

UNLOCKING THE PROMISE OF INTEGRATED MOBILITY IN THE CAPITAL REGION

JULY 2018



GREATER WASHINGTON PARTNERSHIP

FROM BALTIMORE TO RICHMOND.
FOSTERING UNITY. ADVANCING GROWTH.

EXECUTIVE SUMMARY



When you get into your car, you can use Waze to guide you to the optimal route. If traffic changes, Waze will redirect you and save you time. When you go to park your car, you can use Spothero to find and reserve a space, saving you even more time and eliminating the headache of circling to find parking. And thanks to EZPass, when you are driving on I-495 in Northern Virginia, the Intercounty Connector in Central Maryland, or the Powhite Parkway in Richmond, you no longer need to store coins in your car or wait in long lines to pay a toll.

Smart technology solutions have vastly improved the driving experience. Across the Capital Region, spanning Baltimore to Richmond, over 70 percent of daily commute trips involve an individual driving her or his own vehicle. At the same time, planning organizations throughout our region and the country have sought to improve alternatives to driving alone to ease congestion, mitigate pollution, improve economic competitiveness, and deliver a higher quality of life to our residents. Slight changes in consumer choices can improve the transportation system for *everyone*.

But where is the Waze-like experience for those who do not drive alone? Until we create a seamless platform for mobility services—particularly for those using more than one service in a single trip—individuals will continue to be encouraged to drive.

If you choose not to drive, you have some options thanks to technology, like Google Transit, which makes it easier to plan a trip and estimate the time. But Google Transit is not dynamic, and it does not help you buy tickets, toggle between multiple apps, farecards or dongles to complete a trip when using more than one mobility service. The problem is not technical; it is structural. With political will, MARC and WMATA could connect their ticketing

systems to allow a consumer to purchase a single pass from Baltimore to Dupont Circle, via Union Station. With private sector cooperation, the Capital Region could become the first place in the United States to allow consumers to buy a single ticket for a trip involving both public and private services like ridehail or carshare—and give consumers a help line to call if a problem arises en route. But none of these simple innovations is available today.

Viewed through this lens, it becomes clear that technology has delivered a far more integrated experience for our region's drivers than it has for consumers relying on other forms of mobility, both public (transit agencies and bikeshare systems) and private (ridehail, carshare, dockless bikeshare, and dockless scooters). As a result, consumers are nudged toward driving.

The Capital Region must empower each consumer to leverage the full potential of our transportation network by creating a single, seamless mobility platform. Such a platform can provide consumers with convenience, flexibility, and reliability that make mobility services collectively more competitive with driving alone. This will not happen overnight, but we can begin to move in this direction *right now*.

Imagine if...

A consumer can, with a single tap on a smartphone, reserve the nearest bikeshare and buy the Metrobus ticket she needs to complete her two-part trip.

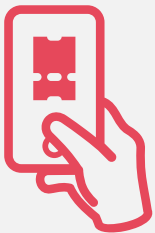
Over the next twelve months, the Capital Region's three principal public transportation agencies in the Baltimore, Washington, and Richmond metro areas have made separate plans to begin allowing consumers to purchase tickets with their mobile phones. Mobile payments are expected to speed commutes and save agencies money, strengthening the Capital Region's mobility network. However, benefits would be far greater if the agencies integrate their payment systems with one another, as well as with the many public and private services moving consumers throughout our region.

The world of urban mobility is evolving quickly, and no region in the United States has yet seized the initiative by creating an integrated platform for all public and private services. That gives the Capital Region an opportunity to become a global leader alongside places like London and Tokyo. The Greater Washington Partnership calls on public and private leaders across

our region to adopt the principles below to make our mobility network world class.

There are many feasible paths to achieve mobility integration, including the adoption of common language across transportation agencies' technology procurements and state-based campaigns to build three mobility networks that ultimately integrate with one other. But before choosing a path, local officials, transportation agency leaders, and private mobility executives must commit to making the regional commuter's user experience as integrated, reliable, and enjoyable as possible. With the Greater Richmond Transit Company (GRTC), Maryland Transit Administration (MTA), and the Washington metro's SmarTrip network on the verge of adopting mobile ticketing systems, the time to act is now. To do otherwise will only keep nudging consumers to choose to drive, putting additional burdens on our transportation system and jeopardizing the Capital Region's global competitiveness.

PRINCIPLES FOR INTEGRATED MOBILITY



1. Put the user experience at the center of ticketing and trip planning investments.
2. Build capacity for interoperability and new functionality in planning and ticketing systems for public and private mobility services.
3. Ensure that new ticketing systems equitably empower all consumers.
4. Leverage new ticketing systems to learn, experiment, and transform the travel experience.

The process of building an integrated mobility platform must begin right away. The action steps below will get us started.

NEAR-TERM ACTIONS

1. Establish strategic goals and plans for a single platform for all trip planning and ticketing in the Capital Region.
2. Incorporate fare capping into public transportation payment systems.
3. Pursue regional and national funding opportunities that move toward seamless ticketing across all mobility options in the Capital Region.
4. Avoid transportation agency procurements that preclude opportunities to innovate and integrate with other public or private mobility providers across the region.
5. Convene leaders of regional public transportation agencies regularly so they can share what they have learned.

Acknowledgement: The Partnership thanks David Zipper for his research, counsel, and management of this issue brief.



INTRODUCTION

The Capital Region's future relies on improving and integrating its mobility network, with estimates showing that congestion and inadequate transit are currently costing the region \$7 billion annually.¹ Mirroring a national trend, public transportation ridership is falling in Baltimore, Washington, and Richmond. In recent years regional officials have invested to improve the safety of public transportation and expand capacity through new capital projects like rail extensions. But on their own, these initiatives are unlikely to reverse widespread ridership declines. To give consumers an incentive not to drive their private vehicles, public transportation must provide a better user experience. Indeed, the experience of taking a subway or bus in the Capital Region has remained largely the same—except for steadily rising fares.

That must change. Using technology to simplify the trip planning and ticketing process can improve public transportation commutes at a fraction of the price of a rail extension—and it can reduce public transportation's long-term operating costs. Moreover, private services like

ridehail and dockless bikeshare can gain new customers by syncing their services with the new mobile ticketing apps that GRTC, MTA, and the SmarTrip network will soon launch.

