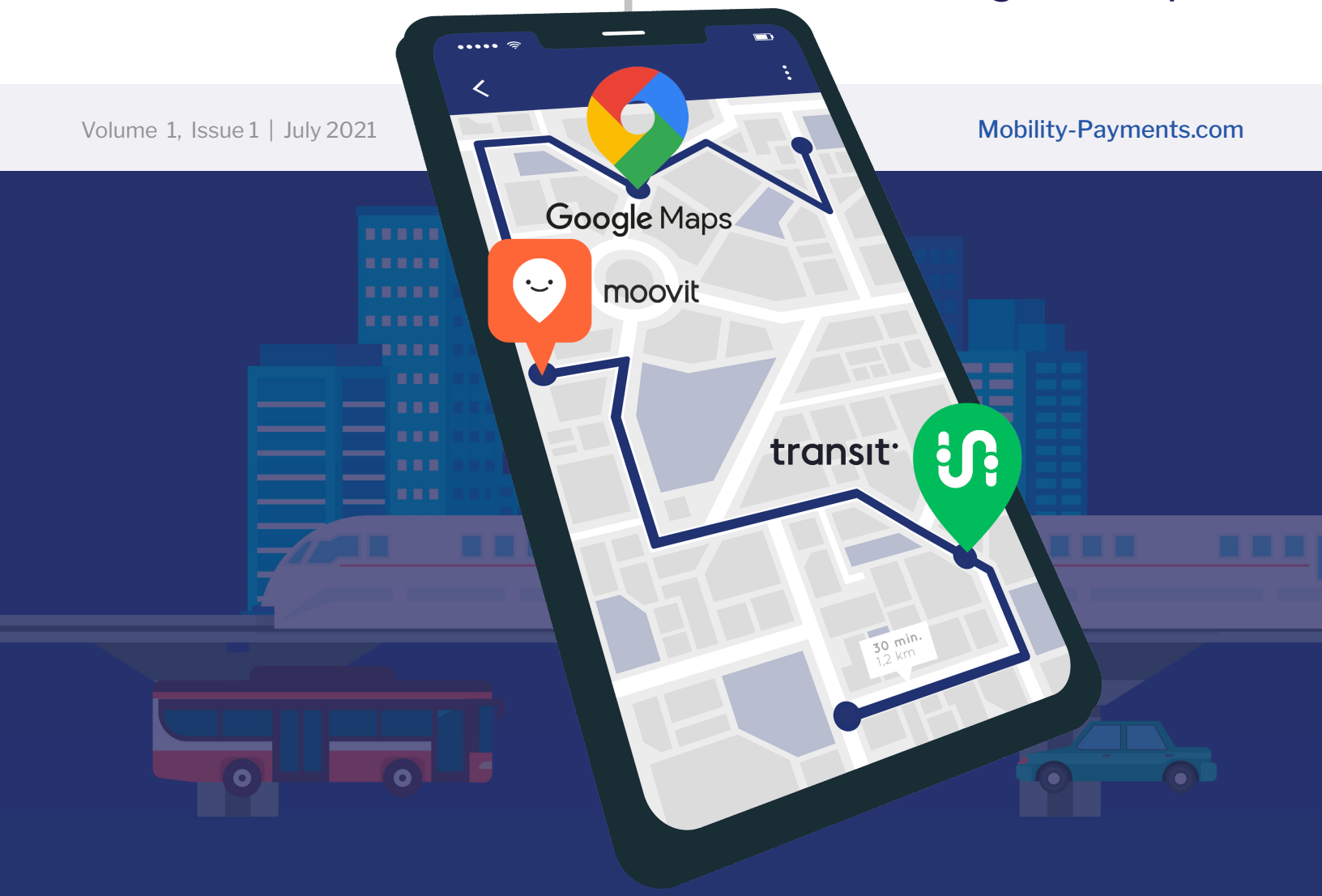
Mobility Payments
Intelligence Report

Volume 1, Issue 1 | July 2021

Mobility-Payments.com



Making the Move into Ticketing & Payments

Major trip-planning app providers see the ticketing and payments piece as one of the last steps toward creating true MaaS platforms.

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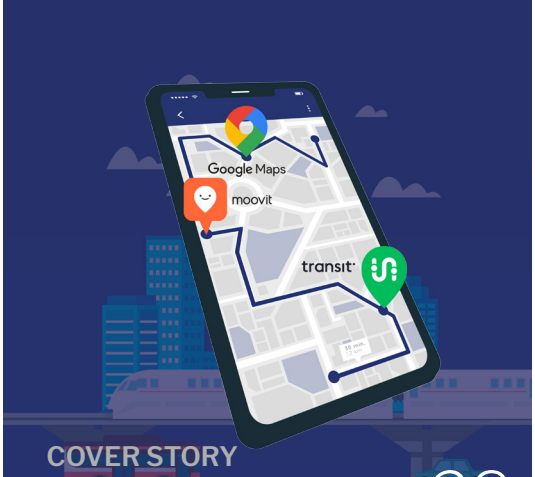

A Vital New Publication for Mobility Providers

FROM THE EDITOR

I'm proud to introduce this new magazine and website, the *Mobility Payments Intelligence Report* and *Mobility-Payments.com*, to chronicle the budding era of mobility payments.

As more and more transit agencies and other mobility providers say no to cash, new forms of fare payments and ticketing are taking on much greater importance.

Mobile ticketing, open- and closed-loop contactless and other forms of electronic payments were already growing before the pandemic. But they are now accelerating rapidly as mobility providers seek ways to reduce customer interaction with their employees and enable riders to avoid touching potentially contaminated surfaces, thus luring wary riders back to bus, metro, train and ferry services. And as mobility alternatives gain in popularity, they will need to plug into new payments platforms.

At the same time, advancing technology and commercial relationships are helping a wide range of mobility providers to gear up more quickly to launch new payments and ticketing services, such as mobility as a service, or MaaS.

One thing that has been missing, however, is a publication dedicated to this emerging market for mobility payments and ticketing–a publication that gives transit agencies and mobility companies the facts and insight they need to make crucial decisions in today's changing competitive landscape. That publication is *Mobility Payments*.

> *"The publication will be a must-read for all mobility providers as part of a robust and growing ecosystem."*
>
> **Dan Balaban,**
> editor
> *Mobility Payments*

Created by the editors of *NFC Times*, which for more than 10 years has produced the most authoritative content in the NFC and digital payments space, *Mobility Payments* will deliver exclusive, well-researched, highly vetted and richly informative content–all complying with high journalistic standards–as it covers the latest topics and trends in the industry.

Mobility Payments will reach a highly engaged, influential readership, including representatives of public transit authorities, transit operators

and fare-collection companies globally, who will receive all premium reports and access to all articles at no charge. The publication will be a must-read for all mobility providers, as part of a robust and growing ecosystem of technology suppliers, from chip makers to payments service providers to systems integrators to app developers and software-as-a-service ticketing vendors.

In this maiden issue of *Mobility Payments* magazine, we give you exclusive insight into the trend for trip-planning app providers, such as Google Maps, Moovit and Transit, to begin enabling users to book and buy tickets on public transit, potentially transforming the way agencies sell their tickets. This puts them on the road toward becoming MaaS platform providers in their own right, though Google is more interested in using transit ticketing to expand its payments service.

We also feature a story on the pros and cons for transit agencies to make one of their most important decisions in fare collection–whether to accept contactless credit and debit cards. This package includes a table with exclusive data on major open-loop payments projects worldwide.

And we look at how mobility platform providers are putting Covid-wary customers more at ease by supplying information on crowdedness levels on transit vehicles and enabling more operators to makes use of idle vehicles with demand-responsive transport, or DRT.

Further, we check in on account-based ticketing projects in Brisbane and Boston and offer insight into the competitive pressures the dominant transit e-purse is facing in Taiwan.

As with all issues of *Mobility Payments* magazine and *Mobility-Payments.com*, you will find exclusive data here that you can't find anywhere else. Besides open-loop projects globally, that includes information on SaaS ticketing platform providers, closed-loop card services offered by the major Pays wallets and more.

As longstanding trends in the transport and mobility sectors combine with the aftershocks of the pandemic, transformation in the industry will occur at an accelerated pace. *Mobility Payments* will be there to help you navigate these monumental changes.

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Mobility Payments Intelligence Report

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Cubic Makes Major Platform Play, Responding to New Competitors

U.S.-based Cubic Transportation Systems–known for building big bespoke fare-collection systems for such major cities as London, New York, Chicago and Sydney–has begun rolling out its Umo platform, targeting small to mid-tier transit agencies, in addition to its traditional customers.

With the launch, which features the company's first-ever consumer-facing app, Cubic seeks to stay competitive as more small transit agencies move to digital payments and mobile ticketing in the wake of the Covid-19 pandemic and as more authorities and operators of all sizes strive to offer their customers such extras as multimodal trip planning, real-time travel information, fare capping and integrated payments spanning regions and various transport modes.

Cubic divides the Umo platform suite into six offers, which agencies can deploy separately or combine. The first to roll out is Umo Pass, which features a revamped ticketing service based on a software-as-a-service platform Cubic acquired more than a year ago. Other Umo platforms are multimodal trip planning, fleet management and real-time arrival information, rewards, faster rollout of open-loop payments and a mobility-as-a-service offer.

"The key difference of the Umo business compared to the conventional Cubic business is that it's (Umo) a platform-based business, where I build one platform and multiple agencies connect to that platform and consume it in an as-a-service business model," Mick Spiers, VP and general manager for Cubic's Umo business, told *Mobility Payments*. "Whereas, Cubic's traditional business has been, you build a ticketing system for New York, you build one for London, and you build one for San Francisco, you build one for Brisbane, you build one for Sydney–and there are core products that get repeated from city to city, but the ticketing system is New York's, no one else's; the Ventra system is Chicago's and no one else's."

The first 15 transit agencies to introduce Umo had been using the SaaS ticketing platform TouchPass, which Cubic acquired with its $43 million purchase of start-up Delerrok, finalized in January 2020.

