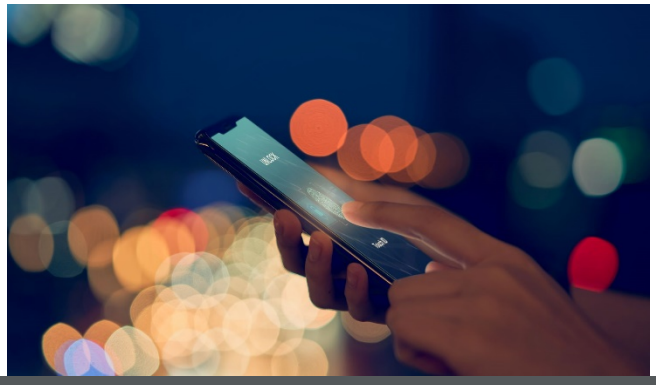
The I-95 Corridor Coalition

Toll Payment Methods

Technical Memo in Support of
TVER April Working Group

April 2020



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1 Overview

1.1 Background

The I-95 Corridor Coalition (Coalition) is a partnership of State Departments of Transportation, and related authorities and organizations, working together to accelerate improvements in freight and passenger movement. This collaborative organization, founded in 1993, brings together over 100 transportation agencies representing multiple jurisdictions, modes, disciplines, and programs up and down the Eastern United States.

The Coalition, through its diverse membership, provides member agencies with the opportunity to leverage resources through multi-state/agency operations coordination, planning, and data sharing. The Coalition strives to keep its members at the forefront of industry innovation through participation in transformative technology pilots/research, best practices sharing, and unique professional development opportunities.[1]

In 2019, the Coalition established a Toll Violation Enforcement and Reciprocity (TVER) Working Group to:

- Advance violation enforcement reciprocity agreements
- Bring stakeholders together
- Leverage existing work
- Collaborate with key partners
- Focus on legislative and cross-agency administrative challenges.

The TVER working group meets regularly with member agencies to identify areas of concern or importance for improving tolling operations within and amongst the agencies. As a result of these regular meetings, the Coalition identifies short research and documentation tasks on various subjects to support member agency tolling operations.

1.2 Objective

The TVER working group met in December 2019 to discuss strategies to focus on addressing heavy (most frequent) toll violators. At the conclusion of the meeting, participants proposed and prioritized a number of options for a subsequent topic. One theme that arose was the issue of payment methods, and the related question: if we make it easier for customers to pay, will that ease issues that toll agencies have with collecting outstanding payments.

To inform the next working group meeting (in April 2020), the Coalition tasked HDR with researching various payment methods offered by toll agencies and facility operators with a specific focus on highlighting innovative features or products that were considered or offered to customers for their payment of tolls. The goal of this research is to improve information sharing amongst agencies and further initiatives for making it easier for

[1] I-95 Corridor Coalition website: https://i95coalition.org/

customers to pay their toll bills. Online research was completed for Coalition member agencies, four additional U.S. toll agencies, and three international toll agencies to identify which types of payment methods are offered.

1.3 Coalition State of the Practice

Tolling agencies provide customers with a variety of options to pay electronically collected tolls. The methods of payment accepted are often based on the account type used. For example, an agency may not permit pre-payment of a toll that is collected by image, while they may require it for transponder based accounts. The below lists summarize account types and payment methods. These are discussed in detail in Appendix A.

- **Account type:**
  - **Account:** A user initiated or agency created record of transactions for a specific vehicle, business, or person. This may include a violation or invoice account used exclusively by the agency to group transactions for a vehicle based on a license plate.
  - **Invoice:** A statement generated by the service provider and sent to the customer in order to collect payment.
  - **One-time Payment:** A single pre-travel or post-travel payment by a customer to a service provider using a license plate and date provided by the user.
  - **License Plate Account:** A user registered account to pay tolls based solely on the vehicle's license plate number, without a transponder issued or required.
  - **Post-Paid:** A payment is made after receiving a service.
  - **Pre-Paid:** A payment is posted to an account before a service is provided.
  - **Transponder:** The in-vehicle device component of an electronic toll collection (ETC) system. A receiver or transceiver permitting the Operator's Road-Side Unit to communicate with, identify, and conduct an electronic toll transaction.
  - **Violation:** A record of an unpaid toll which occurs when a customer does not pay the proper amount.

- **Payment Methods:**
  - **Agency Mobile App:** A mobile application produced or procured by the tolling agency.
  - **In-Person:** The user completes a payment at a physical location, usually a Walk-In Customer Service Center (CSC).
  - **Kiosks:** Agency or third party provided standalone physical self-service locations that allow customers to directly make payments and/or manage accounts.
  - **Mail:** The user is able to complete a payment by sending a check or money order through the postal service.
  - **Mobile Enabled Website (or WebApp):** A website designed to recognize the use of a mobile web browser, automatically adjusting screen size and larger buttons for a more user friendly touch interface. Sometimes referred to as responsive design.

- **Payment Network:** A series of third-party participating retailers and/or other partners that accept cash or credit card payments from customers on behalf of the agency or vendor. They may also sell transponders or starter kits.
- **Phone – Customer Service Representative (CSR):** A user speaks over the phone with a live CSR.
- **Phone – Interactive Voice Response (IVR):** An automated phone line that uses a menu of phone options and/or interactive voice response technology to allow users to complete a payment without speaking to a CSR.
- **Third-Party Mobile App:** A mobile application produced by a third party, which may or may not be coordinated/affiliated with a tolling agency.
- **Website:** A standard online environment which provides customers with the option to manage accounts, make payment.

While many of these account types and payment methods have been around for quite a while, the use of mobile apps, kiosks, and payment networks are more infrequently used methods. Similarly, the one-time-payment and license plate accounts are infrequently used by Coalition members.

All researched Coalition member agencies offer online payments for at least some of the tolling account types above, along with the traditional toll payment collection methods of mail, website, in-person, and over-the-phone. Payment networks are used by only a few agencies and kiosks are relatively rare. At this time, only three member agencies operate their own mobile applications while a number of others have third-party mobile apps. Some of these third-party mobile apps have been coordinated in partnership with agencies while some have not.

Figure 1 - Sample of Apps in Coalition States

Figure 1 is a sample of the mobile apps currently available to Coalition customers.

Table 1-1 on the following page presents payment data collected for each Coalition member toll facility by payment method and account type.

Sample - Does not include third-party unaffiliated apps

Table 1-1 – Pre-Paid Transponder Accounts – Payment Methods

Agency	Account Types	Payment Methods								
		Website	Mail	In-Person	Phone CSR	Phone IVR	Payment Network	Kiosks	Agency App	3rd Party App
Maryland Transportation Authority	E-ZPass Pre-Paid	✓	✓	✓	✓	✓				✓
	Invoiced (Violations)	✓	✓	✓	✓	✓				
	Invoiced (Post-Paid)	✓	✓	✓	✓	✓				
Massachusetts DOT	E-ZPass Pre-Paid	✓	✓	✓	✓	✓	✓			
	E-ZPass Post-Paid	✓	✓	✓	✓	✓	✓			
	Invoiced (Post-Paid)	✓	✓	✓	✓	✓	✓			
Pennsylvania Turnpike Commission	E-ZPass Pre-Paid	✓	✓	✓	✓	✓			✓	
	E-ZPass Post-Paid	✓	✓	✓	✓	✓				
	Invoiced (Violations)	✓	✓	✓	✓	✓				
	Invoiced (Post-Paid)	✓	✓	✓	✓	✓				
Rhode Island Turnpike and Bridge Authority	E-ZPass Pre-Paid	✓	✓	✓	✓	✓				
	Invoiced (Violations)	✓	✓	✓	✓					
Delaware DOT	E-ZPass Pre-Paid	✓	✓	✓	✓	✓				
	Invoiced (Violations)	✓	✓	✓	✓	✓				
	Invoiced (Post-Paid)	✓	✓	✓	✓	✓				
Virginia DOT	E-ZPass Pre-Paid	✓	✓	✓	✓	✓	✓			
	One Time Payments (post-travel)	✓								✓
	Invoiced (Violations)	✓	✓	✓	✓	✓				
North Carolina Turnpike Authority	QuickPass Pre-Paid	✓	✓	✓	✓	✓				✓
	Invoiced (Post-Paid)	✓	✓	✓	✓	✓				
New Hampshire DOT	E-ZPass Pre-Paid	✓	✓	✓	✓	✓				
	One Time Payments (pre-travel)	✓	✓	✓	✓	✓				
	One Time Payments (post-travel)	✓	✓	✓	✓	✓				
	Invoiced (Violations)	✓	✓	✓	✓	✓				
	Invoiced (Post-Paid)	✓	✓	✓	✓	✓				
Maine Turnpike Authority	E-ZPass Pre-Paid	✓	✓	✓	✓					
	E-ZPass Post-Paid		✓	✓						
	One Time Payments (post-travel)	✓	✓	✓	✓					
	Invoiced (Violations)		✓	✓						
Georgia State Road and Tollway Authority	PeachPass Pre-Paid - Private	✓	✓	✓	✓	✓	✓		✓	✓
	PeachPass Pre-Paid - Commercial	✓	✓	✓	✓	✓			✓	✓
	Invoiced (Violations)	✓	✓	✓	✓	✓			✓	
Florida DOT	SunPass Pre-Paid	✓	✓	✓	✓	✓	✓			✓
	One Time Payments (post-travel)	✓								✓
	Invoiced (Violations)	✓	✓	✓	✓	✓				
New York State Thruway Authority & Metropolitan Transportation Authority & Port Authority of NY & NJ	E-ZPass Pre-Paid - Private	✓	✓	✓	✓	✓	✓	✓		✓
	E-ZPass Pre-Paid - Commercial	✓	✓	✓	✓	✓				✓
	E-ZPass Post-Paid	✓	✓	✓	✓	✓				
	Invoiced (Violations)	✓	✓	✓	✓	✓	✓	✓		
New Jersey Turnpike	E-ZPass Pre-Paid	✓	✓	✓	✓	✓				✓
	Invoiced (Violations)	✓	✓	✓	✓	✓				
	Invoiced (Post-Paid)	✓	✓	✓	✓	✓				