Regional consumers will certainly benefit from these advances, but employers will get a boost too. As the *Economist* observed, better mobility technology enables “quicker journeys [that] will increase the catchment area for job-seekers prepared to travel for work.”²

Countries and regions around the world are embracing the promise of integrated trip planning and ticketing removing some of the friction—or superfluous steps in a process—from mobility's consumer experience. In London consumers can wave their credit cards to ride various trip options including the Underground, buses, and commuter rail networks, while those in Tokyo can use their PASMO smartcard to ride public transportation throughout the country and even pay for groceries. Portland allows consumers to pay for rides with Google Pay on their smartphones using a common payment platform; there is

no need to even download a transit application. But the Capital Region is lagging.

With autonomous and electric vehicles on the horizon, the Capital Region must adopt trip payment and planning services nimble enough to incorporate new modes of transport, and fast enough to reduce travel times—while safeguarding mobility for consumers of limited means. The alternative is a balkanized, confusing mobility network that will fail in providing consumers with adequate alternatives to driving their personal vehicles. All residents should be concerned that GRTC, MTA, and WMATA have not explained how their new mobile payment applications will sync with one another and with other public or private mobility services. Nor have they offered a vision for technology-based benefits that can improve the user experience.

There are a number of paths to create an integrated platform for mobility in our region. States could take the

lead, mandating integration for all public transportation systems within their borders and eventually incorporating private modes as well. Regional transit agencies could begin the process themselves, adopting common language in their payment system procurements to ensure their technology is interoperable. WMATA could seize the initiative itself since it is a critical mobility asset for both states as well as the District.

The options are many, but the process needs to start now. For decades, peer regions around the globe have been developing integrated ticketing platforms to improve user experience and compete with the private vehicle. At a minimum, the Capital Region must keep pace. Better yet, if private and public transportation providers embrace agility and interoperability, our region could again become a global leader in mobility—just as we were 20 years ago, when WMATA's SmarTrip was the first contactless smartcard in the country.

DEFINITIONS

This report uses the idea of integrated mobility to encompass three goals:

1. Using a **common payment platform** to give consumers flexibility to easily plan and pay for any regional travel with a smartphone, credit or debit card, or smartcard.

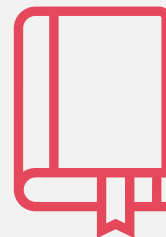
Consumers increasingly use features like Apple Pay or Google Pay on their smartphone when shopping at stores, but very few in the Capital Region can currently use a phone to pay for a trip on public transportation. Private services like ridehail and scootershare are generally based around mobile apps, but they seldom integrate to allow joint ticketing with other private services—or with public transportation.³

2. Leveraging technology to **integrate the region's transportation services** across agencies and with private mobility providers.

With more than 75 public and private entities playing a significant role delivering mobility services in our region, coordination is a challenge—especially one covering two states, a federal district, and the federal government. The more transportation agencies and private mobility providers can build backend systems that communicate and enable integrated ticketing, the more connected our regional transportation network can become—and the easier it will be for consumers to plan and complete a trip.

3. Building a **flexible mobility network** that embraces pilots and open data.

It is easier for public transportation to capitalize on new innovations if agency leaders are able to pilot new features, services, and fare policies without arduous negotiations with their technology vendors. Open data from both public and private mobility providers can enable new innovations to arise, and improve the experience of users who can easily choose the service provider they want for a specific trip.



A NOTE ON PLANNING AND TICKETING TECHNOLOGY

While this issue brief will not focus on the technical specifications of public transportation agencies or private mobility companies, it is helpful to provide a short background on ticketing systems.

Public transportation agencies rely on **systems integrators** to manage technology that powers their ticketing and trip planning services. Companies such as Cubic, Init, and Conduent create payment hardware and software for public transportation agencies including vending machines, turnstile management, and backend accounting. Some of them—along with specialized firms like Moovel—also build mobile ticketing software compatible with smartphones that connects with agencies' hardware systems. Mobile ticketing companies focus on software and are generally agnostic about the hardware agencies use, while larger companies like Cubic build both proprietary hardware and software.⁴

Following their procurement rules, transportation agencies release requests for proposals (RFPs) to select a systems integrator to build and maintain their payment system. Because setting up the initial system is expensive, integrators generally expect guaranteed long-term contracts of ten or more years to recoup their investment.

The contracts with the systems integrators restrict agencies' flexibility with their payment systems, limiting their ability to change fare policies or integrate with other public or private mobility providers.

In addition to managing their own trip planning and fare collection services, transit agencies may share their schedules, GPS locations of vehicles, and realtime arrival and departure data with mapping services like Google Maps, private mobility providers like Uber, Lyft, or Limebike, or wayfinding startups like TransitScreen or CityMapper. Often provided in a standard called General Transit Feed Specification (GTFS), this data allows for third parties to provide applications and services with accurate transit information.

Sometimes private mobility companies (ridehail, bikeshare, etc.) share data with each other as well through application programming interfaces (APIs)—but sometimes they do not. While trip planning in American cities is relatively integrated, only in rare instances can a consumer purchase a trip for a given service—public or private—from within the application of another service or through a third party.



THE BENEFITS OF INTEGRATED MOBILITY

Without a constituency pushing to integrate regional mobility, our transportation network has foregone opportunities to improve the user experiences of those who do not drive. This regional shortcoming undermines Maryland, Virginia, the District, and the metropolitan planning organizations of the Baltimore, Washington, Fredericksburg, and Richmond metros, each of which has prioritized reducing congestion and growing public transportation ridership.⁵ Upgrading and connecting trip planning and ticketing technology will make alternatives to driving alone—both public transportation and private mobility services—more competitive.