Most of the TouchPass agencies are small U.S. bus operators. Cubic would provide Umo Pass in the Umo app, which offers

multimodal trip planning feature–from urban-mobility app provider Moovit–as a default, said Spiers.

A key to the strategy behind Umo is to take advantage of the increased demand by transit agencies, while attempting to slow gains by such competitors as UK-based Masabi, which has been making much noise signing up transit operators in the U.S., Canada and beyond to use Masabi's Justride SaaS ticketing platform. U.S.-based Token Transit is another competing SaaS platform provider.

Masabi and Token Transit each say they have more than 100 agencies under contract using their respective platforms. That compared with a little more than 30 for Umo earlier this year, most of them previous TouchPass clients. And Cubic faces more competition from U.S.-based Bytemark, majority owned by Siemens Mobility-which says it has at least 50 agency clients.

Cubic will continue to charge the same fees to agencies to deliver the Umo SaaS ticketing along with the Moovit trip-planning features, said Spiers, who declined to specify the fees. But TouchPass agencies have said in the past the per-transaction fixed fees range from 10 cents for small volumes down to 3 cents for larger volumes.

Spiers noted that the other parts of Umo, including the trip-planning features, real-time arrival information, rewards, open-loop payments and MaaS are targeted at agencies of all sizes. One very large agency in the U.S., which is a customer of Cubic's, will be plugging into the Moovit trip-planning feature that will be part of Cubic's white-label app for the agency, though it's not an Umo app.

While Umo is a consumer-facing app, Spiers said Cubic will also supply white-label apps to agencies that want their brand to lead. And in cities where Moovit dominates for trip planning, Moovit would continue to promote its branded app, which could use a payments and ticketing engine from Cubic or those of other SaaS-ticketing providers. Moovit is also working with Token Transit and Masabi.

At least 16 other agencies and perhaps several more will get open-loop payments under Umo Pay by the end of 2021, said Spiers. He said Cubic has simplified the connection between the back office and payments gateway that would result in lower costs and faster time to market, but he declined to elaborate. Spiers said the advantages would include quicker certification and recertification of the implementations, not cheaper validators, though he added that Cubic is working on another project for that.

Another one of Cubic's new platforms, Umo IQ repurposes Cubic's NextBus product. The offer will deliver real-time arrival information to riders' phones and includes new LED displays at bus stops and railway stations that could feature arrival alerts and other information and announcements. Like Umo Pass, which has begun moving existing TouchPass agencies to the new platform, IQ transitions 100 cities on the NextBus system to the Umo app.

Under the plan, the Umo app could eventually connect public and private mobility providers with payments and ticketing along with multimodal trip planning in a mobility-as-a-service platform.

"We believe in a world where someone might catch that Uber to the railway station, and they might catch a train for the bulk of the journey," said Spiers. "And then they might get on a Lime scooter or Bird scooter at the end of the trip, and we're going to connect it all together, where all of the connections just work." MP

The Metropolitan Transportation Authority in New York has rolled out its new OMNY open-loop payments service on all subway gates and on board all buses throughout New York City. Zhukovsky | Dreamstime

New York's MTA OMNY Service Continues to Grow as Agency Preps Further Rollout in 2021

NEW TAKES

As New York's Metropolitan Transportation Authority marked the two-year anniversary since launching the first phase of its high-profile OMNY open-loop fare payments rollout in May 2019, transactions continue to grow.

Riders were tapping for more than 17% of all rides on the authority's massive subway system and for around 14% on the entire system, both subway and buses. That's according to figures released by the MTA to *Mobility Payments* around mid-June. As of then, the agency said customers had tapped for a total of more than 93 million rides since the service launched.

As OMNY was marking the two-year mark, overall ridership was recovering from the Covid-19 pandemic, which at one point in 2020 was down by 90%. And usage of open loop continues to increase. The MTA said it recorded a one-day record of 628,000 OMNY taps on June 17. That's up from the earlier daily record the agency announced in May of 500,000 taps.

Contactless taps as a share of total transactions continue to grow and were only around 9% in October 2020.

Despite the pandemic, which caused workers implementing the OMNY system to miss more than 40 days in 2020, the MTA had hit a key milestone for the project by year's end–deploying more than 15,000

> ***"No more failed swipes, no more lines at MetroCard machines."***

contactless EMV readers at all 472 subway stations in New York City and on all 5,800 city buses.

In terms of absolute numbers, on an average weekday, customers tapped for 570,000 open-loop transactions as of early June, a large majority of them–at 79%–on the subway, compared with 21% on buses. That ratio has remained stable.

While it did not release a new breakdown for the share of open-loop payments from EMV card credentials stored in NFC wallets as compared with physical contactless

EMV cards, OMNY chief Al Putre said last fall that the share of contactless EMV payments from wallets remained high, at 73%. That is likely to change, however. According to Visa, more than 70% of Visa-branded cards in New York were contactless-enabled as of the end of 2020, up from 5% when the MTA rollout began in May 2019.

The transit authority–the largest in the U.S.–is planning to continue to roll out OMNY in 2021 with its automated fare-collection vendor Cubic Transportation Systems. Cubic has a contract to build OMNY originally estimated to cost around $540 million. The transit agency in April 2020 decided to modify the Cubic contract and to double the number of certified EMV readers that Cubic would install on buses in order to enable customers to board at all doors on the bus fleet, the agency said.

Going forward, MTA plans to launch its contactless closed-loop OMNY card in 2021, giving customers who don't have open-loop credit, debit or prepaid cards–or who don't want to use them to pay fares–an option other than the agency's aging MetroCard. (An estimated 12% of MTA customers are unbanked.) Plans call for MTA to fully retire the more than 25-year-old mag-stripe MetroCard in 2023.

"No more failed swipes, no more lines at MetroCard machines," said OMNY program chief Al Putre.

Well before the MetroCard finally departs, the agency, with the new closed-loop OMNY card, plans to offer the same discount fares for seniors and disabled customers, as well as weekly and monthly passes, as it does with the MetroCard.

Customers will be able to purchase the new OMNY card in more than 4,000 retail outlets, mainly drugstore chains in New York City and, later, in vending machines. The latter will enable customers to purchase and reload their cards at New York City subway stations. MTA will work with prepaid payments service provider InComm to distribute and manage closed-loop OMNY as reloadable gift cards.

> *"It's already in your pocket. It's clean. It's safe, and it's fast."*
>
> 
>
> **Al Putre**
> OMNY program chief
> MTA

MTA will also debut its OMNY mobile app in 2021 and this could support a virtual OMNY card, which users would tap to pay.

Putre said the MTA board has not decided whether OMNY–either closed loop or open loop–would support fare capping. Since OMNY is an account-based ticketing system, the OMNY terminals also could accept a range of other fare media.

MTA is not finished with its rollout. Among other plans, it will extend OMNY to its two commuter rail services, Long Island Rail Road and Metro-North Railroad in 2022.

But while he touts the forthcoming closed-loop OMNY card and pledged that the authority would "never neglect" its cash customers, Putre emphasized that the agency wants customers to tap their open-loop bank cards and NFC phones and watches to pay for fares.

"It's already in your pocket. It all works. You already own it," said Putre, an unabashed promoter of the project. "You don't have to buy it. You don't have to stand in line. It's clean. It's safe, and it's fast." MP

Milan transit operator ATM is expanding use of contactless EMV payments

NEW TAKES

Italian Transit Operators Expand Use of cEMV, but Cash Difficult to Unseat

Major Italian public transit operators, including those in Rome and Milan, see contactless EMV payments as an important option for customers, even enabling them to use their contactless bank cards in place of monthly passes. And the operators have bigger plans for the technology, as well.

But while transit officials in Italy, as elsewhere, note that adoption of contactless open-loop payments have increased substantially during the Covid-19 pandemic, they add that cash isn't going away anytime soon.

"This is a real challenge–cash and the paper tickets," said Francesco Amendola, who heads ICT for ATAC SpA of Rome, Italy's largest public transit operator. "That is why we are working on it, because, for sure, the future is cashless, and I would say, paperless. But at present, there is still a lot of cash and a lot of paper."

During a six-month period in the past year, Amendola said that no more than 20% of riders used electronic payments while the majority of people, around 80%, used cash, including buying a ticket with cash. Regular ridership from contactless EMV payments is still believed to be much less than 20%.

"I would say it's a cultural heritage; it's a legacy," said Amendola, speaking at a recent Transport Ticketing Digital virtual conference. "So if people are used to go buy a ticket, they still buy the ticket, even if there is a POS device that is able to accept dedicated cards."

> ***ATAC Rome: "Real challenge" to get customers to break their habits of using cash and paper.***

ATAC launched contactless EMV payments in September 2019 on the Rome Metro

and certain urban commuter rail lines, and is expected to expand it to other modes, such as buses.

And the transit agency was one of the first to enable customers to purchase monthly passes online with their EMV payment cards and use those same cards at gates to tap to ride. These terminals will show the card on a "whitelist" and allow the cardholder to pass through the gate. In addition to contactless credit and debit cards, ATAC accepts NFC devices to pay for fares. But for the monthly EMV-enabled subscriptions, which are prepaid, customers can only use an EMV contactless card.

Amendola said the agency plans to enable users to tap their bank cards to pay for their entire families. At present, only one user can pay with a given card or card credential. And for people without credit or debit cards, especially students, the agency plans to enable customers to use prepaid (EMV) cards and what he called digital identity cards.

Italian Operator Sees cEMV as Key to Future MaaS Rollout

Meanwhile, Azienda Trasporti Milanesi, or ATM, in Milan, which began accepting contactless credit and debit cards on its four-line metro in 2018, has begun to expand the contactless service to buses.

Moreover, ATM Milan sees contactless EMV payments as "one of the bricks" in its budding mobility-as-a-service platform, which will enable customers to book and pay for such services as parking, bicycle rental and regional trains, in addition to the metro and buses, according to Roberto Andreoli, IT and ticketing systems director for ATM. And he said bank cards will support not just pay-as-you-go but also subscriptions.

