



**From Cracks
to the Cloud:
Profiler and
Pathway
Data Migration**



Launching Wisconsin DOT into the modern era using cloud technology

State: Wisconsin
Agency: Wisconsin Department of Transportation
Award Category: Business Process Innovations
Project Title: From the Cracks to the Cloud: Profiler and Pathways Data Migration
Project dates: June 2024-March 2024
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Executive Summary

The project aims to migrate Pavement Data stored on Isilon Storage to the Cloud. The current storage infrastructure is at its end of life, leading to multiple emergent recovery efforts due to capacity, software, and equipment limitations. Due to emergent issues, capacity and the next annual storage cycle approaching, it is necessary to migrate off the current storage device to a more appropriate storage platform that is appropriately sized and maintained.

Project Description

The project involves migrating Profiler data, collected annually from 2008-2017, from both Primary and Secondary locations to a single cloud location. This data encompasses annual roadway conditions for 25,000 miles of Wisconsin roadways, totaling 110Tb. The migration process includes data transfer, validation, deletion from current locations and decommissioning of associated solutions. Additionally, the project will establish Proof of Concept and model data migration methods for other data stores within the Pathways bureau, focusing on data management, business operational practice and resilience.

Key Deliverables

- Migration of data to Cloud location
- Implementation of resilience through cloud backup
- Decommissioning of legacy systems

Idea

Enhancement of data management, operational practice, and resilience

The current state of data management involves distributed locations and servers nearing capacity and end of life. Current state maintenance and emergent activity are peaked. Access to data is a long process and due to data locations requires physical devices and handling which requires the devices to be shipped, copied manually and other user intervention.

The idea is to provide a common platform, accessibility, and a platform that meets the Pathways needs of today and tomorrow - expandable without intervention and resilient. The Cloud offers the option to store and access data without physical devices, fewer on-premises servers/storage devices and an environment where access and storage is customizable to drive operational efficiency.

This also facilitates the burden reduction. Today's environment is distributed among the Wisconsin State Government IT Services at the Enterprise Technology Services and Wisconsin Department of Transportation (WisDOT). Distribution is held within Enterprise Technology and WisDOT Bureau Information Technology. The Technology is based on physical devices that are aging, out of warranty and at capacity. The idea is to locate the data at one secure, scalable, and common location accessible by the users and does not need WisDOT device maintenance.

What problem or opportunity does the project address?

The project addresses several challenges including:

- Aging physical devices,
- Expanding IT storage without adding storage inventory,
- Maintaining aging equipment,
- Managing devices in multiple locations,
- The project migrates from aging physical locations and devices and leverages the cloud for storage where capacity is unlimited,
- Resilience is built into the solution,
- Data maintained in the cloud will be more accessible,
- Increased security.

By migrating to the cloud, the project mitigates risks, enhances accessibility and security, and streamlines data management processes.

Why does it matter?

Security and Device technologies change rapidly. The management and maintenance of devices, network and applications is an ongoing effort. The placement of the data in the cloud moves the data to one location and mitigates many hands in the current environment. Other issues include:

- Risk is greatly reduced as platforms, applications, devices, and network connections will be fewer and maintained by a trusted cloud vendor,
- Accessibility will be heightened as data will be stored in one location,
- Accessibility controls will be heightened as IAM would be in place for the entire solution and not unique to locality,
- Public records requests would be more accessible as information is stored in a common location.

What makes it different?

The Pathways project is the first of its nature to migrate data from multiple locations both active data and secondary (backups) to one common platform in the cloud. It ensures:

- Communications ports to offload data leveraged to handle emergent and operational use,
- Data transfer has been validated to be complete/accurate,
- Cloud service has been efficient and predictable,
- Decommission of communication ports and legacy servers has been efficient,
- Data transferred to the cloud is configurable to maintain its legacy schema or customize the schema to match the go forward plan and application support.

What makes it universal?

It standardizes data storage and access controls, ensuring consistency and efficiency across operations:

- Tooling is universal to migrate data from source to cloud,
- Tooling options to manage and process data are many, the solution in place can leverage multiple processors (scaled) based on need,
- Data stored uses its current schema or is customized to meet business needs.

Implementation

What was the roadmap?

Solution roadmap is to address the emergent issues with storage devices and capacity and operationalize one source for data management. The roadmap horizon includes addressing immediate needs and to migrate data to a common/consolidated location rather than a distributed location.

- Achieving a common/consolidated data store location
- Reduce hardware physical inventory and footprint
- Better serve the People and State of Wisconsin with data access

Project Management approach is Agile and delivered incremental change.

Project management needed to facilitate multiple entities and address emergent situations with capacity and maintenance on aging equipment. The project leveraged Agile methodology and leveraged controls in place with multiple organizations.