BENEFITS TO CONSUMERS

- **Increases convenience:** An integrated mobility platform provides consumers the freedom to use a travel portal to plan and book their journey from start to finish, regardless of the modes chosen. Consumers would no longer need multiple online accounts or farecards with stored balances. Indeed, mobile phones and debit cards reduce the need for farecards altogether.
- **Enables speedier trips:** Bus service in particular becomes faster with mobile or debit card payments. To understand why, think about the process for boarding a bus. Many passengers will swipe a smartcard and complete their transaction quickly. But some will find that their smartcard is out of funds and will pause to reload. Others will pay with cash, needing a few seconds to feed their bills into the payment collection system and count coins. These transactions take time, delaying consumer trips.

One recent study in Arlington found that a consumer paying for a bus trip using a SmarTrip farecard takes 2.5 seconds, compared with six seconds with cash or

20 seconds if SmarTrip needs to be refilled. Public transportation consumers paying with a mobile phone take roughly two seconds to board, a bit faster than a smartcard and much faster than cash.⁶ These seemingly small differences add up—on average 20 percent of the time spent on a bus trip is spent waiting for other passengers to pay.⁷ Unanticipated delays from onboard payments further erode overall reliability—and the consumer’s experience—by creating “bus bunching” in which multiple buses arrive in a short period of time, followed by a long wait.⁸

Offboard payments, in which public transportation consumers complete their ticket purchase before boarding a transit vehicle, reduces travel time by eliminating the need to pause and pay on the vehicle itself. Better yet, offboard payments can allow vehicles to let passengers board through all doors, further shortening so-called dwell times by increasing speeds by an additional 10 percent.⁹

The net effect is both faster and more reliable trip times—including for those passengers still using cash, who benefit from others boarding more quickly after paying with their smartphone.

- **Provides assurance during transfers across services:**

By providing consumers service to those making a transfer across systems, an integrated mobility platform can give consumers confidence they will reliably reach their destination. Imagine a price-conscious consumer traveling from the District of Columbia to the Mosaic District in Fairfax, Virginia. The consumer may prefer to take Metrorail to the Dunn Loring Station and then use Lyft for the final 0.7 miles of the journey. But without certainty that Lyft will be affordable and available upon arrival at Dunn Loring, the consumer may opt to drive. That consumer might have left the car at home if there was a way to buy a ticket encompassing both Metrorail and Lyft before starting the trip.¹⁰ One recent study found over 10 percent of daily public transportation users already use a combination of transit and ridehailing daily to reach a destination.¹¹

- **Accommodates payment innovations like fare capping and public and private mobility subscriptions:** Public and private mobility providers often incentivize consumer use by offering unlimited rides on a daily, weekly, or monthly pass. Integrated trip planning and fare systems enable fare capping, which ensures a consumer enjoys the benefits of an unlimited pass regardless of whether that consumer is able to purchase such a pass up front. By capping total fares paid at the cost of an unlimited pass, a mobility provider using fare capping will not charge a consumer for any additional trips once the cost for the unlimited pass has been met. For example, London's integrated ticketing system automatically calculates the best-value ticket for each consumer's daily trips and then charges them the best ticket value at the end of each day.¹² This ensures consumers always pay the lowest and most appropriate ticket price for their trip, which improves the experience and avoids penalizing those who cannot afford the upfront cost of an unlimited pass. An illustration of fare capping is available [here](#).

Integrated payments across mobility modes can also enable subscription services that give consumers a fixed price for a given amount of transportation, regardless of the mode in which a trip is taken. Backend processing allows for payments to be sent to the entities—public or private—that provided mobility services to a subscribed consumer. Finland's Whim program is one of the first to provide such multimodal subscription services.

- **Enables incentives that improve the user experience:** An integrated and frictionless mobility system provides new opportunities for mobility providers to deliver free or heavily discounted fares across services, such as from light rail to bikeshare. This integration was offered in Pittsburgh when the public transportation system's ConnectCard smartcard was linked with the HealthyRide bikeshare system to offer consumers unlimited 15-minute bike rides. This partnership grew bikeshare usage in Pittsburgh by 10 percent.¹³

Consumers with flexible travel plans can benefit too. Integrated ticketing allows public transportation agencies to reduce fares for consumers willing to alleviate unexpected congestion by changing their departure time or altering their route, for example receiving a \$1 discount if they take their regular bus to work 30 minutes earlier than they usually do. Such offers can be delivered through push notifications to smartphones.

- **Creates a consistent and consumer-friendly approach:** Currently, consumers can use applications such as Google Maps or Transit App to plan trips across mobility providers in the Capital Region. However, paying for the itinerary often requires multiple fare payments, applications, and occasional guesswork. An integrated mobility platform can streamline planning and purchasing, removing points of friction. Benefits accrue to residents of the Capital

Imagine if...

A driver stuck in a traffic jam receives a notification offering free parking at a nearby transit stop if he completes his trip by rail.

Region as well as tourists, whose unfamiliarity with the mobility network makes current payment options even more confusing.

BENEFITS TO TRANSPORTATION AGENCIES

- **Increases ridership:** An integrated ticketing platform increases the likelihood consumers opt for public transportation. Integrated ticketing systems have delivered public transportation ridership increases from five to 20 percent in peer regions throughout the world.¹⁴ To put that number in context, Metrobus ridership fell 5.6 percent from 2016 to 2017, while MTA's bus ridership declined 8.9 percent and GRTC ridership dropped 9.1 percent.¹⁵ More riders will bring greater operating revenue to transportation agencies, offering paths to expand service without increasing budgets.
- **Reduces cost to collect fares:** Cash is expensive for transportation agencies to process, as they employ staff to count it in so-called "money rooms." All other ticketing options are cheaper than cash, with the cost of issuing a paper ticket accounting for an average of five percent of transportation agencies' total cost to serve a passenger, smartcards consuming three to 4 percent, and mobile ticketing only 2 to 3 percent.¹⁶ On the payment collection side as well, cash payments cost an average of 5 percent of the fare, compared with 2 percent with credit cards and 1 percent with mobile payments.¹⁷ Although only 12 percent of WMATA's fares are paid with cash, those transactions consume 10 percent of the agency's entire budget for administrative and processing costs.¹⁸

Integrated payment systems can reduce agency expenses significantly by automatically transferring funds from credit cards and mobile payments to transit agencies' accounts. In London, allowing contactless payments with a phone or debit card reduced the cost of collecting fares from 14 percent of total revenue to 9 percent in just over a year.¹⁹

- **Lowens the cost of providing a given level of bus service:** As mentioned earlier, integrated ticketing systems can speed the bus boarding processes. As a result, transportation agencies can save labor, maintenance, and capital costs because fewer buses are required to reliably provide the equivalent frequency of service.