The subscription service will also be available in ATM's mobile app using QR codes. Customers now mainly use ATM's closed-loop contactless card to store subscriptions.

> "The credit card (will) not only be for your daily ticket or occasional trip but also to dematerialize your subscription."
>
> **Roberto Andreoli**
> IT and ticketing systems director, ATM

"We will release this new feature to use the credit card, not only for your daily ticket or occasional trip but also to dematerialize your subscription," said Andreoli, also speaking in a Transport Ticketing Digital conference. "You can take a monthly or yearly subscription and use it in an integrated way, in a mobility service using parking lots, Lombardy railways, also the public transport company of Milan."

ATM said it had recorded more than 20 million EMV contactless trips between June 2018 and December 2020.

After first launching contactless EMV payments on its metro, ATM took two and a half years to expand the service, equipping buses serving three bus lines with EMV readers.

Customers can start their trips by tapping their bank cards or NFC devices on board these buses and at metro gates and can continue their journeys on other ATM lines in certain zones, even if these vehicles are not yet equipped for contactless.

Andreoli said earlier in 2021 that ATM plans

to equip 2,000 more surface vehicles with certified EMV readers soon. Besides the subway and buses, ATM also manages trams, trolleybuses, parking lots and bike share in the region.

Andreoli did not offer details on how the prepaid subscription service would work with EMV cards or card credentials on NFC phones, but it might be similar to how ATAC in Rome is using EMV cards for monthly passes. ATAC's Amendola has said his agency also hopes to launch a MaaS offer, presumably with a role for contactless EMV.

cEMV in Other Italian Cities

Besides Milan and Rome, Gruppo Torinese Trasporti, or GTT, the transit agency serving Turin, Italy's fourth largest city, has also launched open-loop fare acceptance–on its 21-station metro and four routes of its buses in July 2020.

In addition, GTT's open-loop launch includes smartphones and smartwatches supporting NFC payments. GTT had earlier launched fare payments with its closed-loop card on NFC-enabled Android phones.

And in Naples, the country's third largest city, 17 transit agencies that make up the UnicoCompania group are offering open-loop payments later in 2021.

And there will also be the option to use monthly passes at the turnstile or on board buses by tapping a bank card in and around Naples. Guido Cangiano, technical coordinator of the group, confirmed to *Mobility Payments*, that it will be "possible to use bank cards as monthly tickets," adding, "in this case, the customer pays in advance."

Emiliano Doveri, director of the public sector division for Italy-based processor SIA, which will process transactions for UnicoCompania, among other agencies, said enabling multimodal payments can be complex.

"There are boats; there are trains; there are buses, and all of them have different fare rules, different processes," Doveri said. "And we created a layer in our payment gateway, which is connected to the bank, then to the fare-calculation system then to the ticketing system."

SIA also processes the open-loop fare payments in Rome, Milan and Turin and soon Naples. Large Italian bank Intesa Sanpaolo acquires transactions for at least some of these systems.

With open-loop fare collection in its four largest cities and its innovative use of EMV contactless, Italy has become a leader in use of the technology for fare payments, including enabling customers to use passes at the gate or on board buses with credit and debit cards.

But Rome's Amendola added recently that ATAC hasn't seen an increase of late in use of the monthly passes on contactless EMV bank cards, probably because customers see pay-as-you-go as a better payments option than monthly passes as they ride into work fewer days per week than before the pandemic.

But perhaps the biggest challenge for ATAC and other Italian operators will be changing habits.

"I would say that more and more, we have to shift those people toward the digital payment for many reasons, not only in terms of cost, but also accuracy of the accounting and reducing the risk and many other advantages," said Amendola, stressing that the technology isn't the main obstacle. "People have been used for many years to do things that way, and changing habits, it's really hard." MP

The nearly 20-year-old Oyster card remains popular among Transport for London customers. Wirestock | Dreamstime

London Prepares for Major New Contract

Transport for London, which runs the largest open-loop fare payments system in the world, is gearing for a major upgrade of its revenue-collection contract, giving the authority its first account-based ticketing system.

The new contract, which is set to fully take effect in August 2025, aims to retire the aging legacy back-office system for Transport for London's closed-loop Oyster card and put it on the same system as the contactless open-loop system.

The estimated £1.1 billion (US$1.5 billion) project will also replace thousands of readers at 280 London Underground stations, on board more than 8,500 buses and at thousands more commuter, light rail and national rail stops or stations, along with some retail outlets.

Plans call for Transport for London to award the seven- to 10-year contract in March 2024, then transition the implementation of the new contract through mid-2025, when the current contract expires. The contract will include maintenance and operation of the fare-collection system.

U.S.-based Cubic Transportation Systems, which implemented the original Oyster card system, holds the current contract. The authority says it is considering splitting up the new contract, that is, not hire only one major vendor, as it seeks a variety of suppliers that can add value and innovation to its revenue-collection system.

"There is significant interest in our change and innovation roadmap to take our highly successful but bespoke system and journey towards a more modular solution based on open standards," said Kevin Fallon, Transport for London's commercial lead, speaking at the recent Transport Ticketing Digital Summit.

While Covid-19 has sharply cut public transit use in London, as elsewhere, Transport for London collected more than £5 billion (US$6.6 billion) in revenue per year before the pandemic. And the new fare-collection contract has long been anticipated to revamp the nearly 20-year-

old Oyster system.

Contactless payments with credit and debit cards and NFC devices–which Transport for London fully rolled out in 2014–surpassed use of Oyster a few years ago for the main fare payments category of pay as you go. All told, contactless accounts for 45% to 50% of all transactions, which includes season tickets, as of March, up from 35% to 40% before the Covid-19 pandemic. Most of the gains for contactless payments since 2014 have come from a drop in use of season tickets and passes, fueled at least in part by Transport for London's decision to offer both daily and weekly fare capping across all of its modes with contactless EMV.

That is even more generous than for Oyster, for which users only can get daily fare capping across all of the authority's transport modes–though the authority has added weekly capping for buses and trams with Oyster.

Going with Pay as You Go

Still, Oyster remains popular. And the transit agency has no intention of phasing out the closed-loop service.

Transport for London officials have said recently they want to migrate Oyster to the agency's sophisticated contactless back-office system, further cementing pay as you go as the agency's main fare product. That includes adding weekly fare capping, in addition to daily capping, for all Oyster users. The agency also plans to calculate fares and caps for concessionary fares–such as those for seniors and disabled persons–with Oyster.

The new contract could mean the end of use of Mifare technology for Oyster. Instead, Oyster would probably use chip technology similar to EMV, but for closed-loop cards.

Further, the revamp would move the fare-collection system to account-based ticketing. At present, it's a hybrid system, with the contactless readers having been added to the older Oyster terminals. With ABT, all fare calculations, including with Oyster, would be conducted in the back-office, which the authority would host, not on terminals. The agency could also accept more types of fare media or tokens for both closed- and open-loop fare collection, and collect revenue from different mobility services, among other advantages.

This and other parts of the upgraded system would enable the agency to promote a "digital first" strategy and further reduce the number of ticket windows and ticketing machines it must staff or maintain. The new system would also enable Transport for London to greatly reduce or eliminate acceptance of magnetic-stripe tickets.

One UK-based consultant said he believes that the authority will consider developing a mobility-as-a-service, or MaaS, offer.

"This might be of interest if they can generate revenue from private mobility providers who want to use their platform," he said, asking not to be named. Last November, the authority announced it was co-organizing a trial of e-scooter rental operators in London.

Moving Away from Proprietary

Hong-Lam Nguyen, head of the revenue-collection contract for Transport for London's transformation portfolio, said recently the authority is looking for incremental, not "wholesale" change, but stressed that the agency is seeking to move away from "proprietary solutions."

"What is key here is we must be able to move between suppliers easily to allow for future competitive procurements." MP

Boston's Massachusetts Bay Transportation Authority plans to fully roll out its new $1 billion fare-collection system by 2024. The account-based ticketing system will offer greater flexibility of fare policies and will eliminate cash fares. | Dreamstime.

NEW TAKES

Boston Authority Makes Aggressive Push to Banish Cash On Board Buses

The Massachusetts Bay Transportation Authority, or MBTA, in Boston plans to completely do away with cash fare payments on its various transport modes when it rolls out its massive new fare collection system.

The system will enable open-loop contactless payments and expand MBTA's closed-loop CharlieCard program. The authority will also accept payments from both open- and closed-loop cards on smartphones, as well as other devices, including wearables–across all of the transport modes that MBTA oversees: subway, bus, commuter rail and ferry.

U.S.-based Cubic Transportation Systems is building the system, which will cost nearly $1 billion, an amount that includes 10 years of operational costs. The project, which has been delayed, is now scheduled to be fully rolled out by 2024.

"With this system, what we're doing is removing on-board cash payments and expanding our sales network so that people can reload before they get on board," said Nealay Vasavda, MBTA's technical lead for policy implementation. "If we kept the cash payments on board, it wouldn't get the same level of benefit in terms of increasing service speed."

He emphasized the benefits of the planned account-based ticketing system during a recent conferece.

> ***"What we're doing is removing on-board cash payments and expanding our sales network,"***

'A Lot of Equity Concerns'

To banish cash from transit vehicles means making sure customers who don't have credit or debit cards–or don't want to use them to pay for fares–have alternatives. In particular, that requires expanding ways for customers to load and manage MBTA's closed-loop CharlieCard.

MBTA officials earlier acknowledged they didn't do enough community outreach initially, including asking about where to

$935 million project was renegotiated

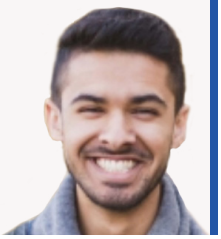
deploy the expanded CharlieCard sales and distribution network. It's one of the reasons that MBTA had to renegotiate its contract with Cubic and "reset" the project. This increased the contract cost by nearly 30% to just over $935 million and added two more years to the rollout schedule.

