



TOLLING. MOVING SMARTER.

**Progress Report of the Interoperability Committee of the
International Bridge, Tunnel and Turnpike Association (IBTTA):
“Migrating to U.S. Nationwide Electronic Tolling Interoperability”
March 19, 2013**

Executive Summary

Since the introduction of electronic toll collection (ETC) in the United States in 1989, toll agencies have made substantial investments in ETC technology and millions of customers have enrolled in ETC programs. Each year, toll agencies in the U.S. collect billions of dollars in tolls through ETC transactions.

ETC systems developed “organically.” In other words, most individual toll agencies adopted ETC systems to serve their own customers and satisfy their own toll collection needs. As more and more agencies adopted ETC systems and more motorists came to rely on them, we saw regions of interoperability develop in which two or more neighboring agencies began to use compatible ETC systems that talked to each other and recognized one another’s customers.

Today, there are dozens of ETC systems operated by scores of toll agencies. Some of these ETC systems talk to one another and recognize one another’s customers; others do not. In addition, there are several large regions of interoperability (e.g. E-ZPass and SunPass) in which groups of toll agencies have banded together to adopt common standards so that all of the agencies within that region have ETC systems that talk to each other and recognize one other’s customers.

The goal of **nationwide ETC interoperability** is a system in which customers have the choice of opting in and are able to pay tolls on any participating toll facility in the country using a single account. The immediate goal is to achieve nationwide interoperability for valid pre-paid toll customers – in essence, registered toll customers. The plan does not include un-registered toll customers.

Efforts to establish national interoperability must recognize and address the established base of technologies and systems already in use, the capital investment expended on these systems, and the institutional and business agreements that must exist among toll operators to recognize a given customer and properly process a transaction to that customer’s account - thus ensuring that each toll operator is properly paid for the use of its facilities. Because different devices are used in the different regions, asking all toll operators to read all varieties of transponders in use would reduce both the reliability and accuracy of reading tags, and would force greater reliance on the more complicated, less accurate imaging of vehicle license plates to identify the account for the purposes of national interoperability.

To address this issue, the IBTTA IOP Committee is analyzing the different transponder protocols in use with the intent of recommending either a single protocol or a limited number of protocols that could function as a select set of common national standards.

MAP-21, enacted in July 2012, establishes a four-year deadline by which *“all toll facilities on the Federal-aid highways shall implement technologies or business practices that provide for the interoperability of electronic toll collection programs.”* While the law provides no specific mechanism to achieve this goal, we interpret this language to be a reflection of our request to Congress that the toll industry be allowed to resolve the issue without any specific mandates on the technologies or business rules to be used.

IBTTA and its member agencies, concessionaires and partners are working vigorously to make nationwide ETC interoperability a reality. We have much more work to do and many more issues to resolve before we are finished. This report describes our progress to date and our vision for the future.

IBTTA Interoperability Committee Report

Introduction: The Law under MAP-21.

MAP-21, the Moving Ahead for Progress in the 21st Century Act (PL 112-141), enacted in July 2012, established new Federal legislative language regarding Electronic Toll Collection (ETC) interoperability as follows;

Section 1512 Tolling (b) Not later than 4 years after the date of enactment of this Act, all toll facilities on the Federal-aid highways shall implement technologies or business practices that provide for the interoperability of electronic toll collection programs.

While MAP-21 does not provide specific direction for achieving this goal, the International Bridge, Tunnel and Turnpike Association (IBTTA) considers this language as supporting our request of Congress that achieving national toll interoperability is best left to the members of the toll industry to resolve.

Aware of Congressional interest in this subject, IBTTA established an Interoperability Committee in 2010 that has devoted considerable effort to formulating the following conceptual framework for achieving national toll interoperability. We are working systematically with numerous industry groups to forge the understandings and agreements necessary to establish a national interoperable toll payment system. This report is one of a series of regular reports we will make to keep Congress informed of our efforts.

Current Electronic Tolling Situation.

US toll agencies in 35 states already operate hundreds of millions of dollars worth of installed electronic toll collection (ETC) equipment (i.e., roadside infrastructure, toll tags and related systems) that generate more than \$10 billion in annual toll revenue while serving almost 40 million toll accounts across the country.