1.4 Innovations in Toll Payment Methods

1.4.1 Opportunities

The adoption of innovative payment methods should only occur if they attract more customers, reduce costs, prompt faster and more reliable payments, and/or improve the customer experience. Not all past innovations are still relevant, and some future innovations may not stand the test of time. Adapting to change and innovation can, however, also lead to:

- Fewer violations
- Faster invoiced payments and account reloads
- More accounts with frequent customers
- Fewer accounts with infrequent customers – using one-time payment features instead
- Fewer calls, in-person visits, emails, and mail to process
- Better and more accommodating service to underserved, unbanked and under-banked customers

The bottom line to these benefits is higher net revenue and improved customer service/satisfaction.

1.4.2 All Electronic Tolling

The conversion of toll facilities to all electronic tolling (AET) has been progressing steadily over the past decade, but has largely only been among agencies with high transponder penetration rates or congestion and safety concerns. Many agencies have been hesitant to adopt due to capital cost, concerns over potential leakage, and costs of invoicing. However, the COVID-19 pandemic has prompted AET adoption across the country to improve health safety, and it is anticipated to accelerate AET's permanent use.

As all electronic tolling is implemented at toll facilities with lower transponder penetration rates, agencies should look to new payment methods and account types to make it easier for the infrequent customers to pay before receiving an invoice. This may lead to the acceptance of less common account types: license plate accounts, and one-time-payments. Few agencies in the E-ZPass network have adopted license plate accounts or one-time-payments. AET conversion may also necessitate the more ubiquitous adoption of mobile apps, rollout of improved mobile enabled websites, payment networks, and other payment and communication methods.

1.4.3 Adoption of Technology

Innovations in toll payment methods have been slow to be adopted in the tolling industry. For example, the iPhone prompted the app Echo-System in 2007, and it took off immediately. It transformed the way customers interacted with merchants. Thirteen years later only a small fraction of tolling agencies provide their own apps with which their customers can interact, even though 81 percent of American adults now own smartphones. Account types are similar in that agencies often only have pre-paid accounts with required minimum balances from which to draw down, or mail invoices/violations.

Agencies face many challenges in adopting new payment methods and account types, which is the primary reason for slow adoption. These challenges are further discussed in the conclusion.

1.4.4 Mobile Apps

Mobile Apps are the payment method most discussed in this paper, primarily because apps have been successfully deployed to transform a number of industries and have also been successful in tolling. Smartphones are in the hands of 81 percent of American adults and the average person checks their phone every 12 minutes during the day. Apps also provide an opportunity to deploy a simple and intuitive interface, and they can easily prompt action through push notifications linking to in-app actions.

Apps, while most featureful, have not been adopted as readily when agencies already have mobile enabled websites (Web App) - those that recognize a phone browser and adjust its format to be touch friendly and sized appropriately. Web apps can provide some of the same features and are accessible to a broader population. They do, however, lack the ability to send push notifications or interact with many of the phone's features - such as sustained use of location services for providing notification when a user travels on a toll road and/or camera utilization for imaging license plates or mobile credit cards for easy entry. Mobile apps require another layer of integration for an agency, but with the general population adopting the same technology throughout other areas of their lives, it can provide a higher standard for customer convenience. A comparison of mobile apps to web apps is shown in Table 1-2.

Table 1-2- Mobile App and Web App Comparison

Element	Mobile App (Download to Phone)	Web App (Responsive Website)
Access to phone features	Location, camera, mobile wallet, tap to call/email, etc.	None
Cost	Higher Cost	Lower Cost
Interface	More intuitive and allows personalization	Broader audience reach, but can have compatibility issues with large variety of phones and browsers
Communication	Push notification with links to app actions, tap to call/email/pay	Not capable – can use text as alternative, but requires phone number
Ease of Access	Can be linked to phone credentials	Requires username, password, and possibly dual authentication

1.4.5 Kiosks, and Payment Networks

The less common payment methods include mobile apps, kiosks, and payment networks. Payment networks come in a few forms. The most common is the use of a retail network to sell transponders or starter kits which typically have a starting balance, allowing immediate use. These networks also often allow customers to make payments at retail locations, primarily providing benefit to cash paying customers who are typically unbanked, under-banked, or want to monitor their cash flow.

Kiosks are another example of a payment network. The kiosks typically can accept cash payments in addition to electronic payments, and for customers to manage their accounts or purchase a transponder. While convenient, these kiosks are difficult to maintain and have higher operating costs, and so have been on the decline in recent years in exchange for more mobile payment platforms or existing point of sale networks.

1.5 U.S. Examples of Innovative Toll Payment Methods

Nationally, four agencies stood out with innovative and unique payment methods. These included the Bay Area Toll Authority, North Texas Tollway Authority, Orange County California, and Kansas Turnpike Authority.

1.5.1 Bay Area Toll Authority

The Bay Area Transportation Authority (BATA) Operates the Antioch, Benicia-Martinez, Carquinez, Dumbarton, Richmond – San Rafeal, Oakland, and Hayward toll bridges in the San Francisco Bay area. The agency's back office system supports the Golden Gate Bridge as well. The agency is part of the California Toll Operators Commission (CTOC) and uses the toll transponder branded as FasTrak. BATA' offers customers several ways to pay beyond the conventional methods, including[2]:

- Pre and post-paid tolls for infrequent users
- License plate accounts for infrequent users
- Partnerships with third-party companies such as eToll, PlatePass, and TollPass which support fleet and rental car customers
- Mobile-friendly websites with easy to find "Pay a GGB Toll" button
- Payment network using PayXChange and Tough-N-Buy Self-Serve Kiosk

Pre and post-paid tolls for infrequent users can by via web, phone, or kiosk. The license plate account holders can use any of the payment methods offered by BATA. The agency also accommodates a number of third-party toll payment providers serving fleets and rental cars. Fleet companies can choose to work with one of these providers if they wish. Finally, two payment networks are offered: PayXChange, a check cashing and bill pay service provider, which will accept payment for FasTrak customers; and Tough-N-Buy self-service Kiosks allowing customers to manage their accounts and make payments.

[2] https://www.ibtta.org/sites/default/files/documents/2016/Denver/Kuester_Carol.pdf

1.5.2 North Texas Tollway Authority

The North Texas Tollway Authority (NTTA) operates toll roads, bridges and tunnels in northern Texas. They directly provide customers a number of ways to pay tolls beyond the conventional methods including:

- Payment networks
- Tollmate app
- Appointments for in-person or phone calls[3]

The Tollmate app is an agency provided app allowing customers to manage their accounts and make toll payments. For non-account holders, invoices are sent which are branded "ZipCash" which can be paid online, by mail, phone or in-person with the NTTA CSC. They can also be paid at participating ACE Cash Express locations or Regional TollTag partner locations. ACE Cash Express is a payday loan, title loan, installment loan, and pre-paid cards service provider. They have over 950 locations.