"There's a lot of equity concerns," said Vasavda, speaking of the planned elimination of cash. "People really are worried that by removing cash on board, that will make it harder for people who rely on cash to take the system, so we took that feedback to heart.

"We really made sure that we (will) have a very expansive sales network, and a lot of different ways to load remotely. But something else that we built into the system is the ability to go negative on your fare card."

For want of a better term, MBTA will basically extend "overdraft protection" to customers, he said. "If you can't find a way to reload before you get on, you can tap your card, go negative and pay us back later."

> *"If you can't find a way to reload before you get on, you can tap your card, go negative and pay us back later."*
>
> **Nealay Vasavda**
> technical lead for policy implementation, MBTA



But that raised other concerns by some customers that by removing cash payments on board transit vehicles, some people "just won't pay," Vasavda said. In response, MBTA is building a "really robust fare-inspection program that makes sure that everyone has paid," Vasavda said. He added that those who don't pay will not face criminal penalties. And the agency has been trying to get fines lowered in Massachusetts state law. There will also be an appeals process for those who are cited for non-payment of fares.

Speeding Fare Collection

By doing away with cash, officials hope to increase boarding speeds. And while the system overhaul was planned well before the Covid-19 pandemic, eliminating cash on transit vehicles and at gates will also ease perceived fears by customers that notes and coins can spread the coronavirus.

Vasavda also said the new fare-collection system would take other measures to speed the fare-collection process, such as enabling customers to board buses at all doors. That alone could increase boarding speeds by up to 10%, he indicated.

Vasavda's senior colleague, Sara Walsh-Mulligan, head of system implementation, fare transformation, noted that the account-based ticketing system will enable MBTA to have much more flexible fare policies. The system puts the intelligence for fare calculation, reloading, refunds, fare capping, rolling period passes, etc. in the back office, not on the card and terminal.

Under the revised rollout schedule, riders won't be able to begin tapping contactless cards and NFC wallets until 2022, after field tests. Full acceptance of contactless payments and the new CharlieCard will be available on all subway and bus lines in 2023, then all MBTA modes in 2024. MP

To Build a Better Post-Covid World: Master the Elusive First & Last Mile

INDUSTRY INSIGHT

By Mick Spiers

If we now have a more efficient way to cover the first and last mile and an efficient means of moving large numbers of people for the middle miles, we have the ingredients to make an efficient mobility system. So what is holding us back?

In towns and cities around the world, people are starting to dream, plan and prepare for a new normal (whatever that means) and a post-COVID world.

A key question for us to ponder is how do we ensure the world we return to is better than before? Can we put commercial interests aside to ensure we put mobility solutions in place that focus on riders' needs and preferences?

You do not have to cast your mind back too far to remember a world full of congestion and stress. We had people leaving home early in the morning because they did not know if their commute would take 40 minutes or more than 4 hours.

Unfortunately, for many people, that is not an exaggeration and created a world full of stressed commuters unsure if they would make it to work on time, miss their flight or get back home in time to spend precious moments with their families.

A significant contributing factor to that world is that we have never mastered the elusive first and last mile. For decades, authorities have found it prohibitively expensive to build and operate public transit networks that connect where everyone lives with where everyone works. The advent of entrepreneurial ride-hailing and micromobility services was somewhat born out of that necessity and gap—the promise of door-to-door services where you don't have to worry about timetables, frequency or connections.

"A key question for us to answer is how do we ensure the world we return to is better than before?"

The issue here is that these services cannot compete with public transit with respect to moving a large number of people over a considerable distance. With finite infrastructure, the net result was an increase in traffic, congestion and travel times in the cities where ride-hailing services have been most successful.

They have helped address the first- and last-mile issue but have cannibalized

people away from more efficient public transit services and circled us back to stressed commuters and riders. That is because, too often, they take people for their entire journeys and not just for the first and last mile.

If we now have a more efficient way to cover the first and last mile (ride-hailing and micromobility) and an efficient means of moving large numbers of people for the middle miles (mass transit), we have the ingredients to make an efficient mobility system. So what is holding us back?

Imagining a System that Promotes Multimodal Travel

Can you imagine a world where someone takes a ride-hailing service from their home to the nearest mass transit hub, where they take a train, bus, or tram for the heavy lifting middle miles; and then connect onto a scooter or bicycle for the last mile? A world where they have less stress and more travel time certainty? A world where everything works seamlessly, and they are never worried about missing a connection and being left stranded.

We have all of the technology and smarts in the world to make this a reality. What we need now is to find suitable commercial models to make it work.

We need a solution where the rider is incentivized to take multimodal travel, where they cherish the benefits of not having to worry about driving or parking and are confident that the service will be more reliable and less expensive.

We need a solution that incentivizes and rewards commercial operators, such as ride-hailing services, for participating in a unified system that works together instead of aggressively competing against each other and public transit.

We need a solution where riders are presented options for integrated, connected journeys based on their preferences rather than the commercial interests of the operators—a solution where these journeys use the correct mode for each leg of their trip.

Coming together on Finding Right Commercial Model

For example, when ride-hailing and micromobility services are used for the first and last mile, they would feed people back to public transit instead of taking riders away and creating more traffic and congestion.

My call to all of you is that, as an industry, we now need to come together and work collaboratively to find the right commercial model to make this happen. We need to acknowledge that each mobility mode serves a unique need and stop fighting against each other.

> ***"They have helped address the first- and last-mile issue but cannibalized people away from more efficient public transit services."***

I strongly believe that we all have a shared vision of providing mobility solutions that focus on riders' needs. Let's put differences aside and build that world together.

Mick Spiers is a veteran of the transit fare-collection industry and heads up Cubic's new Umo platform business.

Using Blockchain to Establish Trust among Parties to Accelerate Growth in the Mobility-as-a-Service Market

INDUSTRY INSIGHT

By Takashi Togame

In general, mobility providers want to collaborate with other providers as part of a mobility-as-a-service scheme. But providers would not like to provide their data to competitors. Blockchain technology could provide a solution.

It seems that city leaders and other officials around the world are pinning their hopes on mobility-as-a-service (MaaS) to help them reduce traffic congestion, slash greenhouse gas emissions and improve mobility for the masses.

One of the major roadblocks to making MaaS a reality is that the public and private mobility providers that need to be part of any successful MaaS scheme may also be competitors. This can lead to a lack of trust among the parties and a reluctance on their part to share data.

That is especially true for MaaS platforms that are normally centralized. Ideally, all public transit agencies, public transportation operators and private mobility providers, such as ride-hailing services and scooter-rental services, should operate under the same rules of governance, with roughly equal rights and access to data. In short, they should be playing on a level playing field.

MaaS transactions can contain financially sensitive information and other private data. That is why MaaS schemes usually require complex arrangements among participants in the schemes before any data exchange can take place.

A blockchain is a type of distributed ledger with data arranged in blocks, which are chained together in an append-only mode. This open and distributed approach to managing data means that the MaaS scheme can automatically apply business rules to manage data for a group or consortium. That helps explain why blockchain applications are already revolutionizing many sectors, including secure sharing of medical data, tracking music royalties, real estate processing and supply chain logistics, to name a few.

> "Blockchain technology offers a high potential to establish trusted data management for an emerging MaaS ecosystem."
>
> **Takashi Togame**
> Incubation manager
> Sony Corp.

In general, mobility providers want to collaborate with other providers as part of

a MaaS scheme. But providers would not like to disclose their data to competitors.

Protecting Sensitive Business Data in a MaaS Scheme

Distributed ledger with blockchain can record anonymized travel history and fares after the players reach consensus.

Each player can confirm recorded anonymous travel history data and revenue sharing. But non-related competitors cannot see each other's sensitive business data. The parties to a MaaS scheme can define business rules about who can access which data.

Blockchain, therefore, can help enable business rules to be carried out with integrity, trust and transparency. This, in turn, could help bring together the industry to enable further MaaS development.

While a distributed ledger architecture could provide a foundation for the type of open and decentralized infrastructure needed to solve some of the challenges highlighted above, many industry observers believe blockchain is unsuited for MaaS. They think it is too slow to handle the huge volume of transactions that needs to be rapidly processed as part of a

"Blockchain, therefore, can help enable business rules to be carried out with integrity, trust and transparency."

MaaS scheme.

The doubts about the suitability of using blockchain technology for MaaS proved to be premature, however.

For example, we developed a blockchain common database for MaaS applications that can handle more than 7 million

"The doubts about the suitability of using blockchain technology for MaaS proved to be premature, however."

transactions per day to record and share anonymous travel histories and perform clearing and settlement of transactions for a range of mobility providers.

A Blockchain Challenge program by the Netherlands Ministry of Infrastructure and Water Management confirmed last year that our blockchain common data base solution could meet their required specifications for sharing large-scale movement history and revenue allocation for MaaS.

Ensuring Trust and Integrity for Sharing of Scheme Data

All of this means that blockchain technology offers a high potential to establish trusted data management for an emerging MaaS ecosystem, including ensuring integrity and transparent sharing of data among the relevant parties. This will help to accelerate further development of MaaS in the market.

Takashi Togame is incubation manager for Sony Corp. and is one of the creators of Sony's blockchain common database for MaaS applications.

Pros & Cons of Open Loop: Transit Agencies Face Choice

OPEN-LOOP PAYMENTS

By Dan Balaban

Boosted by the pandemic, interest remains strong in bank card fare payments, though some transit agencies have passed on the technology in favor of enhancing their closed-loop programs.

While the Covid-19 pandemic has slashed transit agency budgets and delayed rollouts, it has accelerated the trend for the agencies to enable their customers to pay fares with contactless EMV credit and debit cards and other electronic payments.

Because paying with a tap of a contactless card, smartphone or wearable is considered less risky than using cash, touching vending machines or coming in contact with transit agency staff, agencies shuttered their ticket offices and even waived fares altogether during the height of the pandemic lockdowns. Now that cities have been opening up again, many transit officials want "touchless" ticketing. And some agencies are more open to enabling alternative transport modes, such as bike and scooter rentals, which could form part of new mobility-as-a-service platforms. The agencies are also introducing more on-demand transit.

