



Opportunities for Electronic Tolling Authorities

Advancements in Customer Service and Revenue Management Systems



PAVING THE WAY

The tolling industry paved the way for the future of revenue management in the transportation industry. It's a bold claim, but one supported by history.

One of its greatest and most obvious innovations was the use of wireless radio-frequency identification (RFID) technology for in-vehicle tags. With its roots in “identify friend or foe” (IFF) radio reflection technology, developed by the British during World War II, tolling was one of the earliest large-scale uses of RFID.

Today, RF-enabled wireless devices are everywhere: mobile smartphones and tablets, passports, cars keys, bank or transit payment cards and just about everything else you can think of. In-lane wireless systems are becoming a commodity. Just look at the cost advantage of ISO 18000-6C ultra high frequency tags.

But the vehicle and in-lane technology are only parts of the story. Toll collection needed to be an integrated payment processing, customer service and financial management platform. As a result, back office systems (BOS) were added to accomplish these goals, usually as an afterthought.



The results of these innovations were astounding. Customers benefited from faster travel and convenience when paying tolls while agencies experienced lower costs, increased revenues and better throughput on toll roads and bridges.

Conversely, there are problems too. Changes are expensive and time consuming due to the proprietary nature of the systems. Operations and customer service systems struggle to keep pace with advances in web and mobile self-service and drive up costs by requiring expensive custom upgrades. In accounting for its revenues, the industry sees increased costs and, in many cases, direct losses from fraud and reconciliation difficulties closing the books. The proprietary system architectures make it difficult to alter pricing and other business rules and to keep pace with industry security requirements like Payment Card Industry Data Security Standards (PCI DSS).

Despite these pervasive and evident problems, the industry has maintained its focus on the tag, reader and lane controller, in an attempt to solve problems at that level rather than rethink the back office.

Fast forward 20 years, the advances in Customer Relationship Management (CRM), accounting systems and payment processing systems outshine even RFID in-lane technology and have become the new tools to manage a toll system.

This brief will explore challenges and opportunities created by these advances in technologies across all of the domains relevant to tolling systems — payment processing, customer service and financial management.

As a leading integrator and provider of transportation technology and services for intelligent travel solutions, Cubic Transportation Systems managed

\$18 billion in revenue collection in more than 400 transportation projects in 40 major markets on five continents last year alone. Many tenets and foundational elements of our NextCity vision of the future underpin our discussion of the opportunities in front of the tolling sector and knit together the potential of the entire urban transportation infrastructure.

...THE ADVANCES IN CUSTOMER RELATIONSHIP MANAGEMENT (CRM) ...OUTSHINE EVEN RFID IN-LANE TECHNOLOGY AND HAVE BECOME THE NEW TOOLS TO MANAGE A TOLL SYSTEM.

Our solutions integrate with leading processors like First Data and global payment networks like American Express, Mastercard and Visa to help transportation operators ensure that millions of transactions are securely conducted every day between the right parties. Our operations systems power millions of accounts with full access for customer service and accounting while protecting individuals' privacy and security so they can have no fear of being spied on or hacked.

Drawing from our extensive knowledge and experience, we hope the information shared in this guide will empower you to find actionable ideas that you can use to implement highly resilient and effective payment processing, customer service and financial management platforms.

EVOLVE FROM PROPRIETARY TO OFF-THE-SHELF SYSTEMS

Two of electronic toll collection's many achievements and innovations—account-based customer relations and interoperability between multiple agencies—have become even more critical today and make the modernization of tolling BOS a management imperative.

Before electronic toll collection began about 20 years ago, toll patrons were completely anonymous. They just threw money into a coin basket or gave cash to a toll collector. When someone paid a toll, no one knew his or her name.

Electronic toll collection changed that. When someone created a tolling account and tied a payment source and tag to it, suddenly the authority knew that person by name, and he or she became a real “customer,” creating the need for integrated “customer relations” support systems.

Multi-agency interoperability is an equally enduring innovation. E-ZPass, while not the very first electronic tolling collection system in the U.S., was the first multi-agency system covering a large geographic area. Introducing multiple partners, each with their own general ledger and business rules, added complexities for revenue apportionment. At the same time, the high dollar values of the revenue in tolling systems created the need for security, reconciliation and compliance requirements.

Finally, the entire process depended on payment processing that connected funding to the tolling accounts and the tag itself.

All of these capabilities were fundamental to electronic tolling, which created the need to integrate a unique set of capabilities that spanned CRM systems, accounting systems, payment processing and the front end in lane system and tags. Added to that was the historic reality that BOS, in the early years, was treated as an afterthought that was added on later.