The appointment booking for phone calls and in-person interactions with customer service representatives is an innovative way to support customers, answer questions, and open accounts. Customers can reserve a time and method on the NTTA website. The in-person interaction, however, has likely been significantly affected by the COVID-19 pandemic and may be a method that begins to diminish in popularity.

1.5.3 Orange County California – Transportation Corridor Agencies

The Transportation Corridor Agencies (TCA) is a group of agencies in Orange County and Southern California who operate a toll collection system under the name "The Toll Roads". They operate State Routes 73, 133, 241, and 261. Collectively it includes 51 total miles of state highway. The Toll Roads uses transponders branded as FasTrak and is part of CTOC. The agency offers several ways to pay beyond the conventional methods, including:

- One-time-payment within five days of travel[4]
- User rental car registration for a specific period of time[5]
- Agency app[6]

[3] https://www.ntta.org/custinfo/Pages/Customer-Appointments.aspx
[4] https://secure.thetollroads.com/violation/payTolls.do
[5] https://secure.thetollroads.com/violation/payTolls.do?cmd=gotoFleetVeh
[6] https://thetollroads.com/accounts/mobile-app

The Toll Roads offer customers an option to avoid an invoice by making a one-time-payment five days before or after travel using the agency's website. Similar to the one-time-payment, the most unique feature of The Toll Roads is rental car registration. A user can go to the agency website, enter information regarding the vehicle, time and duration of rental agreement, and payment to avoid the hassle of paying through rental car companies and paying their administrative fees. The agency also provides a well branded mobile app.

1.5.4 Kansas Turnpike Authority

The Kansas Turnpike Authority operate the 236 mile turnpike which has electronic and cash toll collection. The authority has partnerships with a number of third-party payment providers in addition to the conventional payment methods. If a toll is not paid in-lane or via transponder, it is considered a violation. The toll system cannot determine where someone entered and exited if they don't pay in-lane or with a transponder, so a flat rate is charged. This gap in capability has likely been a factor in their adoption of third-party solutions to increase electronic toll collection. The third-party offerings include[7]:

- BancPass (third-party full service vendor and operator) – this is discussed in detail in Section 2
- NATIONAL PASS (third-party full service vendor and operator)
- K-TAG retail centers (agency acquired partnership)

The K-TAG website and mobile app are provided as a service through PayIt Solutions to operate on behalf of the Kansas Turnpike Authority. BancPass and NATIONAL PASS are both third-party full service CSCs that have their own customer base with an interoperable transponder. More about these types of vendor services is presented in Section 2.

1.6 International Examples of Innovative Toll Payment Methods

Three international tolling agencies/locations also stood out with interesting approaches to tolling. Specifically, the United Kingdom, Singapore, and the Dublin N50 Orbital Tollway.

1.6.1 United Kingdom

Tolling is highly fragmented across the United Kingdom. Each toll facility has its own payment methods and website, with few having transponders and those that do have low adoption rates. Instead, the tolling agencies rely heavily on in-lane payments and video tolling. In-lane payments include many app based and contactless payment methods not often used in the U.S., including: Contactless; Chip and Pin; Apple Pay; Android (Google) Pay; and Samsung Pay.

The United Kingdom's video tolling typically requires that customers go to the websites and make payment within 14 days of traveling on all electronic or open road tolling facilities, or

[7] https://www.ksturnpike.com/interoperability

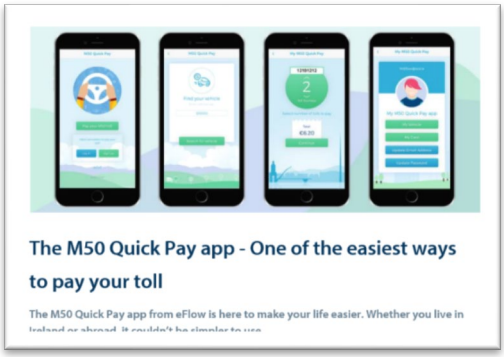
to have an automatic payment through an established video account. Without payment within 14 days, a violation notice is mailed with a significant penalty. This same method is used for the cordon/zone congestion tolling in London.

1.6.2 Singapore

Singapore's congestion pricing system uses an AutoPass card to charge customers traveling within the central business district. The AutoPass card is a stored-value smart card that is encoded with vehicle information. The card is inserted into an in-vehicle unit. Charges are deducted from the card when the car passes certain points/tolling gantries in the central business district. The card can then be reloaded as needed. The card also acts as an in-vehicle contactless payment method for other services such as parking and Network for Electronic Transfers (NETS) retailers. NETS is a company established by local banks to create a debit network, which drove the adoption of the payment method across retail and other industries.

1.6.3 Dublin M50 Orbital Tollway, Ireland

The M50 orbital tollway around Dublin, Ireland is an all-electronic toll road operated by eFlow. eFlow is managed and operated by Emovis and was contracted by Transport Infrastructure Ireland (formerly National Roads Authority) to implement and operate the M50 barrier-free tolling system.



When traveling on the M50, customers are offered three ways to pay their tolls: preregistering and purchasing an electronic transponder, pre-registering a vehicle and providing payment information (no transponder), or by paying as you go within a few hours of using the M50 as a non-customer. Customers can pay through the M50 mobile app or through a Payzone retailer.

2 Toll Payment Vendors

Vendors are available to fill unmet needs of customers and agencies. They provide a wide range of services from supplemental full service CSCs to mobile apps. Broadly, these services fall into five categories which are briefly described below in order of agency involvement. These are discussed in more detail with examples below.

- **Agency Procured/Developed Apps, Kiosks, or Payment Networks:** The agency procures the payment software, devices, or service directly, and offers it to the customer. The services are typically branded, look, and feel like the agency itself.
- **Third-Party Full Service CSC:** While an agency has their own CSC and customers, a third-party CSC is an example of a company that acquires its own customers and manages their accounts. These third-party CSCs interface with the toll agency CSC back office for data exchange and payment. The agency has no contact with the third party CSC customers, essentially making two types of toll-

paying customers (those that pay the toll agency directly and those that make payments through the third-party entity).

- **Third-Party Apps:**
  - **Coordinated/Affiliated Mobile Apps:** Unlike an agency procured product, a third-party company develops an app for a toll agency's customers to make payments or manage their accounts. They are affiliated or coordinated with the tolling agency to develop an interface, but is generally branded separately from the agency with its own revenue model.
  - **Unaffiliated Mobile Apps:** Unaffiliated apps are those published by developers that typically use web-scraping to allow users to manage their accounts or make payments. Little or no coordination occurs between the developer and agency.
- **Fleet Toll Account Management:** This is a company that open one commercial account with each toll agency, and then provides its own customer service center to fleets. The toll manager becomes a middle-man, consolidating tolls and managing accounts across agencies on behalf of the commercial fleets. As opposed to the Third-party CSC, this service is specifically for businesses.