Major payments networks Visa and Mastercard said they each have seen significant growth of contactless payments since the pandemic began.

For example, Visa in late April 2021 said it had seen a 30% growth in contactless transactions in stores in the year starting in March 2020, when the pandemic lockdowns began. During that time–as

New York's Metropolitan Transportation Authority launched its phased OMNY open-loop payments service in 2019

Major Transit Agencies On Six Continents Accept Open-Loop Payments; More Planned

Place	Launch	Transit Modes	Networks Supported	NFC Wallets (supporting local cards)	Fare Capping?	AFC Vendor	Full Account-Based?
Amsterdam NETHERLANDS	2022 (expected)	Metro, tram, bus	Visa, Mastercard	Apple Pay, Google Pay, Fitbit Pay, Garmin Pay	N/A	Thalas (validators)	Yes (planned)
Boston USA	2022 (phase I), 2024 (rollout complete)	Bus, metro, ferry, commuter rail	Visa, Mastercard, AmEx	Apple Pay, Google Pay, Garmin Pay, others (expected)	Expected	Cubic	Yes
Brisbane and QLD AUSTRALIA	2020 (trial), 2022 (rollout complete)	Bus, train, tram, ferry	Visa, Mastercard, AmEx (expected)	Apple Pay, Google Pay, Samsung Pay, Fitbit Pay, Garmin Pay (expected)	Expected	Cubic	Yes
Brussels BELGIUM	July 2020	Metro, tram, bus	Visa, Mastercard; Bancontact (expected)	Apple Pay, Google Pay, Fitbit Pay, Garmin Pay; Payconiq (expected)	Daily	Vix	No
Chicago USA	2013	Metro, bus	Visa, Mastercard, AmEx	Apple Pay, Google Pay, Samsung Pay, Fitbit Pay, Garmin Pay	No	Cubic	Yes
Guangzhou CHINA	Dec. 2016	Metro	UnionPay	Apple Pay, Samsung Pay, Huawei Pay, Mi Pay. Garmin Pay	N/A	N/A	No
Hangzhou CHINA	Dec. 2017	Metro, bus, train	UnionPay	Apple Pay, Samsung Pay, Huawei Pay, Mi Pay. Garmin Pay	N/A	N/A	No
Johannesburg SOUTH AFRICA	Oct. 2019	Train, bus, parking	Visa, Mastercard	Apple Pay, Samsung Pay Garmin Pay	N/A	Thales	No
London UK	2012 (buses) 2014 (all modes)	Bus, metro, tram commuter rail, nati'l rail (in and around London)	Visa, Mastercard, AmEx	Apple Pay, Google Pay, Samsung Pay, Fitpay, Garmin Pay, bPay, Barclaycard Contactless Mobile	Daily, weekly	Cubic	No
Madrid SPAIN	Feb. 2019 (trial) Nov. 2019 (rollout)	Bus; bicycle, cable car, parking (planned)	Visa, Mastercard, AmEx	Apple Pay, Google Pay, others	Daily (planned)	N/A	N/A
Milan, ITALY	June 2018	Metro, 3 bus lines	Visa, Mastercard, AmEx	Apple Pay, Samsung Pay, Garmin Pay, others	Daily, monthly (passes, likely)	Aitek	No
Moscow, RUSSIA	2015	Metro, monorail, train	Visa, Mastercard, UnionPay, MIR	Apple Pay, Google Pay, Samsung Pay	No	N/A	N/A
New York City USA	May 2019 (Ph-I); 2023 (rollout complete)	Metro, bus, commuter rail	Visa, Mastercard, AmEx, Discover	Apple Pay, Google Pay, Samsung Pay, Fitbit Pay, Garmin Pay	Time-based fares planned	Cubic	Yes
Philadelphia USA	2021-2 (delayed)	Metro, bus, tram, commuter rail	Visa, Mastercard, AmEx (expected)	Apple Pay, Google Pay, others (expected)	Expected	Conduent	No
Portland USA	Fall 2017 (rollout)	Bus, tram, commuter rail	Visa, Mastercard, AmEx	Apple Pay, Google Pay, Samsung Pay), Fitbit Pay, Garmin Pay	Daily	INIT	Yes
Rio de janeiro BRAZIL	April 2019	Metro, train	Visa, Mastercard	Apple Pay, Google Pay, Samsung Pay, Garmin Pay	No	N/A	No
Rome ITALY	Sept. 2019	Metro, regional train	Visa, Mastercard, AmEx	Apple Pay, Google Pay, Samsung Pay, Fitbit Pay, Garmin Pay	Daily, monthly (prepaid passes)	N/A	No
Singapore	March 2017 (trial); Spring 2019 (rollout)	Metro, bus	Mastercard , Visa; NETS (debit, prepaid only)	Apple Pay, Google, Samsung Pay, Fitbit Pay, Garmin Pay, Singtel Dash, GrabPay	N/A	N/A	Yes
Sydney AUSTRALIA	July 2017 (trial) Nov. 2018 (rollout), 2019 (completed)	Metro, tram, ferry, bus	Visa, Mastercard, AmEx; eftpos (expected)	Apple Pay, Google Pay, Samsung Pay, Fitbit Pay, Garmin Pay	Daily, weekly, weekend	Cubic	No
Vancouver CANADA	May 2018	Train, bus, ferry	(Credit cards only): Visa, Mastercard, AmEx	Apple Pay, Google Pay, Samsung Pay, Fitbit Pay, Garmin Pay	No	Cubic	Yes

April 2021 Source: Mobility Payments

consumers sought ways to avoid handling notes and coins and also to sidestep inserting their cards into POS terminals–the network saw 1 billion additional contactless transactions in Europe. Moreover, contactless payments in the U.S., which have been lagging well behind the rest of the developed world, doubled during the pandemic–with a penetration of nearly one in 10 transactions with Visa-branded cards.

"In the past three years alone, we've enabled nearly 250 transit systems globally, and we can see based on our research that enabling tap-to-pay on transit can bring more than a 15% lift in transactions for merchants in the surrounding neighborhoods," said Visa CEO Al Kelly on the late April conference call.

Overall, globally, Visa said it is working with around 720 agencies (including initial talks) about moving to open-loop, up from 300 agencies 18 months earlier.

While there is mixed scientific evidence that notes and coins pose an added risk for harboring the coronavirus, the public is still wary about handling cash.

So these networks–which have aggressively sought to expand use of cards and credentials bearing their brands to transit fare payments for years–are pitching their technology as a safety measure for transit riders in the aftermath of Covid-19 lockdowns.

Proprietary closed-loop contactless fare cards are already common in cities in Asia-Pacific and Europe, while in North America, many agencies, even some fairly large ones, continue to use cash and paper tickets. Only four North American agencies accepted open-loop contactless payments as of June, in New York, Chicago, Miami and Portland, OR, with Boston planning to launch next year. A very small agency in California launched an open-loop pilot in May with the help of state transportation officials and vendors, such as Visa.

Open-Loop Vs. Closed-Loop Fare Collection: Weighing the Strengths and Weaknesses

	OPEN LOOP	CLOSED LOOP
PROS	• Globally interoperable as long as cards or NFC devices support the same payments brands on terminals.	• Agencies maintain complete control over the fare-collection system, including branding, security and distribution channels.
	• Avoids the need for customers to find and queue at ticket machines, retail resellers or ticket offices in order to buy a card and load value.	• Allows agencies to benefit from the float loaded onto cards and to earn revenue from non-transit applications, such as retail payments.
	• Customers are not required to lock up funds as they do on preloaded closed-loop cards. Fares are almost always charged on a pay-as-you-go basis.	• Enables agencies to serve unbanked customers and those who don't want to use bank cards to pay fares.
	• Transit agencies don't have to fund upgrades to cards, which are issued by banks and are standardized according to EMV specifications.	• Transaction speeds are often faster than for open-loop cards, which must use certain EMV authentication protocols.
	• There is a reduced need by transit agencies to collect and secure cash for tickets or top-ups of its own cards or to process closed-loop transactions.	• Closed-loop cards can more easily be used for concessionary fares for seniors, students and other groups because they often can store proof of ID.
CONS	• Implementation costs for open loop are often expensive, including for hardware, networking back-office systems and certifications.	• Most closed-loop fare-collection systems are not interoperable across cities and almost never across borders.
	• Some customers are unbanked or do not want to pay with bank cards, meaning agencies will always have to provide alternatives to open loop.	• Transit agencies are almost always locked into proprietary technology. They must also fund costs to produce, issue distribute and maintain cards.
	• Agencies have to pay merchant-service fees to banks to collect fare revenue, which, depending on the country, can be significant.	• Requires ticket offices, vending machines and often retailers (charging commissions) to sell cards and load value. Agencies must collect and handle cash.
	• Agencies have to deal with card clash if customers have more than one contactless EMV card in their wallets.	• Agencies must usually pay for the full cost of upgrades to the fare-collection system.
	• While contactless EMV cards and tokenized credentials on NFC devices carry banking-grade security, some experts believe open loop poses unknown risks to the fare-collection system, such as potential cybersecurity breaches.	• Customers must lock up funds on cards, which they might not be able to fully spend before leaving if they are a foreign visitor.

Source: *Mobility Payments*

But while most agencies continue to prominently promote their closed-loop cards, a growing number are adding contactless EMV fare payments–a trend that began even before the pandemic–picking up steam in Europe, North America and, to a lesser extent, Asia Pacific.

Since the beginning of 2019, such cities as Rome, New York, Singapore, Madrid, Manchester, Brussels, Miami, Prague, Johannesburg, Stockholm and Rio de Janeiro, among others, have launched open-loop fare collection, with more in the planning stages, including Amsterdam, Boston, Brisbane and Dallas. (See table, P21)

Backers hope the New York Metropolitan Transportation Authority's open-loop fare payments rollout will encourage other agencies to in North America to launch the technology.