As a result, electronic toll collection developed as proprietary custom systems

TODAY, ADVANCES IN BUSINESS SYSTEM ARCHITECTURES HAVE PROFOUND IMPLICATIONS FOR TOLLING AUTHORITIES BECAUSE THEY CREATE THE OPPORTUNITY TO USE OFF-THE-SHELF, BEST-OF-BREED COMPONENTS INSTEAD OF THE TRADITIONAL CUSTOM AND PROPRIETARY APPROACH.

that knitted these unique requirements together. Procurements were complicated by the need to create detailed specifications that defined the necessary functionality across all of these domains. Changes were expensive and time consuming. And perhaps the biggest problems of all stemmed from the need to determine and specify, in advance, every detail of how these systems needed to operate. Keeping up with new customer channels like web and mobile and keeping up with advances in payment processing technology also present new challenges and add additional expense.

Today, advances in business system architectures have profound implications for tolling authorities because they create the opportunity to use off-the-shelf, best-of-breed components instead of the traditional custom and proprietary approach.

Thousands of the world's biggest brands such as FedEx, UPS, HSBC, the Bank of England, SunTrust, Transamerica and Prudential already use these off-the-shelf components to provide world-class customer service and accounting platforms for their operations.



These applications are highly flexible and easily configurable so they can be integrated and customized for any industry, including tolling.

One obvious key benefit is that agencies no longer need to specify and pay for custom systems tailored to their individual requirements. In addition, because these systems are easily configured, changes can be made much faster and more cost effective than in traditional proprietary systems.

Finally, enterprise-class best-of-breed systems deliver the collective benefits of the best business practices and requirements of leaders in all other major industries like financial services and logistics that use these same systems. In turn, this creates many opportunities for tolling operators to enhance their operations, customer service and financial security and management. These topics are explored further in the sections below.

However, with transportation infrastructure already struggling to cope, cities must look to other alternatives in order to fill the void caused by changing models of car ownership. That is because, while the demand for car ownership may be decreasing, the demand for mobility services is on the rise.

SHARE SYSTEMS ACROSS AGENCIES, STATES OR REGIONS

A tolling system architecture built on an enterprise-class accounting and financial management platform lays a solid foundation for account-based payment processing and customer services across entire states or multi-state regions for any agencies or types of operators.

State-of-the-art accounting and general ledger platforms are inherently designed for multi-entity use. Core business rules engines that are both powerful and flexible enable each participating entity or division to control its own business rules, pricing, revenue apportionment, transaction clearing and general ledger.

A further advantage is that business rules are clearly visible in the system, not just sitting in a book on a shelf. At any time, financial managers can see exactly how the rules are being applied right down to the general ledger it feeds and can adjust or change them as needed.

This approach delivers the best of both worlds—the control and customization of separate systems as well as the many benefits of using a common platform. For one thing, a shared system costs less than buying and operating multiple ones. Another advantage is that all participants get the same high-quality tools for customer service and accounting, which is particularly valuable for smaller agencies.

Finally, aggregating transactions generally has a favorable impact on unit costs and efficiency. This motivates program participants to bring in more agencies and promote more widespread use of the platform.

IMPROVE FINANCIAL SECURITY AND EFFICIENCY

The financial integrity, accountability, auditability, compliance and efficiency of revenue management for tolling operators significantly improve when off-the-shelf business systems are used instead of custom, proprietary developments. One major advantage is that enterprise-class PCI compliance is provided for key parts of the financial processing system.

Excellent tools are also provided for managing aggregations, auditing, reconciliation, settlement and reporting. Even at the transaction level, auditors or financial managers can drill down on suspended transactions to resolve them or investigate any discrepancy. The built-in capabilities reduce the time needed to reconcile and close out a month (or any period), something that is often a challenge in proprietary systems, such as those typically found in the tolling industry.

Another very important set of advantages is that an enterprise-class accounting system lowers the risk of losses due to fraud, security concerns or errors. Since the systems are proven in use by thousands of blue chip companies and are compliant with accounting reporting standards (GAAP, IFRS), the security and financial safeguards are well developed.

The bottom line is that using off-the-shelf, proven accounting systems enables tolling agencies to run their businesses effectively and securely.

PROVIDE ROBUST CUSTOMER SERVICE ACROSS ALL CHANNELS

As with accounting, incorporating an enterprise-class CRM platform in a tolling system provides a proven, robust customer contact solution for customer service and self-service across all channels, including tools for efficient live-agent management as well as web, mobile and interactive voice response (IVR).

Enterprise-class off-the-shelf solutions are far more comprehensive than traditional custom built tolling systems because they have evolved through the use of best business practices of thousands of successful companies in many consumer facing industries like banking, insurance and shipping.