While not an exhaustive list, Table 2-1 includes at least one example of each type of service. In addition to the online research conducted, BancPass, BestPass, PayIt Solutions, Pragmistic, and Transurban's GoToll were contacted directly to provide more in-depth information about the types of services available. *The information presented below is based on interviews with representatives from these companies, and a web search. They are not being endorsed or recommended by the authors or Coalition.*

Continued on the Next Page

Table 2-1 - Summary of Vendor Products

Company/Product	Approach	Facilities Supported	Revenue Model	Website
Agency Procured/Developed Apps , Kiosks, and Payment Networks				
PayIt Solutions*	One app for toll account management for multiple agencies. Customers find their toll agency, and log-in to manage the account.	Kansas Turnpike Authority Texas: TxTag	Administrative fee and credit card processing fee per transaction	https://www.payitgov.com/solutions/turnpike-and-tolling
Third Party - Full Service Customer Service Center				
BancPass* Product: PlusPass	Full service customer service center, mobile app, website, and cash reload network	Kansas Turnpike Authority, Washington State, Texas, South Carolina, Georgia, Florida	Processing fee of $1 - $2 per transaction.	https://www.bancpass.com/
NATIONALPASS	Full service customer service center, mobile app, and website	"19 toll agencies"	Sale of transponder and monthly service charge	https://www.nationalpass.net/
Third-Party Apps				
Coordinated/Affiliated Mobile App				
Transurban Product: LinktGo	Uses Bluedot geofencing technology. Pay-as-you-go based on license plates.	Transurban facilities in Australia	[Not available from website]	https://www.linkt.com.au/sydney/accounts-and-passes/linktgo
Transurban* Product: GoToll	Uses Bluedot geofencing technology. Pay-as-you-go based on license plates.	12 Virginia toll facilities Partnership with Virginia DOT	Administrative fee charged to users per trip	https://www.gotoll.com/
PayTollo	Pre-paid account using license plate images	[Not available from website]	[Not available from website]	https://www.paytollo.com/#
Unaffiliated Mobile Apps				
doxo	One-time-payment through web scraping – bill pay service	NTTA	Processing fee of $3.99	https://www.doxo.com/info/ntta#anecdote-75213
Pragmistic* – FastToll (for non-I-Pass account holders)	One-time-payment through web scraping	Illinois Tollway	Processing fee per financial transaction of $0.99 or 10%, whichever is higher. .	http://www.pragmistic.com/fasttoll/
Pragmistic* - I-Pass Manager (for I-Pass account holders)	Account management through web scraping	Illinois Tollway		http://www.pragmistic.com/i-pass-manager
Pragmistic* - E-ZPass Apps (for each state)	Account management through web scraping	E-ZPass NY, NJ, MA, VA, MD, NC Quickpass		http://www.pragmistic.com/ezpass-ma
Fleet Toll Account Management				
BestPass*	Fleet Management with multi-protocol readers and BestPass accounts with each agency	"Coast to coast"	Administrative fee charged to users per transponder/vehicle per month	https://www.bestpass.com/
Verra Mobility Product: PlatePass	Pay-as-you-go app, primarily for rental cars	Commercial fleets and rental car companies "worldwide"	[Not available from website]	https://www.verramobility.com/toll-management/

2.1 Agency Procured/Developed Apps, Kiosks, & Payment Networks

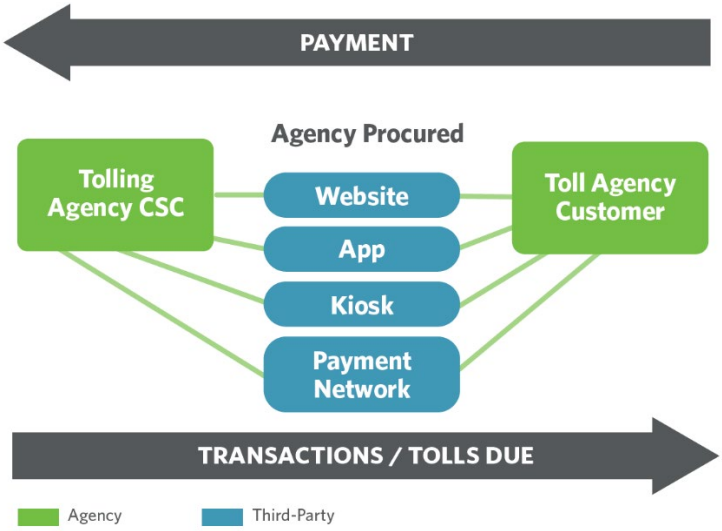
The most conventional method for an agency to develop a new interface with customers is to either build it themselves, contract with their current back office vendor, or to procure a vendor to build or provide it. In any case, the result is a new interface for customers to make payments and/or manage their accounts. Typically these services are intended to increase convenience for existing customers, reduce unpaid violations, and/or bring in new

customers. These types of solutions include the primary customer account management website, mobile app, kiosks, or payment networks.

While apps are the focus of the discussion, vendors also provide retail and payment networks, which are relatively ubiquitous with products such as Visa ReadyLink, MoneyGram, pre-paid cards, and check cashing businesses. These services allow customers to manage their account or re-load their account from more convenient retail locations, and are most used by unbanked or under-banked individuals.

As discussed above, Kiosks are a relatively small segment of vendor services and generally focus on the same users and features offered by payment networks and retail. Payment networks and retail may be more efficient for most applications.

Figure 2 - Agency Procured/Developed Apps, Kiosks, and Payment Networks



PayIt Solutions[8] is an example of a vendor that provides government agencies with a platform to manage accounts and make payments. Their customers include departments of motor vehicles, court systems, counties, localities, and other agencies. For tolling agencies, they provide and operate agency branded toll payment and account management websites and mobile apps. Typically, the primary customer service website is provided or operated by the back office vendor, but PayIt offers an alternative or supplemental solution.

For example, for the Kansas Turnpike Authority's K-TAG toll accounts, PayIt developed the primary customer service website myktag.com and the mobile app. The logo for myK-TAG includes "Powered by PayIt". Their service interfaces directly with the

[8] DiGacomo, T. (2020, April 9), PayIt Solutions Business Development. (A. Cadmus, Interviewer)

Kansas Turnpike's back office and customer service center. The mobile app provides all the same services as the website, but also includes notifications for low balances and other information. The result, PayIt says, is much faster replenishments and fewer zero or negative account balances.

In Florida, they provide similar services to tolling agencies and the DMV, creating an integrated solution for the immediate clearing of vehicle registration holds and vehicle registration within the same app.

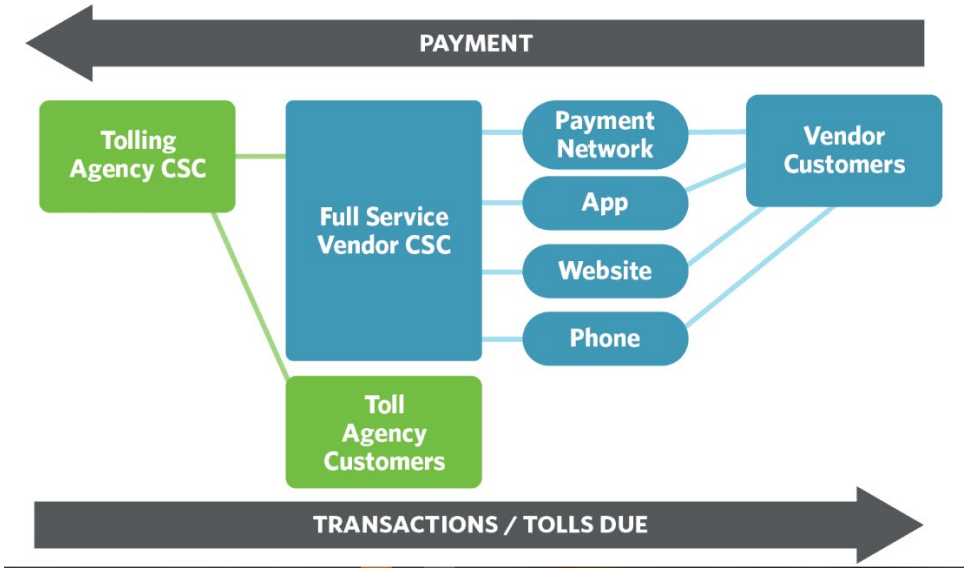
According to PayIt, their product is evolving and may include additional services in the future for interoperability between states/agencies and one-time-payments. However, these solutions have not yet been fully developed or deployed.

PayIt's business model is to deploy their existing platform, "wrap it around" the existing toll agency's customer service center, customize it to the agency's commercial rules and branding, deploy and manage. There are no capital costs to the agency; development and integration is free. Instead, PayIt charges a transaction fee and credit card processing fee per financial transaction. An agency can cover that cost themselves or it can be passed along directly to the customer when they make a payment.

2.2 Third-Party – Full Service Customer Service Center

Third-party, full service vendors provide a secondary customer service option intended to augment an agency's own customer service and account management systems. They may fill a gap in existing services with additional account types, payment methods, and/or customer interfaces. The full service component means that they own the customer and account, and everything that is involved with it. The toll agency has no direct contact with the vendor's customer, but also retains its own customers that continue to make payments through the agency's interface.

Figure 3 – Third-Party Full Service Customer Service Center



BancPass[9] is an example of a third-party full service vendor. They develop partnerships with tolling agencies to augment the agency's CSC to provide targeted services for two customer types: unbanked or under-banked customers, and infrequent toll road users.

