NEUDESIC

E470
Public Highway Authority

Smarter toll road management taps into automation, cloud systems, and predictive analytics

🎯 The Challenge

- Roadway partnerships drove increasing amounts of data, requiring attention to smarter data management and effective analytics
- Reporting capabilities needed to capitalize on the timely value of data needed to enable predictive analytics
- Absence of a single view of data enabled conflicting interpretations of toll road performance
- Flexible, scalable technologies were needed to ensure growth in existing services and attract new partners
- Technology platform needed to better represent E-470's innovative nature as a company

📦 The Solution

- Deep technology partnership with Neudesic fueled the project with strong understanding of development needs
- Capitalizes on Neudesic's proven Microsoft expertise including Software-as-a-Service (SaaS) and Platform-as-a-Service (PaaS) capabilities
- New cloud platform considers performance, flexibility, and supportability, incorporating Azure as a long-term analytics architecture
- Custom, full-featured platform marries a range of primary technologies, adding components to fill in gaps unique to E-470

📈 The Benefit

- Smart combination of Microsoft technologies delivers a best-fit architecture for E-470's internal expertise
- Single view of data formalizes the analytics process and prevents inconsistent interpretations of business performance
- Predictive analytics modeled historical patterns and trends in data to predict future business outcomes
- Self-service reporting is simple and consistent, relying on the same single data truth
- Automated processes empower E-470's workforce for growth instead of routine operations
- Strong long-term growth position, based on scalable technology to attract new partners and develop new services

TECHNOLOGIES IN FOCUS

- **Azure Data Factory**
- **Azure Data Lake**
- **Azure Data Warehouse**
- **Azure Analysis Services**
- **Azure Machine Learning**
- **Azure Automation**

The Client

As a leader in the tolling industry, E-470 advocates an innovative and entrepreneurial approach to improving service and supporting roadway partners. The agency manages a 47-mile stretch of Colorado highway – primarily funded by tolls and using no tax funds to maintain operations, it is the first all-electronic toll road in America. E-470 maintains an A-class rating on its roadway and supports roadway partners such as the Colorado Department of Transportation, Plenary, and Northwest Parkway with operations such as data management, billing, and customer service.

The Challenge

Operationally, the E-470 business model works in two distinct ways. Monthly account holders utilize RFID technology, which adheres to the vehicle windshield, connects to a financial account, and authorizes a transaction each time a toll is incurred. Alternatively, E-470's cashless system relies on cameras which snap multiple images of vehicle license plates as they move through a toll area, ultimately going through a series of steps to generate toll billing. "Ideally, image data is processed using Optical Character Recognition (OCR) technology; however there is always a need for manual support. It is demanding but allows us to provide the best service to customers who need flexibility in how they use our roadways," Ryan Ninness, Senior Application Development Manager, E-470.

Together, these multi-step processes represent a vast trove of driver data. For E-470 and its partners, seamless and efficient toll operation is dependent upon high performance systems for data collection, processing, and management for analytics.

"Between the stretch of highway we manage directly and the toll lanes of our partners, there is a tremendous amount of data consuming the network," Mike Lahey, BI Analyst, E-470. "Finance records, images, billing, and more are the very definition of big data, which moves at an incredible pace given the nature of our business."

While robust and high performing, E-470's existing data center infrastructure was demonstrating limitations in the areas of business intelligence, analytics, reporting, and data warehousing as the agency's services grew. For example, IT was required to facilitate even simple reporting requests, reducing the speed and effectiveness of the reporting process. "We needed to integrate self-reporting functionality to better serve stakeholders, and also wanted to ensure consistency in how data was gathered and constructed to inform business decisions," Ryan Ninness, Senior Application Development Manager, E-470. "E-470 is considered an innovator in this industry, leading the charge in technology-based roadway management. We began to consider a new kind of infrastructure – better matched to the pace and scope of our data management needs."

> **Neudesic took steps to understand our needs on a deeper level, generating clarity and confidence in our choice to move to a fully cloud-based platform. Today, E-470 is on a forward-thinking growth path that more closely relates to our operational style, enabled by smart, flexible cloud technology.**
>
> **– Ryan Ninness, Senior Application Development Manager, E-470**

The Solution

Neudesic came on board as E-470 was considering its options in terms of building out a significant new on-premise solution or adopting a cloud strategy. "Neudesic came to us initially with three possibilities: upgrade the existing on-site server capabilities, execute a full jump to a cloud-based system, or create a hybrid of the two approaches,"Ryan Ninness, Senior Application Development Manager, E-470. "It was clear their recommendations were about our needs rather than a specific technology. Our leadership opted for the bold route and a complete cloud buy-in." Neudesic focused on Azure's Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS) components, including Azure Analysis Services, Azure SQL Data Warehouse, Azure Data Factory, Azure Data Lake Store, and Azure Machine Learning. "Neudesic has a proven track record with Microsoft Azure, and their professionals bring extensive competencies to the table," Ryan Ninness, Senior Application Development Manager, E-470. "Implementing SQL-based technologies was smart for our internal team as well, creating an architecture we could readily support and manage."

Microsoft Power BI provides the front-end user interface, and has helped promote E-470's transition to more proactive analytics. "Our predictive capabilities have evolved dramatically, based on the modern data platform design which provides access to more consistent and timely insights into what is happening within the system and with our customers," Mike Lahey, BI Analyst, E-470.

" *The Neudesic team offered both strategic and tactical intelligence on how to improve our IT infrastructure and predictive analytics capabilities – blending Microsoft expertise with creative solutions and a personal approach.* "

– Ryan Ninness, Senior Application Development Manager, E-470

The Benefit

E-470's unified view of data – a single source of truth for reporting and predictive analytics – has enabled material change in its operations. For example, the group can access weekly snapshots of system performance, in contrast to the quarterly reports they relied on in the past. "We're getting more insight out of data because we can actively see the health of our business. Predictive analytics are smarter, inefficiencies are managed immediately, and we're a better, faster, more productive firm." This more robust infrastructure positions the agency for continued growth in partnerships and the types of services offered. "Our new platform essentially catapulted our data & analytics capabilities to the forefront of industry solutions," Ryan Ninness, Senior Application Development Manager, E-470. E-470's partners also have unprecedented access to an on-demand, anytime-access system, poised to handle additional services and data that will grow revenue.

E-470's modern data platform also streamlines financial analytics in real-time, pulling in different parameters for immediate reporting. Instead of having to make theoretical adjustments to the data – such as accounting for an extra weekend, holidays, or bad weather in a given month – the agency can adjust reporting in real time. "We now have access to data that can really optimize business decisions through a platform of our own design. It's enhanced global understanding of our customers, and unified our thinking as an agency – driving productivity, reducing costs, and keeping us in the technology lead," Ryan Ninness, Senior Application Development Manager, E-470.

Self-reporting functionality is now a reality at E-470, with positive impact on speed and quality of reporting. "Previously, it took 30 days or more after tolls were incurred before we could access critical metrics such as revenue leakage or service issues. We now have that data in days, and can access two years of historical data relating to finance, collections, and imaging on a weekly basis."

Cloud migration also positions E-470 to pursue opportunities that would have been out of reach with alternative solutions. "Automation in imaging is an area where we can innovate based on improved data management capabilities, for example integrating a secondary OCR engine to reduce manual review of license plates," Ryan Ninness, Senior Application Development Manager, E-470. E-470's cloud-based system is not only reducing costs and opening opportunities for growth, but also positioning the agency for a scalable, high performance future.

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