A TOLLING SYSTEM ARCHITECTURE BUILT ON AN ENTERPRISE-CLASS ACCOUNTING AND FINANCIAL MANAGEMENT PLATFORM LAYS A SOLID FOUNDATION FOR ACCOUNT-BASED PAYMENT PROCESSING AND CUSTOMER SERVICES ACROSS ENTIRE STATES OR MULTI-STATE REGIONS FOR ANY AGENCIES OR TYPES OF OPERATORS.

These systems are easily tuned for operations oversight with single-pane, at-a-glance management “dashboards” and built-in capabilities for tracking Key Performance Indicators (KPIs). These tools are easily reconfigured and changed so that workflows can be optimized continually based on experience gained over time using the system.

Customer service representatives are given what they need to drill down into specific accounts and transactions in order to answer customer questions and resolve issues.

In addition, these systems are compliant with the best practices and regulations concerning Personally Identifiable Information (PII) such as payment account information, something that is now a legal requirement in most states.

BIG DATA AND ANALYTICS CAN OPTIMIZE RESOURCES

Large volumes of vehicle and passenger data are starting to pour in and hold the promise of helping to make cities’ roads, bridges, tunnels, highways and transit systems more efficient and rider friendly.

With “big data,” planners can now combine that with even larger sets of information from multiple sources. A new generation of analytics and visualization tools will enable them to get insights into what the massive amounts of information is telling them. The upshot is they will actually be able to predict what is likely to happen under different scenarios, making them far more effective at restructuring the entire city’s transportation networks than they are today.

With better tools and more dynamic views of data, planners will be able to link trips and look at whole journeys. Their planning will be able to incorporate the relationship between



origin and destination and cross all modes of travel, not just the toll roads, bridges or transit systems.

Armed with broader and deeper insights, planners can more effectively spot trends and take proactive action to balance demand against capacity when restructuring services. For example, knowing the origins and destinations of passengers’ journeys lets planners determine not just how many people will be impacted by a schedule change, but what their re-route possibilities are and determine the actual time impacts on those affected. That insight lets planners deeply assess the real customer travel implications of the changes they make.

Using predictive analytics, planners will also be able to model policy decisions such as changing the pricing of interlocking tolling, bridges, parking and transit to help optimize resources and throughput.

Data visualization is equally important to achieving these goals as new analytics tools and massive cloud data stores and number crunching computers. Through the application of innovative state-of-the-art visualization techniques, analysts and planners will be better able to get actionable

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insights from these massive data sets, model different scenarios and then more effectively communicate the conclusions to other stakeholders.

Big data has already begun transforming other sectors like retail and logistics, but it is early days for its use in the tolling and transportation industries. Nonetheless, the potential gains from it are truly significant.

CONCLUSION

Traditionally, the tolling industry had to rely on proprietary, custom systems to meet its requirements. Changes were slow and expensive to implement, procurements were complicated and keeping up with all the different customer channels and payment advancements was truly challenging.

However, developments in business systems architectures, such as component systems for payment processing, customer service and financial management, based on world-class enterprise-level applications, gave tolling authorities the opportunity to make sweeping changes to the way they produce and operate their tolling revenue management platforms and change the face of tolling as we know it.

The time is certainly ripe for those next-generation solutions. Transportation providers all over the world, including tolling agencies, are only now coming to

terms with the new transportation reality, where growing customer expectations, the march of automation and the growth of mobility-as-a-service are dictating the rules of the game, creating new challenges but also new opportunities on multiple fronts. Modern technologies can help tolling agencies not only protect and better manage their revenues, but also provide an even better and more cost-effective customer service and thus support regional actors, local and central governments and other travel authorities in making urban travel simpler and more efficient across all modes of transportation.

With better tools, newest technologies and the ability to take advantage of dynamic views of data, those tolling authorities that make the most of the ability to replace expensive, proprietary solutions with next-generation, off-the-shelf alternatives are not only uniquely positioned to become an important piece of the modern day multi-

modal travel puzzle, but also cement their role in reshaping the mobility services to suit travelers and motorists now and in years to come.

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CUBIC – A LEADER IN INTELLIGENT TRAVEL SOLUTIONS

At Cubic, we believe our identity is intrinsically linked with our customers, and the people our customers serve. How they get from one place to the next – how that impacts their lives, their fellow travelers and their cities – and how it feels along the way.

That's why we're passionate about developing transportation solutions that improve the way we move throughout cities. Innovation is in our culture, and our history speaks for itself. In our 45-year history, we've delivered public transport fare collection systems to over 450 operators, including 20 regional back office systems, and traffic and transportation management systems for major cities and regions on four continents.

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