- **Leverages better data to improve public transportation operations:** Modern ticketing platforms can provide transportation agencies with far richer and more up-to-date data about customer trips than legacy systems. If a transportation agency knows that a consumer commutes on a given bus line every evening, it could provide push notifications via cell phone notifying the consumer when there is a service disruption—thereby reducing congestion. Long term planning can benefit as well, with agencies able to automatically generate fuller pictures of their consumers' experience.²⁰ Armed with better information about consumers' original points of departure and final destinations, they can adjust routes to better align service with user demand within their given resource constraints.
- **Paves the way for future innovation:** A flexible ticketing system can empower transportation agencies to develop consumer tools they never had before. For instance, an agency could experiment with gamifications and frequent traveler benefits like those airlines and toll networks use to maintain consumer loyalty. Rewards can be instantly "pushed" toward smartphones. Further, transportation agencies could cross-market with major events or retailers to earn new revenue.

Looking further ahead, integrated ticketing platforms allow transportation agencies to maintain flexibility for an uncertain future. The transportation sector is already going through a transformation with services like microtransit and dockless bike and scooter sharing systems growing rapidly; it is impossible to anticipate what the next decade could bring, especially with autonomous and electric vehicles ascendant. The hardware used for issuing tickets—either paper tickets or smartcards—is expensive and often difficult to adjust. In contrast, transportation agencies deploying mobile ticketing with open data and APIs can more easily change service, add partners, and collect new data as needs arise.

Indeed, if transportation agencies do not quickly embrace a role as a platform for both public and private mobility, they may lose the opportunity. In March 2018 Uber's CEO traveled to Ward 7 in the District to announce integrations with Jump (a recent acquisition) and Masabi, allowing Uber's users to book bikeshare and public transportation trips in addition to its core ridehailing options.

Other mobility companies have shown similar interest in becoming hubs of multimodal transport, with Ford purchasing bikeshare and microtransit companies and Via and Mobike entering into a ridehail-bikeshare alliance.²¹ For now, the question of who will create the trip planning and ticketing mobility platform of the future remains open.

BENEFITS TO PRIVATE MOBILITY PROVIDERS

- **Opens wider and deeper market of potential consumers:** Hungry for new consumers, private mobility providers stand to benefit from integrating their platforms into a seamless mobility platform. Hundreds of thousands of new consumers could access a private service if a single application allowed them to purchase a ticket encompassing both dockless bikeshare and bus, or ridehailing and rail—especially if consumers know they can access a hotline if any problems arise when transferring between services. As shown by Uber’s announcement of the Jump acquisition and the Masabi partnership, private mobility companies believe there are benefits to integrating their services. Doing so expands the market size of potential consumers.

Unfortunately, private mobility companies often restrict public agencies and third-party trip planning applications from integrating their data and services with those of perceived competitors. For example, Uber or Lyft may engage in mobility pilots paid by public transportation agencies—but the presence of one generally keeps the other away. Ridehailing companies also have refused to grant access to their APIs to startups like Transit App and TransitScreen unless there is a guarantee that competitors’ data will not also be available.

These policies limit potential integrations with public transportation agencies that are constrained from favoring one company over competitors. They also complicate consumers’ experience planning and paying for trips, reduce competition across modes, and collectively suppress demand for private mobility services vis a vis driving a private vehicle. Mobility company executives regularly claim to be competing primarily with private vehicle trips; if that is the case they should then embrace openness of their own data to establish stronger partnerships with public mobility providers and the region’s consumers.

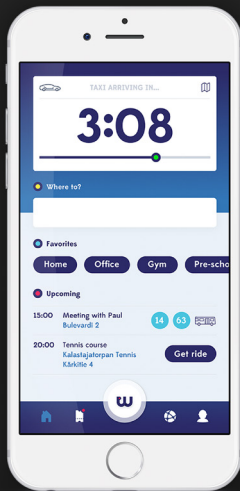


UNITED STATES

Almost all major American cities today either allow consumers to purchase tickets by smartphone or plan to do so shortly. Of the 10 largest public transportation systems in the country, WMATA was the last to announce such a move in April 2018. However, very few American public transportation systems allow consumers to purchase tickets across both public and private mobility providers.

Portland, Oregon’s Hop system is one of the nation’s newest mobile ticketing systems, launched in July 2017 and incorporating TriMet, Portland Streetcar, and C-Tran in nearby Vancouver, Washington. Unique in an American city, Hop allows consumers to manage a transit account through Google Pay, with the ability to buy any ticket that a physical Hop card would offer. For that reason, a consumer using Hop does not need to download a new public transportation application and register for an account; the consumer can simply use the Google Pay function already on an Android phone.²² Notably, Hop is also the first transit payment system to incorporate fare capping to ensure consumers do not pay more than the cost of an unlimited pass for travel.²³

WORLDWIDE



Outside the United States, many urban consumers have access to transportation payment systems that are more integrated into daily life than any comparable product in the United States.

For example, in Tokyo consumers can use a PASMO smartcard for commuting on public transportation, but they can also use it on buses or rail systems in other Japanese cities like Osaka or Kyoto. They can even use PASMO to rent a storage locker in a train station—or they can utilize the debit card functionality to buy coffee or a magazine at a convenience store that is part of the PASMO network.

In Europe, Finland has incorporated both public and private transportation providers into its Whim application. Consumers can use the Whim application to plan and pay for trips from public or private mobility providers, with the application recommending routes and carriers based on origin and destination. Public transportation, taxis, bikeshare, and carsharing services are all available.

ENSURING BENEFIT TO THOSE WITHOUT SMARTPHONES

Integrated ticketing platforms leverage the power of smartphones, as well as other smart payments options (e.g., smartcards, credit cards). The benefits consumers reap from integrated ticketing may not resonate as universally in low-income communities where the cost of a smartphone or an associated data plan can be prohibitive.