A number of smaller cities in such countries as the UK, Turkey and Poland, have introduced open-loop payments, too.

Some Downsides for Open Loop

The move by agencies over the past few years to accept contactless EMV payments has both advantages and disadvantages for transit agencies compared with closed-loop stored-value cards that have dominated fare collection at large agencies globally for the past 20 years.

Among some of the downsides are high upfront capital costs and the fact that transit agencies still have to support fare payments options for riders who cannot or will not use bank cards to pay–effectively requiring the agencies to maintain two fare-collection systems.

In addition, in many cities, closed-loop, reloadable cards remain popular, such as in London. There, the Oyster card has kept most of its usage for pay-as-you-go transactions despite the growing popularity of open-loop bank card payments following full rollout of the technology in 2014.

In and around London, open-loop payments are now the most used form of payments for billions of yearly journeys customers take on buses, metro, trains and trams–accounting for more than 45% of all trips and more than half of all pay-as-you-go transactions. That's thanks in part to the decision by Transport for London to offer both daily and weekly capping for users of open-loop contactless transactions, an even better deal than they get with Oyster cards.

More recently, the pandemic and concerns by riders about touching surfaces increased use of contactless by 10 percentage points compared with the pre-Covid era, Transport for London said.

But most of those gains for EMV contactless payments have come at the expense of season tickets and passes–which fell in use by 50% over the first six and a half years after the service

launched–while Oyster pay as you go only fell by around 7 percentage points to 28% of total trips. In fact, the London transit authority still sells around 100,000 new Oyster cards each week, a number that hasn't declined much with the growth of contactless.

Also, in some cities or countries, especially in Asia, transit agencies and some private companies own fare-collection companies that use their closed-loop, stored-value fare cards for non-transit applications, in particular for retail payments. The payments services include Suica in Japan, Octopus in Hong Kong, EasyCard in Taiwan and Tmoney and Cashbee in South Korea.

The closed-loop contactless card programs earn fees from merchants. But when they accept credit and debit cards, transit agencies themselves become the merchants and have to pay merchant service fees to banks.

Those fees are significant in some countries, such as the U.S., where the Dallas Area Rapid Transit agency told *Mobility Payments*' sister publication, *NFC Times*, last year that credit card fees for its planned move to open-loop would cost it around 3% of the transaction amount.

Transport for New South Wales began testing its open-loop payments service on one of the ferry services in Sydney Harbour in 2017.

Some transit agencies are shunning open-loop payments so far. That includes such large agencies as the Los Angeles County Metropolitan Transportation Authority, or Metro; and the Metropolitan Transportation Commission, or MTC, which serves nine counties in the San Francisco Bay Area. They are instead opting to promote and expand their closed-loop fare programs, including allowing NFC Pays services, such as Apple Pay, to create virtual versions of their closed-loop cards.

A spokesman for Metro said that the agency has not moved ahead with open loop because "open payment is a capability that will cost money to develop and includes parameters that make equity more difficult for our seniors, disabled, students and low-income riders."

But it isn't only the costs of implementing open-loop payments that rub some agencies the wrong way. For example, MTC in San Francisco Bay Area is paying Cubic Transportation Systems more than $460 million to overhaul its Clipper closed-loop fare collection system and operate it for 10 years. Thousands of card readers will have the hardware to make them ready to accept EMV payments. And to actually implement that functionality with planning, designs and testing would only cost another $7 million, according to MTC, not counting maintenance and merchant fees. But it's difficult to get agreement from

Payments with NFC devices make up more than 20% of contactless transactions for Transport for London fares.

among MTC's two dozen transit operators for open loop, and many of them don't see it as a priority.

Not only large transit agencies are going to open-loop fare payments. Miami-DadeTransit launched service in 2019, accepting payments from contactless debit and credit cards and bank credentials on NFC devices.

Advantages of Open Loop

Despite the merchant fees, going to open-loop payments can save money for transit agencies, as well as increasing convenience for customers.

Silvester Prakasam, senior advisor, fare systems, for the Land Transport Authority of Singapore, which rolled out open-loop fare collection in 2019 following a long trial period, said costs for issuing and topping up closed-loop cards for transit agencies in general are significant and have tripled as a percentage, to 9%, over the past several years. He was likely referring to topping up as a percentage of fare revenue. That would include costs for wages or commissions to ticket agents, maintenance of vending machines and card issuance. Prakasam, speaking in 2019, estimated that Land Transport–which handled 7.5 million bus and train rides per year–could save SGD 20 million (US$14.7 million) in operational costs by fully going to open-loop payments.

Estimates have placed the cost of closed-loop cards at US$1.50 to $3, though prices vary. That doesn't include distribution. An earlier report from L.E.K. Consulting in Australia, in association with Mastercard, estimated a few years ago that agencies pay 2% to 5% to retailers for riders to top up closed-loop fare cards. While many agencies have automatic top-ups online for registered users, the usage rate of users in most cities, is not high. And open-loop also reduces cash counting and storing cash. And customers save time on time loading the cards.

With open-loop cards, agencies aren't locked into proprietary technology or particular vendors and also don't have to fund upgrades to cards, which are issued by banks and are specified by the global EMVCo organization, co-owned by the international payments networks.

That also adds the latest security. While full authorization doesn't take place in most open-loop fare-collection systems, there is only a risk that a rider using a fraudulent card gets away with the first ride, and that risk is often shared or assumed by the banks or card schemes as part of agreements. For example, UK card issuers agreed to pay the first £10 (US$13.87) in fraudulent or uncollected open-loop transactions from a rider.

Meanwhile, agencies also move to open-loop to offer more convenience to customers, who don't have to queue at ticket counters or vending machines or lock up value on their cards, just tap their credit or debit cards or card credentials stored on NFC devices. An analysis in Singapore showed that in 2018, there were SGD 200 million (US$150 million) on closed-loop cards. Some of this money is never used, especially by foreign visitors, who load cards but don't get to spend it all before they leave.

And with networks, such as Visa and

Mastercard, providing clearing and settlement, the open-loop cards also are interoperable in countries that accept their branded cards, meaning visitors to a new city don't have to buy closed-loop cards with value and don't have to worry about calculating fares. If the agency offers fare capping, they don't have to decide whether it makes sense to buy daily or weekly passes.

Andy Shaw, senior product manager for payments for Transport for London said at a recent conference that EMV payments technology enables agencies to extend their payments services across cities and regions, across transport modes and even across agencies.

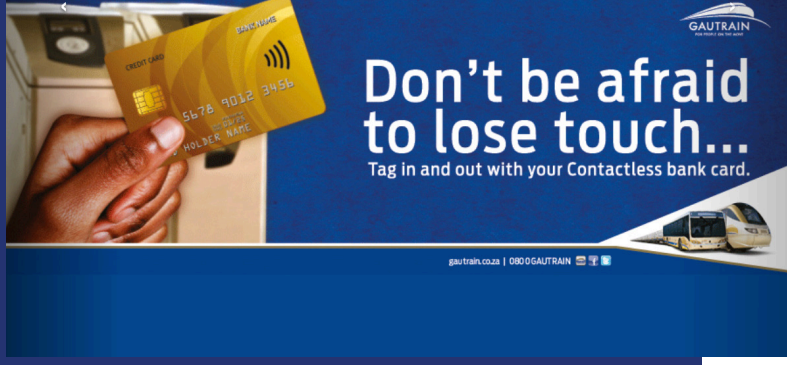
"And I think that's the exciting bit that EMV and open standards, open protocols, give us–that potential to start to join things up a little bit more," he said. "Now granted,

"From looking at the major technology taking shape right now, account-based is kind of the foundation of everything,"

Boris Karsch
senior product unit director, Umo Pass and Umo Pay and formerly VP of strategy, Cubic Transportation Systems

there's going to be things like data sharing. You need back offices to talk to each other, but I believe, in this way, we start to move toward more open technology."

Shaw added that transit agencies can use EMV as a "token for pre-purchasing tickets, "not just pay as you go. That is similar to what transit operators in Italy are doing–enabling customers to pay in advance for monthly passes with an EMV card and use



A promotion by Gautrain in South Africa for its open-loop fare payments service.

the same card to tap readers on gates and on board buses to ride. Operators in Milan and Rome are also talking about extending use of EMV cards to pay for mobility-as-a-

> ***"The exciting bit that EMV and open standards give us–that potential to join things up."***

service platforms they plan to launch.

Transit agencies have been moving to open loop for years, for a number of reasons. But for many transit agencies, enabling customers to pay fares directly with their bank cards on board buses and at metro turnstiles go hand in hand with support for account-based ticketing. Account-based ticketing puts the fare calculation and other intelligence in the back office not on the card and terminal, offering much greater flexibility to transit agencies to introduce new fare policies and discounts, offer new transit services and to change the way their customers pay.

That includes offering access to their customers to other mobility providers, such as bicycle rental and car sharing.

"From looking at the major technology taking shape right now, account-based is kind of the foundation of everything," Boris Karsch, senior product unit director of Umo Pass and Umo Pay and formerly VP of strategy at Cubic, earlier told *Mobility Payments* sister publication, *NFC Times*.

Transport for London launched what would become the world's largest open-loop payments service in late 2012 on buses, with a full multimodal rollout in 2014.

Cubic is the largest systems integrator for fare collection systems globally. "Obviously, contactless (EMV) is, you know, a flavor of account based."

Cubic, with the launch of its Umo platform in January, which includes a software-as-a-service ticketing platform, is enabling more small to mid-tier transit agencies to launch electronic ticketing, which can include open-loop EMV payments.

Despite the continued popularity of many closed-loop fare payments programs, the days are numbered for card-based fare-collection programs, agree Karsch and other experts.

> ***"I believe we're on the thesh-hold a major step change in our industry."***

"In five year's time, I don't think you'll be able to buy a card-based system; they'll all be account-based systems," said Australia-based consultant Greg Ellis, who worked on open-loop and account-based fare-collection projects in both Sydney and, more recently, in the state of Queensland., in Australia. "In 10 years' time, we might be talking about the ancient history of card-based schemes. I believe we're on the threshold of a major step change in our industry."