The idea behind this product/service is to provide an option for low-income, unbanked, or under-banked individuals that may not be able to afford, or don't desire to buy, a transponder and maintain the agency required balance on a conventional transponder account. They may also not have a bank account and therefore desire convenient cash payment methods where few agency walk-in-centers exist. Similarly, infrequent customers may not want to maintain a significant balance on their account or they may simply want a mobile payment option if the agency does not provide one. BancPass does not require a minimum balance or automatic reload, allowing these customers more control over their cash flows. BancPass also provide thousands of cash reload locations through a network of retailers.

BancPass provides a mobile phone app which allows users to establish an account with BancPass (not the agency) by taking a picture of their license plate, entering their email address and payment information. Customers can either enter credit card, debit card, or checking account information to make one-time or automatic replenishments at a value they choose. Alternatively they can use a cash-reload card to add money to their account. A "service kit" is available at partnering retailers which provides the transponder, a reload card, and the terms and conditions. Cash payments/reloads may be made at retailers including Kroger, CVS, 7-11, Costco, and others nationwide.

BancPass is the CSC for their customers, handling all account management, customer questions, disputes, and issues. They manage all communication with an emphasis on text messages, app notifications, and emails to notify customers of low balance or payment due. BancPass markets their products independently, but they have been able to co-brand with some of their partners (e.g. "BancPass powered by K-Tag").

They typically pay for the necessary development and interface cost acting as a "home agency" for the partners they work with, and guarantee payments to those agencies based on the valid account lists provided through the interface. BancPass passes along the toll amount charged by the agency, without inflating or adjusting the amount due by payment method (i.e. a transponder toll rate is not inflated to a cash rate). They generate revenue through service kit sales and transaction fees when users reload their account balance or make payments. For their current partners, BancPass charges users $2.00 for payments made at a retailer (which is split between the retailer and BancPass) and $1.00 for app or automated payments.

BancPass also has another product called PlusPass. This is an app for untagged and infrequent users to avoid receiving a violation or bill in the mail. Establishing a user account

[9] Swank, S. (2020, April 3), BancPass Chief Marketing Officer. (A. Cadmus, Interviewer)

is similar, but uses a pay-as-you-go approach and requires an electronic payment method. We discuss these one-time-payment apps further with another example below.

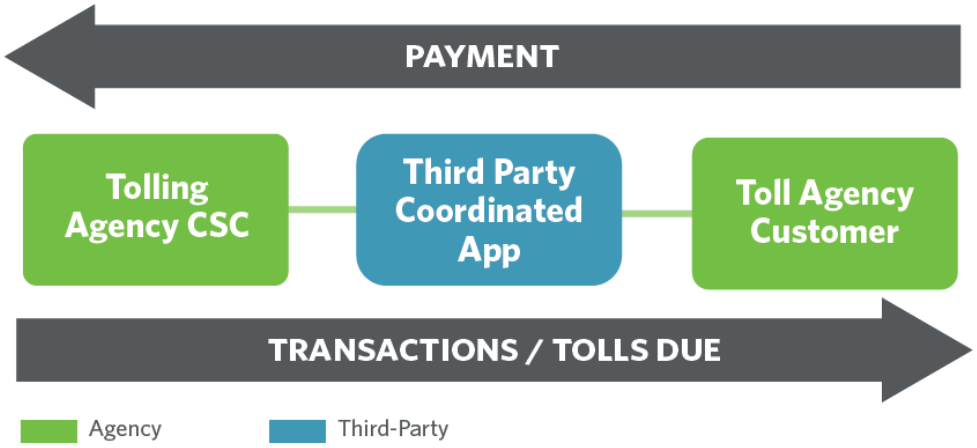
2.3 Third-Party Apps

Third-party mobile app developers have products to simplify the digital interface between customers and tolling agencies. The apps are created to fill a gap in the market: mobile toll account management and toll payment. Many toll agency websites have not performed major upgrades in years. These websites may be difficult to use and not compatible with or formatted for mobile web browsers. They may also not provide the means for non-account holders to make a payment prior to receiving a bill or violation in the mail. These third-party apps may be coordinated/affiliated with or unaffiliated with the agencies they support. The line between the two types is often a gray area where companies straddle the line between coordination and taking liberties (not asking permission) in how they interface with customers.

2.3.1 Coordinated/Affiliated Mobile App

Coordinated/Affiliated mobile apps are provided by vendors who have relationships with agencies and have worked together to provide additional services to their customers. In some cases, the product is not endorsed or marketed by the agency, and in others it is co-branded. Often, the interface between the agency and mobile app provider is through an agreed upon data exchange process.

Figure 4 – Coordinated/Affiliated Mobile App



Again, the line between coordinated/affiliated and unaffiliated apps is blurred, but Go-Toll[10] is more closely an example of a coordinated mobile app for paying tolls. The first iteration of the app was deployed in Australia under the brand name LinktGo, produced by Transurban and used on their facilities. The domestic version was recently rolled out as Go-Toll, providing a toll payment option for 12 tolled facilities in Virginia, including those owned and operated by Transurban. Go-Toll is owed by Transurban, but they consider it is

[10] Bell, E. (2020, April 4), Transcore Mobile Products Director. (A. Cadmus, Interviewer)

a separate commercial enterprise and fire-walled off from their toll road ownership/operations.

The app provides non-E-ZPass account holders or infrequent toll users another way to pay their tolls. The users register within the app by entering their license plate, email, and payment information. When the user travels on one of the toll roads, the app must be open in the background. The app uses geofencing technology from BlueDot to identify when a user was on a toll road. Go-Toll then notifies the user, at a safe time after stopping, that they traveled on a toll road and prompts payment.

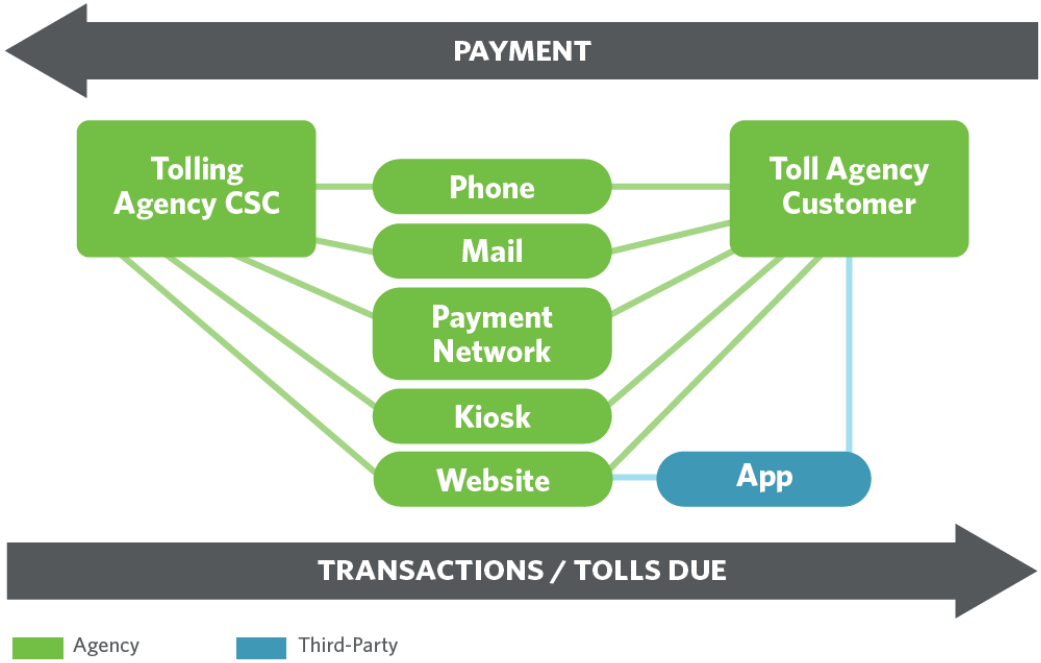
Though it is a stand-alone app, Pay-Go states that their business model is to engage with tolling agencies. Some agencies fully embrace the option for their customers with co-branding or promotion, others accept it as another payment option for their customers without endorsement. Go-Toll says that there is no cost to agencies. Instead, they charge a convenience fee of $0.85 per trip to the customer.

The app is not currently available outside of Virginia as the company evaluates how users interact with it, but they have plans to expand in the future.