Efforts to establish national interoperability must recognize and address the established base of technologies and systems already in use, the capital investment expended on these systems, and the institutional and business agreements that must exist among toll operators to recognize a given customer and properly process a transaction to that customer's account - thus ensuring that each toll operator is properly paid for the use of its facilities. Additionally, many toll facilities have bond covenants that cannot be jeopardized or adversely impacted by new legislation without negatively affecting their bond ratings and their fundamental business operations.

Definition of Nationwide Electronic Tolling Interoperability

IBTTA envisions the "interoperable" toll system as one that allows drivers to establish a single toll account that would allow for payments on all US toll facilities. We envision that a driver who has a valid registered account with any electronic toll collection (ETC) system (i.e. E-ZPass, SunPass, TxTag, FasTrak, etc.) can have their vehicle identified seamlessly in the electronic toll lanes of any other ETC system using a required National Toll Tag (which would also be associated with their existing account) and have the appropriate fees deducted from their account. This would be accomplished by having the ETC system read an electronic toll tag or, at the election of the toll operator, using an image of the correctly registered license plate.

The Foundation of Nationwide Interoperability: Connecting Regions with a National Standard.

Current ETC operations require the use of a computerized toll transaction processing and customer account management system, commonly known as the "back office," serving either a single or multiple toll facility operators. The "back office" manages the posting of debits and payments to individual customer accounts within those systems and the transfer of funds among toll operators.

IBTTA's Interoperability (IOP) Committee currently envisions a nationally interoperable ETC system using regional service centers (hubs) which would offer a central information exchange for identifying an ETC tag in an "away" location and matching that tag or, at the election of the toll operator, an image of a correctly registered license plate, to the customer's pre-paid "home" account, similar to the process used in processing credit card and cell phone transactions.

Toll operators that are not already part of the four major regional programs (E-ZPass in the Northeast US, SunPass in Florida, TxTag in Texas and FasTrak in California) might elect either to join a regional program or submit their interoperable transactions directly to a central exchange hub. Toll road customers could then drive on any participating toll facility and be accurately identified by a transponder (or, at the election of the toll operator, their correctly registered license plate). Once properly identified, their toll transaction would be applied to their existing account, and all transactions would be managed through a single account.

The Cornerstone: Accurate Identification

Critical to the above process is correctly identifying the specific vehicle and linking it to a valid account registered in a different tolling system. The major regional toll systems today use different types of transponder tags. Each region's hardware was originally designed to meet the business requirements and performance criteria of the members of that regional toll system.

Achieving widespread interoperability requires that a toll operator can read both its “local” customers’ tags as well as those being used by travelers from other systems, without reducing reliability or accuracy or jeopardizing revenue collections.

Because different devices are used in the different regions, asking all toll operators to read all varieties of transponders in use would reduce both the reliability and accuracy of reading tags, and would force greater reliance on the more complicated, less accurate imaging of vehicle license plates to identify the account for the purposes of national interoperability.

To address this issue, the IBTTA IOP Committee is analyzing the different transponder protocols in use with the intent of recommending either a single protocol or a limited number of protocols that could function as a select set of common national standards.

To be considered for the national standard, a transponder protocol must meet the following two requirements:

- (1) The candidate protocol(s) must employ “open” technical and design standards – i.e. non-proprietary protocols available for use in devices and related equipment that can be built and sold by any entity that meets testing and certification requirements. This will promote market competition while ensuring interoperability.
- (2) The candidate protocol(s) must meet a minimum set of operating requirements and message data formats that will be established by the IBTTA IOP Committee after review and input from the toll operators and their consultants.

A Guiding Interoperability Principle: Freedom of Choice.

The foundation for national electronic toll interoperability should establish multiple choices for both toll operators and US motorists in how to collect/pay tolls and achieve interoperability. This matter of choice should facilitate implementation and adoption of interoperable standards and practices.

- (1) **National Toll Tag:** The identified national protocol(s) would initially be offered as a “second or alternate” tag within regions that do not use the selected protocol as their primary transponder. The second/alternate tag would be detected by more than one protocol, one of which could be the identified national protocol linking to the customer’s existing transponder account. When the customer **who has opted in**¹ to national interoperability travels outside of their home region, the second/alternate tag, in combination with their license plate (at the election of the toll operator), would be used to identify their “home” account.