Eighty-one percent of households in the Capital Region have access to a smartphone.²⁴ As high as that number may seem, some 748,000 regional households still lack a smartphone. As shown in the map on the next page, smartphone penetration rates across households vary significantly in the Capital Region, with the Northern Virginia suburbs over 85 percent while most of the City of Baltimore is below 72 percent.

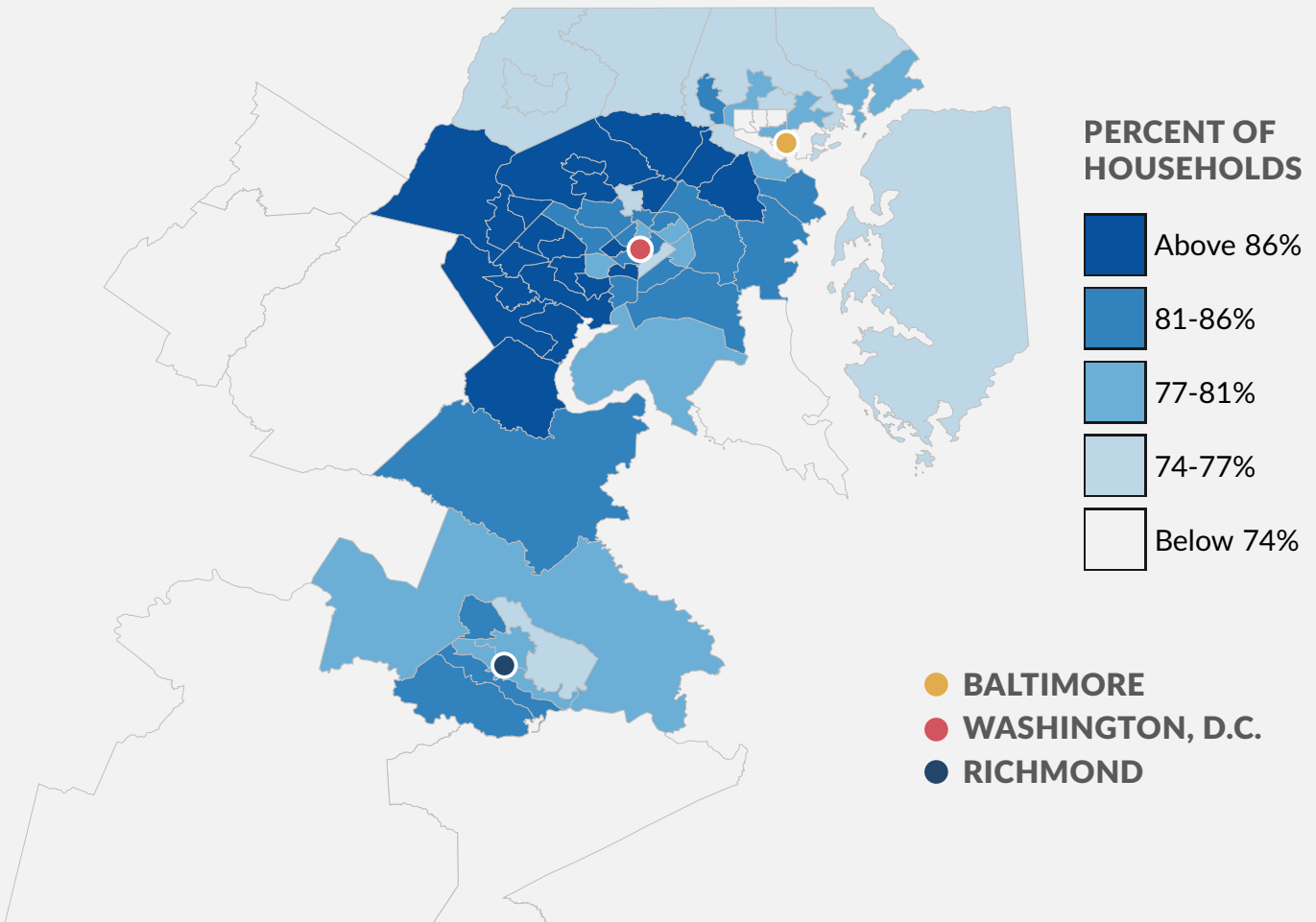
For that reason, an integrated mobility platform must not erode the user experience or restrict access for those unable to afford smartphones. One way to ensure low-income residents are not harmed by new mobile ticketing is to maintain the ability to pay with cash whether on board, at an off-board kiosk at the stop, or at a nearby store. Those using cash will still benefit from faster, more reliable public transportation trip times when others complete transactions with their smartphones.

Indeed, the benefits of mobile payments should be particularly strong in low-income communities because public transportation use is generally higher in these communities. They will therefore benefit disproportionately from the faster service and better user experience that mobile ticketing brings—along with cost-saving features like fare capping.

Imagine if...

A tourist checking into her hotel for a convention finds a credit for seamless, integrated travel across public and private mobility services.

HOUSEHOLDS WITH SMARTPHONE ACCESS IN THE CAPITAL REGION - 2016



Source: Greater Washington Partnership Analysis,
Census Bureau 2016 Public Use Microdata Sample

Imagine if...

Rather than waiting for a near-empty late-night bus that runs every 45 minutes, a restaurant worker whose shift ends at 2 a.m. can get home with a publicly-subsidized ridehail trip.

THE STATE OF INTEGRATED MOBILITY IN THE CAPITAL REGION

Why are residents of the Capital Region unable to use a single platform to plan and pay for any trip on rail, bus, bikeshare, carshare, or the other modes that comprise our non-driving transportation network? And why can so few consumers pay by phone?

As of May 2018, there are few examples of integrated ticketing in the Capital Region. VRE and Amtrak are the only public transportation providers in the Capital Region that offer mobile ticketing to consumers. However, MTA, GRTC, and WMATA all plan to roll out new mobile ticketing options in the next 12 months.

A chart of select transportation networks and their ticketing capabilities is shown below, followed with an overview of the Baltimore, Washington, and Richmond metro areas.