2.3.2 Unaffiliated Mobile App

Third-party mobile application developers also have products which are unaffiliated with the agencies they support, and generate revenue through user fees. These companies essentially scrape information off of an agency website using a customer provided username and password, allowing the customer to manage the account through an unaffiliated mobile app.

Figure 5 - Unaffiliated Apps - Relationships



One example of this solution is Pragmistic[11], a private company providing toll payment and account management mobile apps. The company claims to streamline customer interactions with tolling agencies. There are two product lines:

- E-Toll, which essentially uses a mobile phone as a transponder
- A mobile account manager app to manage pre-paid agency accounts.

E-Toll uses global positioning system (GPS) technology to identify when a vehicle travels through a tolling point or on a toll road. The product is branded as FastToll and is exclusively used for one-time payments on the Illinois Tollway. Customers who use the app are notified that they traveled through a tolling point, and have seven days to pay through the app. The application interfaces with the Illinois Tollway website through a process called web-scraping. Web-scraping is simply a method of grabbing information from a website and re-surfacing the data in a new format. This method can also be used to enter data into a website. The app uses this process to pay the toll on behalf of the customer. It eliminates or reduces the need for a customer to remember that they went through the facility and to log into the Illinois Tollway website to pay the toll. Vehicle details, date and time, and the license plate number is generated by or entered one time into the app for convenience. The app offers a method of interoperability.

The account manager products are mobile apps, which are claimed to be more user friendly and accessible than the typical toll agency website. The company has developed an interface with an agency's native website to log in and interact with the user's account, again through web-scraping. No agency coordination or development is needed. The app allows customers to log into their account, check balances, add money to the account, view toll history, update credit card information, and manage registered vehicles. Currently supported agencies include the Illinois Tollway (I-Pass Manager) and E-ZPass Agencies: Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, and Virginia.

In either case above, Pragmistic does not perform customer service functions other than to handle technical issues with the app or misapplied payments.

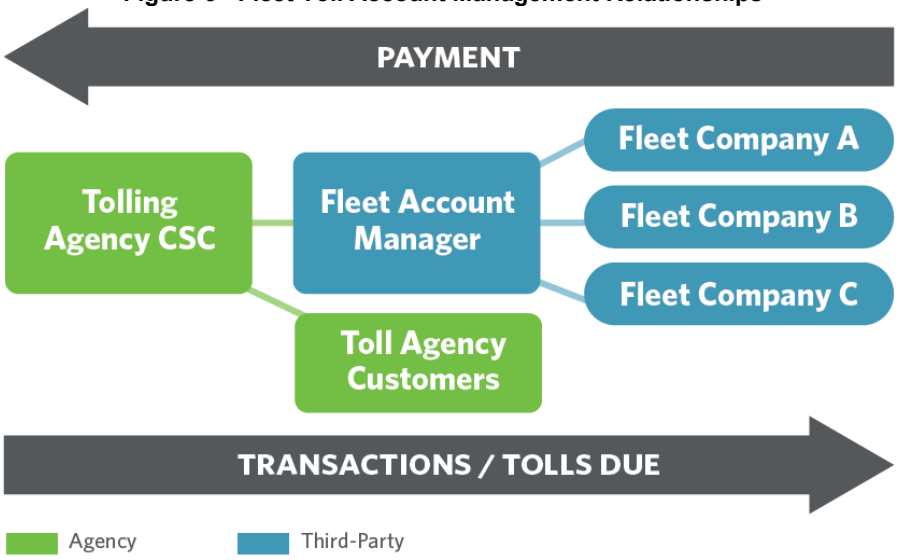
According to the owner, the company is PCI compliant and current in its security practices, however agencies are typically endorsing or marketing this product or other third-party products. The owner says the primary reason is that the agencies don't have a relationship and haven't developed trust with the company. It may also be that public tolling agencies are not willing to endorse a private product. Pragmistic generates revenue through user fees: $0.99 or 10% of the toll payment made through the FastToll app and a flat $0.99 for the account management apps. The agencies do no incur any costs in development or maintenance.

[11] Mista, R. (2020, April 3), Pragmistic LLC Founder. (A. Cadmus, Interviewer)

2.4 Fleet Toll Account Management Services

There are a few vendors that provide toll account management services directly to companies. These vendors essentially open accounts with several tolling agencies. Companies, in turn, open accounts with the account management vendor. As the company's fleet of vehicles use various toll roads, the transactions flow through the account management vendor to the various companies. The vendors provide transponders or record license plates to match transactions received from the agencies to fleet companies.

Figure 6 - Fleet Toll Account Management Relationships



BestPass[12] is an example of a fleet toll account management vendor. The business model is to simplify toll payments for trucking companies, removing the administrative costs of fleets having toll accounts with each agency. This reduces violations and/or the costs of paying higher toll rates for away or license plate transactions.

BestPass stated that they have transponder or license plate accounts with agencies across the country to provide vehicle fleet companies a seamless one-stop-shop for toll payments, essentially providing a form of interoperability to their customers. Companies will open an account with BestPass, and based on the facilities the fleets will use, BestPass determines what type of transponder to issue. BestPass then updates their accounts with agencies to add the plate and/or transponder. When the truck passes through a tolling point, the toll is charged to BestPass who pays it with a pre-paid or post-paid account, guaranteeing the payment to the toll agency. BestPass then invoices their appropriate customer for the toll amount due.

BestPass is the CSC for their customers, handling all account management, customer questions, disputes, and issues. They also manage all communication and invoicing. BancPass markets their products independently to trucking fleets, but they do not serve

[12] Clavelle, J. (2020, March 30), BestPass Vice President Business Development, Service Partners & Providers. (A. Cadmus, Interviewer)

rental car companies. Similar services are provided by other vendors to rental car companies.

BestPass passes along the toll amount charged by the agency, without inflating or adjusting the amount due by payment method (i.e. a transponder toll rate is not inflated to a cash rate). Similarly, if the agency provides discounts (e.g. volume discounts like those in Maryland), they pass those savings on to their customers. BestPass generates revenue through monthly service fees to their customers, ranging from under $1.00 to around $10.00 per transponder or vehicle per month.

BestPass, however, does not have accounts/relationships with every agency within the country, limiting their customer base in certain regions. They stated that they are endlessly working to break down barriers between fleets and agencies, providing them both with cost savings.

2.5 Vendor Type Analysis

There are many vendors providing a wide variety of services in the tolling industry. Some are well coordinated with, or specifically have a contract with agencies. Others have no affiliation and provide solutions they believe to fill a market gap. Services provided by these vendors are summarized below. These assessments are not a reflection of the specific example companies described above, and may or may not be realized by any given vendor. These are potential advantages and disadvantages for the class of vendors herein described.

2.5.1 Agency Procured/Developed Apps, Kiosks, and Payment Networks

Advantages

- Agency has full control over development, implementation, and management with procured vendor
- Can include low or no cost solutions to the agency, but would include transaction costs to the customer
- Agency branded – leading to easy customer understanding
- Can attract underserved, unbanked, and under-banked customers

Disadvantages

- Cash payment networks within retail locations typically include very limited customer interaction and services for customers
- Customers may be charged more in fees by the third-party vendor for transactions using cash payment network, kiosks, apps, or web
- Typically requires agency procurement process
- Can include high capital cost or ongoing maintenance costs for the agency

2.5.2 Third-Party - Full Service Customer Service Centers

Advantages

- Can include guaranteed payments
- Can include low or no cost to the agency
- Procurement process is typically not required
- Can attract underserved, unbanked, and under-banked customers
- Can lower costs due to fewer violations and fewer accounts to manage

Disadvantages

- May reduce customer base for agency
- Poor customer services by third-party could reflect badly on the agency
- Could be confusing for customers to have two customer service entities
- Agency no longer has the customer relationship and may have limited control of the flow of information
- Customers may be charged more in fees by the third-party vendor

2.5.3 Third Party – Coordinated/Affiliated Mobile apps

Advantages

- Agency has some control over the app, its use, and interface with their system
- Fills a gap in customer account management and payments
- May lead to more and faster payments / fewer violations
- Can attract underserved, unbanked, and under-banked customers
- Procurement process is typically not required

Disadvantages

- Agency may have less control over the customer relationship the flow of information
- Poor customer services by third-party could reflect badly on the agency
- Customers may be charged more in fees by the third-party vendor
- Though less likely than unaffiliated apps, it may be developed poorly or lead to errors for the agency to handle
- Though less likely than unaffiliated apps, could compromise account security