Project Management engaged with key partners and structured the work to ensure a solid foundation was built, data migration, validation and decommission of existing solutions.

Project success is defined by:

- Producing a repeatable and operational solution,
- The migration needed to migrate data to a common schema as defined by business stakeholder,
- Migration needed to be accurate with minimal/no human engagement,
- Legacy data stores are decommissioned.

Who was involved?

- Department Enterprise Technologies
- Bureau of Information Technology Services (BITS) Operations
- Bureau Information Technology Services Department Transportation Investment Management (DTIM)
- Cloud vendor

How did the solution get organized, and work completed

Enterprise Technologies has been engaged as stewards of storage and infrastructure for legacy data. Devices have been monitored and storage capacity has been attained, new capacity is required. Further the existing storage devices are aging and requiring emergent maintenance. Enterprise Technologies

communicated necessity for further capacity and maintaining devices. Enterprise Technologies and BITS Operations, DTIM-Pavement Unit, DTIM and cloud vendor the team designed and delivered a solution, performed data migration, validated migration, removed data from legacy location and decommissioned legacy services and storage devices.

- BITS Operations CSSE is at the core of configuring the cloud solution and migrating the data to the new location,
- DTIM – Pavement Data Unit identified and managed the data structures and validated accuracy,
- DTIM – Pavement Data Unit developed operation practice to manage and maintain data,
- DTIM – Pavement Data Unit is positioned to manage and access data based on User Role,
- DTIM – Pavement Data Unit will have a one stop shop to access data.

Buy-In from the business and those involved were present in the decision process and design of the solution. Further as the solution was designed and delivered the involved individuals (groups) were engaged and trained. The solution was delivered in an incremental format so that those involved were presented with success along the way. Each step built upon the prior and results were evident. In the end the project team watched and learned solution configuration, data migration and accesses Profiler data in the cloud. Approval and request to decommission the legacy solution was embraced and acted upon without reserve. Decommission was celebrated within the team and in reporting with management across the teams.

How did you do it?

The key to the “How” is to maintain communications, engage individuals and make each step along the way meaningful.

Engage the team: the team needed to focus on the goal and be part of the solution. While IT and business contributors are of a different role, each has ownership in the outcome. To ensure contributors were engaged the follow vocabulary and actions were important and engaging for all:

- Aligned roles of the parties involved,
- Planned the solution vision with the team,
- All individuals delivered/contributed,
- Celebrated successes and learning.

The project priority was to attend to timely delivery and mitigate issues. The path to success required thoughtful planning and consistent task completion. There was limited room for timeline slippage. Engaging the individuals and holding firm to commitment, early identification to roadblocks and celebrating accomplishments kept the team engaged and enthused.

The project is leveraging the cloud for data storage. Prior storage was maintained in four primary storage locations and backup locations. Management and maintenance for the systems and access control was laborious.

Going forward, the new system will leverage one cloud instance where the data will be stored at different accessibility levels and backed up. Further, high-capacity storage units will be eliminated from

the architecture. Access management will also be minimized as the storage will be limited to one cloud instance and four roles.

Key benefits derived by project:

- Accessibility – User Roles are better managed,
- Data accessibility – data will be stored in one schema and one point of service,
- Data management and migration is automated and local in the cloud – no manual process,
- SOC II compliance, Resilience.

Impact

What did the project make better?

The project enabled the business and IT Support to better manage data. The project lowered the support burden on hardware, security, devices, manual operations, and data accessibility.

- The project result demonstrated a highly repeatable process to migrate data and manage data,
- Business unit readily access to information.

The Legacy environment had been distributed to multiple locations and in some cases communication between appliances was walked and transported between locations. Data stored in the cloud is now available to all who should have access from their desktop.

The project has developed and exercised an approach to migrate data from aging platforms. Where capacity and aging platforms are causing maintenance and support activities. This project has produced a planned mechanism to address migrating data from at risk platforms.

How do you know?

Data management from collection to storage location and processing. At present, the manual process to copy, load and transport may require 4-6 days (physically copy, drive/deliver) between locations just to make data available for business operations. The solution delivered in this project eliminates the manual processing and transport. Now the data is readily accessible to those on the company network.

- Data storage eliminates the purchase of further large storage appliances,
- Eliminate support of devices (storage) and associated backup storage devices, network, and security - software, licenses
- Data is readily available,
- Data Storage per year of data in Long Term storage is a fraction of the physical devices.
- The cloud solution is readily available 24 hrs. a day and always up,
- Hardware maintenance and operation is managed by the cloud provider.

What now?

Moving forward, the initial investment in discovery and execution will yield dividends by providing better access to data and reducing infrastructure burdens. The project ensures operational continuity

with data transferred to long-term storage in the cloud, paving the way for future initiatives to leverage cloud-based solutions for data storage and management.