The region's public transportation agencies deserve praise for recognizing the faster travel times and convenience that mobile ticketing systems can bring. However, the region has made little progress integrating trip planning and ticketing across public and private mobility providers. Nowhere in the Capital Region is it possible to reserve a private bikeshare bike or carshare vehicle from within a public transportation ticketing application, or vice versa.

CURRENT STATE OF INTEGRATED TICKETING IN THE CAPITAL REGION

	ANNUAL RIDERSHIP	MOBILE PAYMENT AVAILABLE	SMARTCARD AVAILABLE	SMARTCARD USAGE	CASH PAYMENT AVAILABLE WHEN BOARDING	FARE CAPPING	JOINT TICKETING WITH PRIVATE MOBILITY PROVIDERS	INTEROPERABILITY WITH OTHER PUBLIC AGENCIES OR SYSTEMS
MTA (Baltimore)	111 million (2016)	No ²⁵	Yes	25% ²⁶	Yes	No	No	None ²⁷
Metrorail (Washington)	180 million (2016)	No	Yes	100%	No	No	No	SmarTrip network ²⁸
Metrobus (Washington)	123 million (2016)	No	Yes	88%	Yes	No	No	SmarTrip network ²⁹
GRTC (Richmond)	7.9 million (2017)	No ³⁰	No	N/A	Yes	No	No	None ³¹
MARC	9.0 million (2016)	No	N/A	N/A	Yes, with surcharge of \$5	No	No	None ³²
VRE	4.3 million (2015)	Yes	N/A	N/A	No	No	No	Amtrak
Amtrak (Northeast Corridor)	11.9 million (2016)	Yes	N/A	N/A	N/A	No	No	VRE



BALTIMORE

MTA is in the process of replacing the CharmCard, a smartcard, with a new backend ticketing system designed by Cubic and a mobile ticketing option managed by Moovel. These new systems are expected to launch in 2018. The new system will offer mobile ticketing, which could substantially improve bus service since roughly 40 percent of MTA consumers currently using cash to pay for their trip.

One regrettable result of MTA's CharmCard overhaul is the loss of its interoperability with the Washington metro area's SmarTrip network, meaning that consumers using transit in both the Washington and Baltimore metro areas will need separate smartcards or mobile apps to complete a trip. MTA's decision to move beyond SmarTrip's limitations is understandable, but it is a step away from achieving frictionless mobility services throughout the region. As of May 2018, it is also unclear whether the new MTA ticketing system will integrate with private mobility providers or adjacent transit systems in the Baltimore metro area, allowing consumers in places like Howard County to manage their trips into Baltimore with one application.

WASHINGTON, D.C.

Designed and maintained by Cubic, SmarTrip is foundational to the Washington metro area's mobility network. WMATA's reliance on Cubic hardware and software gives other transportation agencies within the SmarTrip network strong incentives use the same system.³³

But SmarTrip is now almost two decades old, and its technology is near the end of its useful life. Changes to fare policy are increasingly difficult to incorporate into the legacy system. For instance, SmarTrip does not allow for fare capping, and its hardware does not accommodate offboard payments for buses—an important priority of many transportation agencies. A consumer using a suburban bus service to access Metrorail must pay twice via SmarTrip: first on the bus (e.g., bringing a consumer on Arlington Transit to Pentagon Metro Station) and then again when boarding Metrorail (e.g., at Pentagon to reach a job near Gallery Place).

In April 2018, WMATA announced a new plan to make the existing SmarTrip ticketing system available to consumers

with a mobile application, with full deployment in 2021. However, because the new mobile application would utilize the existing, proprietary SmarTrip infrastructure built by Cubic, SmarTrip would remain effectively unable to integrate with private mobility providers and potentially incapable of integrated ticketing. Similarly, maintaining the closed back end system for SmarTrip will make it difficult to adjust the system for new mobility solutions (microtransit, autonomous vehicles, etc) that may arise in the future. WMATA also made no mention of incorporating rewards or loyalty programs into the mobile payment feature.

Regional partners of WMATA were caught off guard by the announcement, expressing concern they received no advance information about the details of a plan that affects their system and customers. Montgomery County is currently planning to pilot a mobile payment system for RideOn targeting the 25 percent of passengers who do not pay with SmarTrip. In Virginia as well, the Northern Virginia Transportation Commission is in the midst of a visioning exercise with the mobility providers in their planning region to develop a strategic plan for a next generation ticketing system.

An ideal solution for SmarTrip would do more than allow mobile payments within the confines of the current system; it would also address many other limitations of the current system.³⁴ Seamless mobility in the Washington metro area relies on SmarTrip being flexible and connected to other transportation modes, both public and private. As WMATA builds the SmarTrip mobile app, the agency has a unique opportunity to position public transportation as a central, agile, and interoperable platform for all mobility options.

RICHMOND

Of the three principal public transportation agencies in Baltimore, Washington, and Richmond, only Richmond's GRTC has not yet offered smartcards to consumers, requiring them to pay with either paper tickets or cash.

Later this year GRTC will roll out a new ticketing system offering smartcards and mobile ticketing through a new application. While the application will be free to download, the smartcard will be available to purchase at over 300 retail outlets in the region. Along with the deployment of the new technology, GRTC will unveil a new bus network in the City of Richmond, updated for changes

in housing and job locations for the first time in the system's history. GRTC will also launch the region's first bus rapid transit (BRT) service—the second in the Capital Region—with offboard payments. Called the Pulse, the new BRT service along Broad Street and Main Street will offer offboard payments and is projected to offer faster travel, better reliability, and more frequent service.³⁵

In another regional first, GRTC is also planning to integrate RVA Bikeshare, Richmond's bikeshare system, into its new ticketing system. The agency deserves great credit for pushing forward on so many technology fronts simultaneously and should use this momentum to connect its system with private mobility providers and transportation agencies throughout the Capital Region.

THE ROLE OF PRIVATE MOBILITY COMPANIES

Ridehailing companies have occasionally struck limited partnerships with transportation agencies in the Capital Region, as Lyft has done with Baltimore's bikeshare system and as Uber was planning to do with WMATA in 2016 until the agency canceled the project.³⁶ However, there is no way to buy a ticket in the region that encompasses public and private mobility options—a major shortcoming.