2.5.4 Third-Party – Unaffiliated Mobile Apps

Advantages

- Fills a gap in customer account management and payment interface
- May lead to more and faster payments / fewer violations
- Can attract underserved, unbanked, and under-banked customers
- No cost to the agency excepting app generated customer issues
- Could reduce costs to agency with fewer calls if app works well

Disadvantages

- Agency has little control over unaffiliated apps, marketing, use, or the interface with their system
- Customers may be charged more in fees by the third-party vendor
- Apps may be poorly developed or maintained, leading to errors for the agency to handle
- Apps may violate customer terms and conditions
- Apps may compromise user account security

2.5.5 Fleet Toll Account Management Services

Advantages

- Fills a gap in customer account management and payment interface
- Consolidates difficult to manage fleet customers into one dedicated company – reducing agency management and costs
- Can include guaranteed payments to the agency
- May lead to more and faster payments / fewer violations
- Often no cost to the agency
- Provides customers some level of interoperability

Disadvantages

- Poor customer services by third-party could reflect badly on the agency, though less likely to occur
- Agency has little control over the flow of information to the fleet companies without management company support
- Coverage of company may vary, leading to customer confusion
- Customers may be charged more in fees, but often save money

3 Conclusions

The quest to provide customers with the account types and payment methods that work for them has created a robust set of options. This helps to accommodate the diverse customer base that toll agencies serve. Unfortunately, it may also lead to customer confusion, especially given the relatively inconsistent framework of account types and payment methods within the I-95 corridor. An example of this is how different agencies and toll facilities treat rental cars and collecting payments - some collect the tolls through rental car companies, others through apps, and others through agency websites. It is easy to imagine how an individual driving a rental car who travels through more than one tolling agency might miss a toll payment inadvertently. Additionally, Customers can sometimes use their own “home” transponders in a rental car depending on the transponder interoperability of the visiting facility, but this feature is not always utilized by customers – for a variety of reasons – forgot to add the rental plate and dates of travel, forgot to bring the transponder on vacation, etc.

3.1 Challenges

Agencies face many challenges in deploying new payment methods, which is the primary reason for slow adoption. These challenges include:

- Procurement processes
- Desire to control the customer relationship
- Maintaining customer trust and privacy
- Aversion to risk to revenue and reputation
- Potential, unanticipated fraud or gaming the system
- Cost
- Variety of options and customer confusion
- Clear and effective communication about the payment options

3.1.1 Vendors

Regarding vendors, which became the focus of this paper, there are many that will offer high quality service to customers or even have their own customer service centers. However, agencies struggle to endorse or allow co-branding and joint marketing. According to the vendors we interviewed, they believe this is a result of undeveloped trusting relationships, concern over endorsing one vendor over another, and potential legal concerns.

In contrast, third party service providers could provide poor customer service and apps prone to errors. This can lead to distrust of the toll agency, and more violations. Without agency accommodations for unaffiliated third-parties, these third-parties and/or customers may also be in violation of the terms and conditions of the customer agency accounts.

3.1.2 Risks

More broadly the adoption of new products and services also bring unanticipated risks to revenues. An example of this is the abuse of E-ZPass On-The-Go transponders sold in retail locations. E-ZPass On-The-Go is only for passenger two-axle vehicles and comes pre-loaded with $25 in tolls. However, trucks have been known to purchase these transponders and use them through the I-95 corridor over the course of a day, exhausting the balance quickly, allowing remaining tolls for the day to be unpaid. The E-ZPass interoperability rules protect agencies from the responsibility for guaranteeing tolls for transponders they issue and say are in good standing with the daily file exchange – therefore an On-The-Go transponder may fall into a negative balance quickly but inadvertently be guaranteed by an issuing agency. If images aren't taken of all vehicles regardless of transponder status and class mismatch, agencies have no recourse to collect from the customer.

3.1.3 Procurement

Agency procurement processes can take a significant amount of time, be cost prohibitive for smaller vendors, and too complex for a small vendor to understand and navigate. This also may slow adoption and acquisition of the most innovative products from startups and other small businesses.

3.1.4 Communications

Account types and payment methods are two pieces of a complex relationship that agencies have with their customers. Now, more than ever, it is more difficult to grab a customer's attention to educate and collect payment. Simplicity and effective communication becomes arguably the biggest piece of the puzzle. However, the variety of account types and payment methods create a significant challenge in communicating and educating customers, especially due to diversity of options and branding/payment names in the corridor.

3.2 On the Horizon - Vehicle to Infrastructure Payments

In recent years, there has been an increasing push regarding the use of cellular connectivity for vehicle-to-infrastructure (V2I) communications. All of the major passenger vehicle manufacturers have developed systems and programs to enable this

communication with expected roll-outs beginning in 2021. Some manufacturers, such as Toyota, have already built this type of communication into their vehicles. There are two conflicting possibilities.

The first scenario would be that a vehicle operator could link the vehicle to their smartphone and have “pass through” capabilities such as electronic payment from virtual wallets (i.e. Apple Pay and Google Pay). This type of connectivity is predominant in vehicles today – but lacks the final ingredient that would enable the vehicle to broadcast to the infrastructure as this is still being performed from the smart phone.

In the second scenario, on which car manufacturers are working, the vehicle itself is equipped with cellular (and/or Wi-Fi, Bluetooth, etc.) capabilities and is capable of broadcasting and interacting with infrastructure directly, without a smart phone being present. Visa and MasterCard are both working on systems for in-car commerce[13]. Their approach is to link vehicles and merchants for touch free and secure payments. Merchants may include paying for fuel, drive through food and beverage, and tolls. The COVID-19 impacts are also fueling a push for these services, but they are still fragmented with barriers such as a lack of interoperable systems, multiple initiatives from different players, and safety concerns related to distracted driving. MasterCard is currently working with GM, Honda, IBM, and Amazon among others. The primary push from these credit card companies is to not be displaced by smartphone integration into vehicles, and remain relevant in the industry.

Another significant push in the transportation arena is the move towards a “universal payment” system whereby users can pay for services using the same mechanism. This is a phenomenon that has developed during the past 30-40 years as various transit, tolling, parking, and other service providers have all adopted different systems for payment of services. This is exacerbated as the transportation community moves from a cash-based focus to an account-based focus. Today’s customers, and certainly future customers, want a one-stop shop for payment of services. Households with sufficient financial resources can to some extent achieve this through the use of credit-card based services and or electronic linkage to their bank accounts. Still, many services such as toll systems, require registration and payment from different accounts. In the not so distant future, there will be a push for consolidation of these accounts into a single one-stop master account. This is already beginning to occur as companies such as Apple, Google, Facebook, and Amazon are actively enabling the consolidation of electronic passwords, and are beginning to serve as account aggregators.

[13] Arnfield, R. (2020, April 1). How Visa, MasterCard are building a road map for in-car commerce. Retriefed from Payment Source: http://paymentsource/com/news/how-visa-mastercard-are-building-a-roadmap-for-in-car-commerce

3.3 Recommended Next Steps

To take the next steps in researching best practices and innovations in toll payment options, it is recommended that the I-95 Corridor Coalition perform more direct research by contacting agencies directly.

1. **I-95 Corridor Coalition Agencies Verification**

   It is recommended that the Coalition agencies review the research and results of our web-search to confirm accuracy of accepted account types and payment options. The authors did not reach out to agencies directly, only doing desktop research as directed. The questions would include:

   - Are the account types and payment methods in Section 2 accurate for your agency?
   - Have any of these account types or payment methods brought significant success or hardship to the agency? If so, please explain.
   - What has been the effectiveness of the payment methods and account types offered?

2. **Contact Agencies with Implemented Innovations**

   It is recommended that the Coalition reach out directly to agencies whom have already implemented innovative payment methods. This conversation would provide insight into how the agencies deployed the payment methods, the challenges and opportunities it provided, and the resulting success or hardship. The desktop research included in this paper does not include how successful these innovative payment options have been once deployed, and if they accomplished their goals. It is recommended that the following agencies be contacted with the questions listed below:

   - Kansas Turnpike Authority
     - What was your approach to procuring a separate vendor for your K-TAG website and mobile app to interface with customers, rather than using your back office vendor?
     - What have been your biggest challenges and opportunities in using a separate vendor for the website and mobile app?
     - We understand that PayIt Solutions typically charges per financial transaction. Is that the arrangement that K-TAG has, and is that passed to the customer or absorbed by the agency?
     - It appears from your website that you are interoperable with third-party customer service providers such NATIONALPASS, and cobranded with BancPass. What was your experience with coordinating/affiliating with these types of companies and how has it impacted your facility?