Toll operators in regions already employing the “national” protocol would not have to issue a second tag. The changes required for these operators would be making the

¹ Existing toll operators whose current transponders are not the same protocol as the national toll tag may choose to allow existing as well as future customers to receive a “home” transponder that may be lower cost but only works within their “home” region, or for an additional cost the customer may chose to acquire a national toll tag which will work in other regions, allowing motorists to opt in to national interoperability at their own choice.

institutional and technical enhancements required to submit the interoperable transactions to the exchange hubs, along with updates to their back office and customer service processes if they don't already collect the "universal" data fields established by the IBTTA IOP Committee review, and have the transaction properly billed to the correct account and receive payment in return.

- (2) **Multi-Protocol Readers or Image-Based Tolling:** Toll operators and/or regions that do not have the "national" toll tag as their local device would have the choice of employing multi-protocol readers in their electronic toll lanes to read the National Toll Tag or to use license plate images (or both multi-protocol readers and images) as the mechanisms for identifying all toll customers (in-region and out-of-region). Electronic and image-based toll transactions would then be submitted to the agency's regional service center or a transaction exchange hub for clearance, account processing and payment.
- (3) **Toll Tag Conversion:** Regions and/or toll operators that do not currently use the National Toll Tag would have the choice of; (A) adopting the national protocol and replacing their current system, (B) maintaining their current system and processes while augmenting their lane equipment to include the national transponder protocol and offering their customers an option for acquiring national protocol toll tags. In the latter instance an agency may, at their option, use license plate images as the mechanism for identifying correctly registered toll accounts. Electronic and image-based toll transactions would then be submitted to the agency's regional service center or an exchange hub for clearance, account processing and payment.
- (4) **New Toll Facility Deployments:** New toll agencies and facilities would be encouraged to deploy the national standard transponder protocol(s).
- (5) **Third-Party Account Providers:** Third-party providers would be encouraged to use the national standard transponder protocol and settle their toll payments to participating agencies for which they have a certified service agreement through participation in regional service centers, or directly with a national exchange hub.
- (6) **National Toll Tag Evolution:** The identification of national protocol(s) initially as a secondary/alternate protocol will allow regions and/or toll operators to evolve to a unified national standard as they procure replacement lane equipment and transponders from multiple suppliers in a more competitive market environment, on schedules that provide for reasonable amortization of their existing toll facility investments.

How Can Congress Help?

Our needs from the US Congress are:

- (1) Assistance with the cost of the technical evaluation leading to identification of the final candidate(s) for the national transponder protocol.
- (2) Financial assistance to help toll operators cover the cost of adding the hardware and software necessary to read multiple tag protocols and/or reliably capture license plate images.

- (3) Continued recognition and support for IBTTA leadership in the development and implementation of the electronic toll interoperability plan.

Concerns about Migrating to Nationwide Interoperability.

While IBTTA and its members are committed to achieving nationwide interoperability, it is important to highlight two significant issues: (1) the costs of implementation and incremental operations, and (2) the potential for revenue loss.

(1) Increased Costs

This report establishes a set of choices toward achieving nationwide toll interoperability. All of them require toll operators and possibly customers to bear additional costs. The establishment of a National Toll Tag requires toll operators from regions that use other systems as their primary tags to either bear the cost of using a secondary tag, or use license plate imaging and pay-by-plate business practices to identify valid electronic toll accounts.

There are three ways for toll operators and/or customers to acquire the secondary national tag:

- Toll operators could purchase the tags outright and distribute them to their customers.
- Toll operators could require customers to pay the full purchase cost of the tags.
- Toll operators could share the cost of the secondary tags with the customer by subsidizing the price of the equipment.

In addition to the cost of supplying alternate/secondary tags, toll operators that do not already use the National Toll Tag protocol in their current operations may have to incur the cost of new, multiprotocol lane equipment to read their own “home” tags and the alternate/secondary “national” tag, or to apply systems and practices that use video images of license plates to post tolls to valid accounts. Adoption of the secondary protocols may also require additional data collection and conversion of existing back office systems and user accounts to accommodate the technical requirements of the National Toll Tag.

The option of converting toll tags would allow agencies that do not already use the National Toll Tag protocol to switch out all existing tags and lane equipment and install the new protocol. While this may be economically beneficial to toll operators with small installed bases of equipment and toll tags, it will be more costly to toll operators with large established electronic tolling programs. National toll tag conversion would also entail new costs for toll operators, though some of these costs would occur normally if coordinated with agencies’ routine replacement programs for aging equipment.