In fact, even trip planning across public and private options can be difficult because private operators push for exclusive partnerships with agencies and startups. It would be laudable (and perhaps more consistent with antitrust law) if they relaxed those constraints.³⁷ Dockless bikeshare and scootershare companies have similarly pushed back against sharing realtime data in a way that would allow consumers to see all bike and scooter options in realtime under one application, including availability from competitors. Transit App has scraped data from various competitors to gather such realtime information, but the scootershare and bikeshare companies themselves did not give Transit App permission to do so.

A SEAMLESS MOBILITY EXPERIENCE

The Capital Region's slowness to integrate mobility services is attributable more to a lack of will than to the limitations of technology. For example, when MTA worked with Cubic to design its new payment system, the agency decided that integration with SmarTrip could be sacrificed. MTA ultimately procured a new one that does not communicate with SmarTrip—even though Cubic designed both systems.

With the three largest transportation agencies in the region launching new mobile apps, it should become less costly to integrate them—if policymakers make an integrated regional platform a priority. For example, building APIs between mobile ticketing systems could in theory allow a resident of the Capital Region to buy a GRTC ticket from an application managed by WMATA, MTA, or a third-party. Because mobile ticketing is relatively new, industry experts are unable to point to another region of the United States that has built such APIs across public transportation agencies' applications. But they see it as a much easier proposition than doing so with smartcards. Unfortunately, there is little evidence that regional transit agencies planned for such integrations as they developed their mobile payment strategies.

Integration with private mobility providers—most of whom are already native to mobile—should likewise be easier once the Capital Region's transit agencies offer mobile ticketing. The process for such integration should be established by public leaders, in close coordination with private operators. The ultimate goal should be giving consumers an integrated platform allowing them to purchase a single ticket across any mobility provider, public or private. Both private and public mobility providers will have to open their APIs and partner in new ways in order for the Capital Region to enjoy such frictionless mobile trip planning and ticketing.

Imagine if...

A new autonomous shuttle service launches in Richmond, and GRTC instantly adds it to the options available within its mobile app.

PRINCIPLES TO ADOPT SEAMLESS MOBILITY

The Capital Region must capitalize on integrated mobility to make it as easy as possible for consumers to opt out of driving. A unified platform that incorporates all public and private mobility options will make those services collectively more competitive with driving alone by improving the consumer's experience. It will also bring new riders and revenue to transportation agencies.

Creating a seamless mobility platform will require sustained effort from elected officials, transportation leaders, and mobility advocates. Regional integration

must be front of mind when a transportation agency procures a new ticketing system (or updates an existing one) when local officials adopt or enable new public or private mobility options, or when a private mobility company plans its regional expansion.

The principles below provide a roadmap to guide leaders toward policy adjustments and technology adoption that makes trip planning and ticketing more integrated and seamless. They must be at the center of regional mobility decisions.

PRINCIPLE 1

Put the user experience at the center of ticketing and trip planning investments.

The technology of mobility integration is only as valuable as the user experience it enables. Features like fare capping can enhance the user experience, while forcing consumers to jump between multiple mobility farecards and applications detracts from it. By integrating ticketing systems, transportation agencies around the world have increased ridership from 5 to 20 percent.³⁸

PRINCIPLE 2

Build capacity for interoperability and new functionality in planning and ticketing systems for public and private mobility services.

The future of mobility is uncertain, with autonomous vehicles in their infancy and the line between public and private transportation blurring. By adopting ticketing systems with flexible design and open APIs, transit agencies can make it easier and more affordable to revise their payment system or integrate it with other public and private mobility providers. Even in situations where integration is not currently possible, agencies should require their vendors to leave the door open for future connectivity. Agencies should also plan for the incorporation of private mobility providers into their mobile payment systems and vice versa.

PRINCIPLE 3

Ensure that new mobile ticketing systems equitably empower all consumers.

The benefits of integrated mobility cannot only accrue to those with financial means to own a smartphone. New mobile payment systems should be designed around the needs of residents with limited means by maintaining cash payment options and by incorporating fare capping features. Meanwhile, public officials should take steps to close the digital gap by empowering all consumers to access public and private mobility options through digital devices such as digital kiosks and publicly-available Wi-Fi.

PRINCIPLE 4

Leverage new ticketing systems to learn, experiment, and transform the travel experience.

If upgraded ticketing systems incorporate open payments, agencies can experiment with new products without incurring the substantial modification costs of proprietary, hardware-based fare systems. Mobile ticketing thus unlocks opportunities for cost-effective pilots that should be supported. For example, public transportation agencies could pilot programs that send push notifications to consumers offering discounts if they adjust their commuting time. Agencies could also develop loyalty programs for regular riders and design discount offers to encourage more people to regularly choose transit.

In the private sector, consumer-facing companies constantly use their applications to conduct experiments, observe the results, and learn how they can better serve their clients. With the rise of mobile ticketing, transportation agencies can as well.

Imagine if...

A consumer planning to ride MTA and then take a ridehail for the “last mile” of her trip knows she can reach a customer service agent if there is any problem making the transfer.



NEAR-TERM ACTIONS

Consumers in the Capital Region need a seamless and integrated platform to travel on any mobility service—public or private. The steps below will hasten the region's progress in building one, which must happen soon in order to capitalize on the mobile ticketing efforts underway at MTA, GRTC, and WMATA.

ACTION 1

Establish strategic goals and plans for a single platform for all trip planning and ticketing in the Capital Region.

The region must decide how it will pursue mobility integration across public and private providers. Maryland, Virginia, and the District could lead that process, or the transit agencies themselves could. Either way, regional integration and open design must be bedrock priorities for trip planning and payment investments. Systems integrators must understand that services that lock transportation agencies into a rigid and proprietary combination of software and hardware are no longer wanted.

The region should leverage joint procurement RFPs and use of common language into their agreements with systems integrators to ensure their systems align, integrate, and achieve cost savings. One encouraging initial step in this direction is the Mid-Atlantic Purchasing Team (MAPT), a joint initiative between the

Baltimore Metropolitan Council (BMC) and the Metropolitan Washington Council of Governments (MWCOG), whose rider clause enables public entities to join each other's contracts. Such pacts should be extended to encompass Maryland, Virginia, and the District. Similarly, the region's elected officials and transportation leaders should communicate openly with private mobility providers, inviting them to be a complementary part of the regional transportation network and, whenever possible, remove restrictive covenants on their data and services.