- New York CSC
    - What were the goals, objectives, and needs that led you to deploy kiosks and a payment network?
    - What were some lessons learned from those deployments?
    - Were those payment methods adopted/accepted by customers and what are the results today?
    - Did the deployment of these payment methods achieve the goals and objectives originally envisioned? If not, why?
- Bay Area Transportation Authority / Golden Gate Bridge
    - What were the goals, objectives, and needs that led you to deploy kiosks and a payment network?
    - What were some lessons learned from those deployments?
    - Were those payment methods adopted/accepted by customers and what are the results today?
    - Did the deployment of these payment methods achieve the goals and objectives originally envisioned? If not, why?
    - Do the license plate accounts seem to reduce the market share of FasTrak?
    - Does the one-time payment option provide the revenue expected and does it cause any unintended consequences or challenges?

3.3.1 Additional Research in Communication

As stated above, communication and education are a critical components to providing effective and easy payment methods. The challenge is to manage the many threads of communication to provide transparency about the many payment options. The communication content could include consideration of:

- Account type messaging
- Payment method branding,
- Policies,
- Education, and
- Interfaces such as texting, email, apps, mail and phone

Best practices in communication and education relative to the items above will not only help them manage existing payment methods, but should inform the steps for agencies to select and deploy new payment methods, interfaces, and account types.

Appendix A

Detailed Description of Payment Methods and Accounts

Payment methods cannot be discussed without an understanding of account types as well. Different account types require different payment method options for users. For example, a user without a transponder or license plate account will not have an option for automatic replenishment of their pre-paid funds. Below, payment methods are listed, followed by a detailed discussion of account types and the methods available for each.

Payment Methods

Based on the type of account established by a customer, tolling agencies offer a wide range of payment options. The main focus of this research is to summarize the ways in which users are able to make payments, including more innovative or unique methods. Much of the innovation in the industry

TRADITIONAL (MAIL, PHONE, WALK-IN-CENTER, AND WEBSITE)

Traditional toll payment methods are well known to tolling agencies, and include mail, phone with a CSR or IVR system, in-person at a walk-in-center (WIC), website, and automatic credit/debit card or checking account. Several toll agencies have added more payment methods recently, including through mobile phone applications (“apps”), third-party payment networks/services, and physical kiosks that accept cash and credit/debit cards. A few agencies have produced their own mobile apps while a number of others benefit from third-party mobile apps to help customers manage tolling accounts. The capabilities of the apps vary widely but.

PAYMENT NETWORKS (RETAIL, POINT OF SALE, AND KIOSKS)

Payment networks come in a few forms. The most common is the use of a retail network to sell transponders or transponder kits which typically have a starting balance, allow immediate use. These transponders must then be registered to open an account.

Another option is allowing payments or account reloads at retail location point-of-sale machines. These are often the greatest benefit to customers who are unbanked or under-banked (those with limited access to credit and bank accounts) or those wishing to carefully manage their cash-flow. The retail location uses their already extensive network of point-of-sale machines to collect payments from customers and forward to toll agencies. These locations include convenience stores, supermarkets, drug stores and similar, often also selling transponders or transponder kids. These locations often charge a fee per financial transaction for reloads or payments that can be paid by the customer or agency.

Kiosks are another example of a payment network. Agencies, will deploy customized self-serve kiosks to locations in a region. The kiosks typically can accept cash payments in addition to electronic payments, and for customers to manage their accounts or purchase a transponder. While convenient, these kiosks are difficult to maintain and have higher

operating costs so have been on the decline in recent years in exchange for more mobile payment platforms.

APPS (AGENCY OR THIRD-PARTY)

Apps vary the most significantly across payment options. Some only allow account management without one-time payment options, while others only allow one-time payment. Many other third-party apps simply provide users a mapping function to avoid toll roads or calculate tolls. App can be developed or procured by agencies themselves, be developed by third-parties with or without agency support/collaboration, or be provided as part of a service of their existing customer service center (CSC) contract.

The apps can be powered by different technologies as well. They can be based on geo-fencing which notifies customers after having driven on a toll facilities. They may also have direct connection to the agency back office database. Other apps simply use web scraping, a method of using a customer username and password to access their agency account.

Account Types

TRANSPONDER ACCOUNT - PRE-PAID

All of the member tolling agencies researched offer transponders for the use of electronic toll collection. Most agencies divide account types between personal and commercial. At a minimum, all tolling agencies allow the same subset of five toll payment methods for users with pre-paid private and commercial transponder accounts: website, mail, in-person, and phone by customer service representative (CSR) and interactive voice response (IVR).

Some agencies also accept additional payment methods. Within the Coalition member agencies, there are two agency-based mobile applications that allow users to add funds to their transponder accounts directly. The Georgia State Road and Tollway Authority offers users the option to use the Peach Pass GO! mobile app to manage Peach Pass accounts. The Pennsylvania Turnpike Commission produced the PA Turnpike E-ZPass mobile app to be used by E-ZPass account holders in Pennsylvania. Along the same lines, 11 of the member agencies researched have transponder account payments available through both coordinated/affiliated third-party mobile applications and unaffiliated ones. More details regarding the specific vendor provided applications are discussed in Section 3 of this document.

TRANSPONDER ACCOUNT - POST-PAID

In addition to pre-paid transponder accounts, some agencies allow post-paid commercial transponder accounts with a surety bond: the Massachusetts DOT, Pennsylvania Turnpike Commission, Maine Turnpike Authority, New York State Thruway Authority, Metropolitan Transportation Authority, and Port Authority of New York & New Jersey.

All of these agencies also offer the same five core payment methods for post-paid transponder accounts: website, mail, in-person, and phone CSR and IVR.

In addition, the Massachusetts DOT allows post-paid transponder customers to make payments using a third-party payment network that includes physical vendors as well as the third-party cash payment vendor MoneyGram.

NON-ACCOUNT - ONE TIME PAYMENTS

One-time payments are toll payment made by a customer without a registered account. This payment method is used by four of the member agencies and generally helps to avoid an agency needing to mail an invoice. Post-travel one-time payments are utilized by Transurban, Virginia DOT, New Hampshire DOT, Maine Turnpike Authority, and the Florida DOT.

In Virginia, account holders must use the website to pay a missed toll if it is not automatically deducted from an existing account. However, non-account holders can use the third-party mobile app to make post-travel payment.

The Maine Turnpike Authority allows one-time post-travel payments when users accidentally use an E-ZPass lane without a transponder or when cash lanes are unstaffed. The payments are accepted through the website, in-person, through the mail, or over the phone via a CSR or IVR system.

In New Hampshire, customers that use E-ZPass tolling facilities without a transponder are able to make a payment within seven days, before they receive a violation. The New Hampshire DOT also accepts pre-travel one-time payments through the License Plate Account program and is the only Coalition agency to do so. Available payment methods for New Hampshire's pre-travel and post-travel one-time payments include website, mail, in-person, and over the phone via CSR or IVR.

Road users in Florida that have recently passed through a toll lane without a transponder or making an in-lane payment are able to pay afterwards without an invoice or citation using their license plate number. Payment for this post-paid account type can be made online or through the agency's mobile app.

The table on the following page displays the available payment methods for agencies that utilize one-time payments.

NON-ACCOUNT - POST-PAID INVOICES/VIOLATIONS

All member agencies researched utilize some form of post-paid invoice, whether they issue violations to customers that have not followed proper procedures, offer post-paid invoices as a typical toll payment option, or both.

The table below summarizes the invoice types used by tolling agencies as well as the payment methods offered for each. It is notable that most agencies allow customers to utilize the same five payment options: website, mail, in-person, and phone via CSR or IVR.

Massachusetts offers a third-party payment network for post-paid invoices while the New York CSC takes the convenience to another level by allowing customers to use the third-party payment network and kiosk locations to pay invoiced violations.

The Georgia State Road and Tollway Authority is the only agency in the Coalition that allows users to pay invoiced violations via a mobile app. The following table shows the payment methods allowed by Coalition member agencies that issue invoices.