Any of these options may also include the use of license plate imaging, as either a back-up or substitute approach to relying on a secondary toll tag with the national protocol. Such reliance on license plate imaging could incur one-time capital costs for systems and lane equipment upgrades, as well as ongoing operating costs for image review and

account maintenance to ensure that license plates are uniquely associated with a single toll account.

(2) Lost Revenue

Adopting new technologies, systems, processes, and/or business rules carries the risk that revenues may be lost, an unacceptable outcome for toll operators and their investors and bond-holders. Revenue loss means less money for necessary reinvestment in the maintenance and long-term capital refurbishment of the highways, bridges and tunnels. This revenue loss may come in many different forms including:

- The inability to read the toll transponder on a vehicle from outside the home region;
- The inability to read a license plate image as a substitute for the transponder; and/or
- The inability to process the transaction in the back office (even after reading a valid transponder or license plate image) because of incompatible business rules and account management practices between different regions of interoperability.

Any such revenue losses may adversely affect the bond agreements and revenue projections of the individual toll agencies. Thus, should Congress legislate a fixed and inflexible time frame for achieving regional and national interoperability, the agencies that participate in a conversion or evolution may need fiscal insurance to cover these potential losses.

Toll operators' tolerance for revenue risk may vary by the size of the revenue stream, the covenants with bond holders, and the commitment of funds for operations and investment. In all cases, however, any erosion in revenues or decreased accuracy in toll collection systems will be unacceptable to toll operators.

Conclusion

Tolling is an essential tool to augment, supplement or increase revenues for transportation infrastructure. Creating the conditions for practical, nationwide interoperability of electronic tolling will open up new opportunities to fund and finance America's vital surface transportation network. IBTTA and its members look forward to continuing to work with Congress and the wider industry to meet the requirements of the MAP-21 legislation.

Appendix: National Interoperability Achievements to Date

- Formation of the IBTTA Interoperability Committee in Fall, 2010
 - Multiple live and teleconference meetings
 - Forming consensus on a 2-tag solution (local/national opt-in) and plan to develop a common set of business requirements and specifications for the national tag
 - Meeting of IOP Technical Subcommittee Jan. 14-15, 2013
- Formation of the National Interoperability Coordinating Group (NICG), Fall 2012, a cooperative effort of the Alliance for Toll Interoperability (ATI), the E-ZPass Group, IBTTA, OmniAir and others to: share information, coordinate and leverage the efforts of related organizations focused on interoperability, and steer a path toward nationwide interoperability by 2016
- ATI/E-ZPass outreach efforts to the American Association of Motor Vehicle Administrators (AAMVA), 2012 - present
- Formation of the ATI/AAMVA/E-ZPass Committee, Nov. 2012, coordinating communications between the toll industry and state motor vehicle administrations, seeking to facilitate development of toll violation enforcement reciprocity
- Pilot Toll Violation Enforcement Reciprocity Program agreement established August 2011 between Maine, New Hampshire and Massachusetts, now in second year of demonstration
- Alliance for Toll Interoperability conducted a successful Hub Pilot Program to prove the concept of a national exchange of transaction information for license plate tolling - which can also be applied to transponder transactions. Three vendors participated and all were able to deliver the desired operating and exchange process envisioned for the hub.
- The E-ZPass Group has created a public interoperability portal on its website that shares test plans, technology RFP and tech specs, business rules, policies, and agreements, etc.
- Interoperability Webinar given by E-ZPass Group and hosted by the IBTTA. More than 400 participants.
- Kapsch, the manufacturer of the E-ZPass Groups tags and readers, which collect 75% of electronic toll revenue in the United States, opens its protocol and plans on publishing its TDM specs in the first quarter 2013.
- The E-ZPass Group establishes a national affiliate membership for toll agencies using E-ZPass compatible equipment. North Carolina is the first national affiliate, becoming interoperable with the 24 members of E-ZPass.
- Florida, North Carolina and Georgia announce their intent to be mutually interoperable by July 2013.
- OmniAir issues first certification of an ETC product (6C), which ensures tolling tag and reader interoperability (IOP) across equipment vendors and toll facilities that choose to deploy equipment certified as compliant to the "6C Requirements Document" defined by the 6C Toll Operators Committee.