not always followed. This program treats the entire portfolio of applications, tracking and managing maintenance activities to produce a regular, predictable maintenance cycle.

Our Application Preservation Program is primarily a **security and risk management** effort, a **top priority** for MNIT, and also for NASCIO State CIOs. But, like many good efforts, it is **not one-dimensional**. In addition to providing measurable progress in MNIT and MnDOT's cybersecurity profile, the project that stood up the Application Preservation Program was very much about **customer relationship management**, also priorities for both MNIT and NASCIO State CIOs. This was an opportunity for MNIT to fully engage MnDOT business partners on many levels to build awareness of the problem and solution. Most importantly, it was an opportunity to build customer **agency confidence**, which led to an **unprecedented** level of **long-term investment**.

Impact

The impact of The Application Preservation Program is real and measurable. In a year, the team has worked through over 165 applications, **doubling the Cybersecurity Risk Scorecard numbers from the initial 1.4 to 2.8**, and consequently **lowering MnDOT's risk profile**. The team has also **reduced impact** to business by consolidating maintenance activities to happen at the same time. One of the most valuable impacts MNIT and MnDOT are already seeing is that staff **retain knowledge** from the program, which makes them more efficient going forward. Previously, consultants were hired and knew nothing of the environment or business practices. Permanent staff continue to learn and build business-related knowledge, which makes their work more **efficient**, and makes them more **valuable assets** to the agency.