Many observers believe that open-loop fare payments is the same thing as account-based ticketing. But that is not technically true.

Paul Gwynn, director of international business development for Germany-based systems integrator INIT, noted to *Mobility Payments* that contactless EMV isn't necessarily account-based ticketing because it doesn't require a personal account with the transit agency. Foreigners visiting from other cities or countries can tap to pay for fares with credit or debit cards but will not have registered with the local transit agency.

"So (with accounted-based ticketing), it could be a smart card from an operator or an authority. It might be a mobile phone, it might be an EMV card, the details of which are contained in your personal data," he said.

He and other experts predict many more open-loop fare payments projects to come globally.

And as transit agencies deal with the aftermath of the Covid-19 pandemic, they will be looking for more digital payments, including enabling open-loop payments from bank cards and digital wallets.

Making the Move into Ticketing and Payments

COVER STORY

By Dan Balaban

Such major trip-planning app providers as Moovit, Transit and Google Maps see ticketing and payments as an important new service and for some, it's one of the last steps toward creating true MaaS platforms.

Moovit, Transit, Google Maps and other trip-planning app providers are starting to enable ticketing and payments for public transit rides for the first time, a move that could one day transform the way transit agencies sell tickets and passes to their customers.

The Covid-19 pandemic, which is accelerating the rollout of "touchless" fare payments by transit agencies globally is helping to fuel the push by trip-planning apps to offer their users mobile ticketing and contactless card payments.

Although take-up has been slow in some of the first participating cities, the multimodal trip planners–which give their users information on which bus to take or train to catch–see ticketing and payments as a vital new service.

And it brings their apps one stop closer to becoming true mobility-as-a-service platforms, although Google says it is more interested in using transit ticketing to broaden its Google Pay service, not create a MaaS offer. In any case, all of the apps would move closer to the goal of enabling users to "plan, book and pay" for multimodal travel–whether bus, metro, commuter rail, taxi, ride hail or such

"You need to be able to view a schedule to plan a trip using a multimodal planner, but also being able to pay using the same app further simplifies the user experience,"

Yovav Meydad
Moovit's chief growth and marketing officer

micromobility modes as bike and scooter rental–all in one app or platform.

"You need to be able to view a schedule to plan a trip using a multimodal planner, but also being able to pay using the same app further simplifies the user experience," Yovav Meydad, Moovit's chief growth and marketing officer, told *Mobility Payments*. Moovit, which bills itself as the world's largest urban-mobility app, offering trip planning in 3,400 cities globally, was acquired by Intel in May 2020. Intel said it bought Israel-based Moovit–at a cost of nearly $1 billion–to further the tech giant's MaaS initiatives.

Moovit began in earnest adding transit agencies in 2020 and supports ticketing in such cities as Cincinnati and Buffalo in the U.S. and Madrid and Barcelona in Spain. More recently it has been adding at least 90 U.S. cities and towns, mostly small bus operators, linking to a software-as-a-service ticketing platform from U.S.-based Token Transit through an API, though not all are live yet.

Most of these agencies already use the consumer-facing Token Transit app to provide their customers with mobile ticketing.

Meanwhile, rival trip-planning app Transit,

SaaS Ticketing Platforms Compete for Contracts as Virus Stokes Demand for Electronic Fare Collection

	FOUNDED	OWNER/MAIN INVESTOR(S)	SOME NOTABLE CUSTOMERS*	PRICING**	NOTES
Masabi	2001	Venture capital, Keolis, Mastercard	MTA (New York, commuter rail); MBTA (Boston, commuter rail, ferry), Metrolink (LA commuter rail), RTD Denver, CO, (bus, light rail, NEORide (OH, KY, MI, bus), Calgary Transit, CAN (bus), RTC Southern NV (bus)	1% - 3.5% of txn amount; for some agencies, not including credit card processing fee	Boasts of 100-plus public transit agency customers, most in U.S., but including some in its UK home base, Canada, Australia and elsewhere. Began with mobile, adding cards and open loop. **Among trip-planning platforms working with:** Transit, Moovit, Uber, Lyft, Jorudan
Umo	2021 2012 (Delerrok)	Cubic	SporTran (Shreveport, LA, bus), Skagit Transit (Skagit County, WA, bus), GoTriangle (Raleigh-Durham, NC. bus) and Ventura County Transportation, CA, (bus), MET (Billings, MT, bus), Omaha Metro (Omaha, NE, bus)	Fees starting at 10 cents per txn, declining to 5 cents, then 3 cents based on txn numbers for at least some agencies, not including credit card fees.	Cubic announced the launch of its Umo offer in late Jan. 2021, combining SaaS ticketing platform it acquired from start-up Delerrok, with trip-planning tech from Moovit and its own payments and mobility know-how. Has 30+ SaaS customers. Cards, mobile, open loop. **Among trip-planning platforms working with:** Umo, Moovit
Token Transit	2015	Venture capital	AC Transit (Oakland, CA, bus), NFTA (Buffalo, NY, bus) Big Blue Bus (Santa Monica, CA, bus), San Jaoquin RTD, Stockton, CA, bus), Go BG (Bowling Green, KY, bus), Omnitrans (San Bernardino County, CA), StarMetro, (Tallahassee, FL, bus)	8% of gross revenue (7% + 6 cents for txns under $2), including credit card fees.	Silicon Valley start-up has its mobile-ticketing app in 100-plus mostly small U.S. public bus agencies. First SaaS ticketing provider to work with Google Pay/Maps, which now supports more than 90 agencies. Enables only mobile ticketing. **Among trip-planning platforms working with:** Google Maps, Transit, Moovit
Bytemark	2011	Siemens Mobility (majority owner)	Presto (Toronto, bus), Capital Metro (Austin, TX, buses), OCTA (Orange County, CA, bus), Houston Metro (Houston, TX, bus, rail). RIPTA (Rhode Island, bus), Sound Transit (Seattle, Lt. rail, commuter rail, exprss. bus) DART (Des Moines, IA, bus)	1.5% to 2% commission of monthly ticket sales, not including credit card fees	Ten-year-old New York-based company provides SaaS ticketing to around 50 transit agencies, most in the North America with a few in Europe. Bytemark is part of group that includes Hacon (trip planning). Can provide fare payments with mobile ticketing and proprietary contactless cards; open loop to come. **Among trip-planning platforms working with:** Transit, Hacon

June 2021 * Most agencies offer ticketing in local apps for now. ** Pricing information provided by transit agencies is subject to change. Source: *Mobility Payments*

More transit agencies are installing readers to enable customers to scan codes or tap cards, getting away from visual inspection of tickets by drivers or conductors.

which is strong in North America, began signing up transit authorities and operators at least two years ago, focusing mainly on small to mid-tier agencies, and now says it has more than 30 signed up in such cities as Denver, Cincinnati, St. Louis and Las Vegas in the U.S.; and Montreal in Canada; mainly using an SDK from UK-based SaaS ticketing platform Masabi. At the same time, it has enabled more than 40 additional agencies–mostly small bus operators, in the U.S. through Token Transit. (See table on P32.)

Google's Transit Payments Play

Some regional trip-planning apps, such as Jorudan in Japan, also are adding a growing number of cities in which users can purchase tickets in their apps, working with Masabi.

And Google this spring enabled more than 80 public transit agencies in the U.S. to sell tickets or closed-loop cards through Google Pay, a figure that had grown to over 100 by June. Google was to have enabled users to initiate the ticket and card purchases through Google Maps, too, but that implementation has been delayed, even as Moovit and Transit have moved ahead with the service–via Token Transit–in their apps.

A source told *Mobility Payments* that public transit ticketing would be available in Maps by the end of June, but at least for many agencies, that has not yet happened. When it does, users will likely see a button in Maps asking if they would like to buy tickets, at the same time the app gives them route options involving public transit. If the user proceeds, Google Pay would handle the transaction using credit or debit cards on file. Google Pay would also store the ticket or fare card.

> *" It's going to be a really tough ask to get Uber to do a separate integration with a city. If you're New York, yeah, they'll do it. If you're some some small town in Colorado, probably not. "*
>
> **Ben Whitaker**
> head of innovation
> and co-founder, Masabi

Most transit agencies Google has signed up so far are small cities and towns, with users able to purchase and download the

Big Blue Bus in Southern California, among other agencies, plans to sell tickets through the Google Maps app.

ticket, which they can then activate and show to the bus driver or other agency staffer for visual validation.

There are some large cities, such as San Francisco, Chicago and Washington, D.C., where users will be able to buy closed-loop cards starting in Maps.
As with the mobile ticketing with smaller agencies, they can already do this within Google Pay. In other major cities, such as London and Singapore, users will be able to continue to pay for fares with open-loop EMV credit and debit cards in Google Pay, but the transactions could have a link in Maps.

Unlike Moovit, Transit and some other trip-planning apps, Google isn't trying to turn its Maps app into a MaaS platform, a Google spokeswoman told *Mobility Payments.* Instead, the play is a "deeper integration between Google Maps and Google Pay," she said. "Google Maps does not issue a ticket, rather, it gives people the option to use Google Pay on supported routes right from transit navigation."

Kathy Schultz, planning and development manager for Kalamazoo Metro Transit, one of the first transit agencies to support the Google service–including participating in a pilot program last year–earlier told *Mobility Payments* that riders in the pilot could first plan their bus routes in Google Maps by picking their destination, then they clicked on the transit link within Google (Maps) and saw a button to buy and save tickets to their phones. This linked directly to Google Pay, where users purchased and stored the tickets, though at the time, they also could go to the Token Transit app.

Uber and Lyft Get Involved

Such ride-hailing apps as Uber and Lyft are also beginning to enable route-planning in certain cities, and users in an even smaller number of cities–such as Denver, Las Vegas and Cincinnati in the U.S.–can buy public transit tickets in the Uber or Lyft apps or both.