ACTION 2

Incorporate fare capping into public transportation payment systems.

Fare capping ensures that consumers pay the lowest price for transit, regardless of whether they pay initially for an unlimited pass. It simplifies the decision to buy an unlimited pass for all consumers, but particularly benefits those lacking funds to purchase such a pass upfront. Adopting fare capping will help the region ensure that low-income consumers share in the gains from new and more flexible transportation ticketing systems. The adoption of new mobile ticketing systems makes fare capping easier to implement. Agencies should seize the opportunity.

Imagine if...

WMATA's U-Pass for college students unlocked access to Capital Bikeshare.

ACTION 3

Pursue regional and national funding opportunities that move toward seamless ticketing across all mobility options in the Capital Region.

With the region's largest public transportation agencies all looking to upgrade their ticketing systems, the next step is to integrate them with each other—and with private mobility providers—to enable joint ticketing and simplify trip planning.

Such technology upgrades cost money that public agencies struggle to find, but numerous federal programs can provide funding and technical assistance to help. For example, Chicago received \$400,000 from the Federal Transit Administration's Sandbox program to integrate the bikeshare system Divvy into Ventra, the region's mobility platform that is accessible via web and mobile, and the Metro Transit in Minnesota's Twin Cities invested \$300,000 in federal Congestion Mitigation and Air Quality (CMAQ) to cover 80 percent of its mobile application development costs. The Capital Region could also leverage a federally-mandated Northeast Corridor Commission joint ticketing study to launch a pilot for VRE, MARC, and Amtrak.

The region would likely be more competitive for such federal funds if the metro areas within it share strategic goals and a deployment plan (see Action 1).

ACTION 4

Avoid transportation agency procurements that preclude opportunities to innovate and integrate with other public or private mobility providers across the region.

While GRTC, MTA, and WMATA should be applauded for embracing the promise of mobile ticketing, their new systems should be designed with flexibility in mind. The agencies should be clear how their new payment systems will accommodate innovations like merchant partnerships or frequent traveler benefits, as well as integration with other public and private mobility options. To maintain their competitiveness, transportation agencies should not launch procurements that fail to account for an innovative and interoperable future.

For example, WMATA's announcement to bring SmarTrip to mobile phones did not include an explanation of how the new SmarTrip app would enable integrations with other regional public transportation agencies or private mobility providers. Maintaining the closed SmarTrip infrastructure will not give public transportation agencies flexibility to pilot loyalty programs or instant discounts that could improve the user experience. Without accommodating innovation or integration with other modes, Washington metro area's mobility network will remain ill-equipped to adjust in the fast-evolving mobility landscape.

ACTION 5

Convene leaders of regional public transportation agencies regularly so they can share what they have learned.

Consumers in the Capital Region need a seamless and integrated platform to travel on any mobility service—public or private. The steps below will hasten the region’s progress in building one, which must happen soon in order to capitalize on the mobile ticketing efforts underway at MTA, GRTC, and WMATA. The world of urban mobility is evolving rapidly, and the roles of public transportation agencies must keep pace. Innovation and strategy officials of agencies like WMATA, GRTC, MTA, VRE, and MARC should meet on a biannual basis to share results and lessons from recent innovations and technology pilots, and to alert one another about upcoming procurements. These meetings can facilitate joint technology procurements, which can lead to more negotiating leverage with vendors that in turn lead to lower capital costs.



Imagine if...

A consumer can receive a notification on her smartphone offering a gift card usable at local shops as a thank you for being a loyal rider of public transportation.

CONCLUSION

It is time for the Capital Region to finally integrate the public and private services that transport consumers. All three of the largest public transportation systems are about to offer mobile payment options that could improve the user experience and enable connectivity with other mobility options. And the number of those options—especially on the private side—is only growing, with scootershare the latest entrant. The looming emergence of autonomous vehicles suggests still more new services are coming. If the region continues down the disconnected path we have been on, the user experience of those who do not drive will become more cumbersome and confusing, implicitly incentivizing consumers to drive their own personal vehicles.

But if we embrace a future of integrated mobility, a world of new opportunities can unfold. Consumers can easily access any mobility option—public or private—when planning a regional trip. Drivers stuck in congestion can get a discount to park and switch to transit—thereby freeing up road capacity for others. Transportation agencies can find innovative ways to raise revenue, such as partnerships with bars and restaurants along commuter routes. The list goes on.

It is up to all of us to decide how we want to bring about the integrated mobility platform our region needs. A reasonable plan could place responsibility with the

states and the District, with each aligning the mobility providers in their jurisdiction and then ensuring that the three platforms connect with each other. Transit agencies themselves could take the lead, issuing joint procurements or incorporating common language into their agreements with systems integrators to ensure compatibility. Or we could start by running a series of pilot experiments to test hypotheses (i.e., ridehail could be an affordable and customer-friendly replacement for late-night bus service). Whichever path we choose, private services will be part of the solution—and will need to soften their resistance to sharing data with the public or being on platforms alongside their competitors.

There is room to debate the best course of action to build an integrated mobility platform for the Capital Region, and that conversation must begin now. If it does not, the user experience of those who do not drive will worsen, and the various public and private mobility options will fail to nudge residents away from driving alone. For very good reasons, every regional Metropolitan Planning Organization wants to grow the share of commuters who choose to travel without driving a personal vehicle. By integrating our mobility options, we can achieve that goal while improving our commutes, saving transportation agencies money, and ultimately making our region a more popular destination for both talent and business.



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29. *Ibid.*
30. GRTC plans to release a smartcard and a mobile payment system later in 2018.
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ABOUT



The Greater Washington Partnership is a first-of-its-kind civic alliance of CEOs in the region, drawing from the leading employers and entrepreneurs committed to making the Capital Region—from Baltimore to Richmond—one of the world's best places to live, work and build a business.