Uber was the first to support the ticketing service in its app, launching in Denver in early 2019 to enable its users to find buses, trains or other public transit to complement or even take the place Uber's own ride-hailing service.

In a small but growing number of cities in the U.S., Uber is enabling public transit ticketing and payments, as well. That includes in Las Vegas; the NEORide consortium, which handles ticketing for more than a dozen mostly small bus agencies, but including Cincinnati; and Fire Island in New York. Uber rival Lyft began enabling ticketing in Denver last fall and in Las Vegas in late June 2021.

Trip-Planning Apps Get on Board with Public Transit Ticketing and Payments

Transit app	Montreal, CAN St. Louis USA Denver USA Cincinnati (& NEORide) USA Dayton USA Las Vegas USA Santa Monica USA Buffalo USA Rochester USA Duluth USA Plus 40+ more transit agencies through Token Transit
Moovit	Cincinnati USA (& NEORide) Little Rock USA Fort Wayne USA Buffalo USA Bowling Green USA Madrid SPAIN Barcelona SPAIN Valencia SPAIN ISRAEL Plus nearly 100 more mostly small transit agencies launched or planned viaToken Transit
Google Maps	Links in Maps to Google Pay to more than 100 transit agencies, most small, to begin rolling out in late spring or early summer 2021.
Uber	Denver USA Cincinnati USA (and NEOride) Las Vegas USA London UK (Uber Boat) Fire Island USA
Jorudan	Tokyo JPN Sapporo, JPN Okayama Prefecture JPN Kumamoto, JPN Kagoshima JPN Oita, JPN Kitakyushu JPN
Citymapper	London UK

June 2021 Source: *Mobility Payments*

Plugging into SaaS Platforms

The vast majority of the payments and ticketing for the trip-planning apps so far use software-as-a-service platforms. These platforms, from such companies as Masabi, Token Transit and, more recently, U.S.-based Bytemark, for years have been providing mostly mobile ticketing directly to the agencies themselves through either white-label apps as with Masabi and Bytemark, or a consumer-facing app for Token Transit.

> ***"We'd like to be active in all the public transit agencies ..."***

Masabi and Token Transit each say they have more than 100 transit agencies using their platforms, while Bytemark says it has more than 50. Most clients of the three platforms run small to mid-tier bus agencies in North America.

SaaS ticketing has grown in demand with the pandemic, which has increased calls for mobile and contactless ticketing to replace cash and paper.

With the SaaS platforms, agencies can start offering the service quickly, within weeks, sometimes even days, by plugging into the platforms, if they are only introducing mobile ticketing with visual inspection by bus drivers. Without the need for validators, they would have virtually no start-up costs, either. They pay commissions based on transaction revenue or volume. (See table on P29). Validators that can scan bar coded- or QR-coded mobile tickets and accept reloadable closed-loop contactless cards cost around $1,400 apiece including installation and readiness to also accept open-loop EMV contactless payments.

Drawbacks to SaaS ticketing–that the agencies don't own the platforms and can't add their own features or customize the platforms much, is more of a concern to large agencies, not to small to mid-tier ones.

With agencies already plugged into the SaaS platforms, it's mainly a matter of the trip-planning apps installing SDKs or APIs to add the ticketing and payments services from the SaaS platforms, if agencies agree.

Ben Whitaker, head of innovation and co-founder of Masabi, told *Mobility Payments*' sister publication *NFC Times* that an agency already being integrated with Masabi's Justride SaaS platform can mean the difference between the trip-planning or ride-hailing app supporting the public transit ticketing service or not.

"They don't have to reintegrate every time," he said. "It's going to be a really tough ask to get Uber to do a separate integration with a city. If you're New York, yeah, they'll do it. If you're some small town in Colorado, probably not."

Some agencies have made the trip-planning app its default app and added mobile-ticketing directly to the app. That was the case for St. Catharines Transit, a small bus agency in Canada, which launched mobile ticketing in the Transit app in April 2019.

Other SaaS ticketing providers are getting involved. For example, U.S.-based Cubic Transportation Systems–known for implementing huge bespoke fare-collection systems for such major cities as London, New York, San Francisco and Sydney–has adapted the SaaS platform, TouchPass, it bought to offer more agencies mobile and contactless ticketing with its Umo platform play.

Getting Off to Slow Start

Despite the high profile launches, some of the first transit agencies to have enabled ticketing through the third-party trip-planning apps are still seeing the vast majority of their mobile ticketing through their own apps. That appears to be especially true if the agencies had their own mobile-ticketing apps on the market before adding the third-party apps.

Some prime examples are transit agencies RTD Denver and RTC of Southern Nevada, based in Las Vegas, which were among the first to enable ticketing through Uber, and were also early partners of Transit. Both are still seeing more than 95% of their mobile-ticketing sales through their white-label apps. (See charts on 33.)

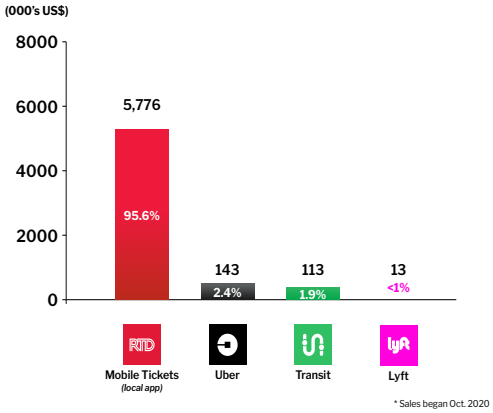
Third-Party Apps Off to Slow Start

Mobile-Ticketing Sales

RTD Denver Mobile-Ticketing Sales

Feb 2020 - March 2021

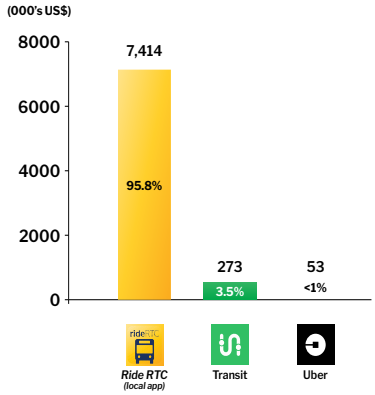
(Total mobile-ticketing sales: 6,045)



RTC Southern Nev. Mobile Ticketing Sales

April 2020 - March 2021

(Total mobile-ticketing sales: 7,738)

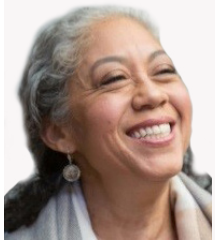


Mobility Payments Source: RTC Denver and RTC of So. Nev.

RTC in Las Vegas launched its RideRTC app in 2016, while RTD Denver launched its Mobile Tickets app in late 2017. RTC saw a healthy 28.3% of total fare revenue through mobile ticketing for the 12 months ending in March 2021, despite the cash-heavy business it does in Las Vegas.

Meanwhile, RTD in Denver was recording around 13% mobile-ticketing adoption before the pandemic, a figure believed to be unchanged in the past year. Tonya Anderson, RTD Denver's senior manager of fare operations, has said overall use of mobile ticketing has greatly exceeded expectations. And the low ticket sales so far from the third-party apps don't faze her. It's important to give customers options, she said.

"There's a concept called app fatigue," Anderson said, speaking earlier at a conference. "It's that friction that you feel when someone says, 'oh, easy, just download an app.' And you're thinking, 'Oh, I can't download another app. I just can't do it.' We wanted to take away this first point of friction by putting our tickets in a ubiquitous app (Uber and Transit) that customers already have on their phone."



"There's a concept called app fatigue. It's that friction that you feel when someone says, 'oh, easy, just download an app.' And you're thinking, 'Oh, I can't download another app. I just can't do it.' "

Tonya Anderson
senior product manager, electronic fare operations, RTD Denver

RTD later added yet another third-party app, Lyft, in the fall of 2020. Sales are still minimal.

The situation is different for the Ohio-based NEORide consortium, which has seen sales of more than 60% of its mobile tickets through third-party apps, especially in the Transit app. That's because the largest agency in the group, Metro of Cincinnati, made Transit its default app and promotes mobile ticketing from the app. NEORide also supports ticketing in Moovit and Uber.

Still, mobile ticketing does not appear to be taking off for the NEORide group yet. Transit and NEORide announced in mid-April 2021 that they had sold 500,000 rides through the Transit app, presumably since the service launched in 2019. By comparison, the Cincinnati Metro bus service alone delivered around 600,000 rides per month in 2020.

Small to mid-tier transit agencies, such as Buffalo, N.Y.-area NFTA, are adding mobile ticketing, working with SaaS ticketing platforms using standalone apps and also becoming part of trip-planning apps.

Creating True MaaS Apps

The trip-planning apps are also beginning to enable other transit modes, such as bike share, in their apps, although they have a long way to go.

Enabling users to plan, book and pay for their multimodal travel in one app–so that users no longer need to own their own transportation, meets the definition of mobility as a service. While MaaS has been touted as a technology that can transform the public transportation industry, progress toward rollouts has been slow. Now, with trip-planning apps starting to embrace ticketing and payments, more apps of this type could help MaaS begin to meet its promise.

Many of the additional transit modes are deep links in the apps that take users to another app to book and pay, which wouldn't really meet the description of true MaaS apps, however. And enabling users to pay for private mobility, including micromobility, with the same account as public transit has been slow to happen.

Moreover, public transit operators also complain they are receiving little data when ride-hailing companies sell their public transit tickets in their apps.

But Michelle Whitney, revenue operations supervisor for RTC, speaking at a Transport Ticketing Digital conference in March, said that with the data the agency is collecting from electronic ticketing in general, RTC has a clearer view of who its core riders are and how they are moving through the system. It can propose other services, in addition to bus and bike share. She said she believes being part of third-party apps will benefit more than hurt public agencies. (Her agency recently enabled Lyft, in addition to Uber.)

"We are building for a lot of different integrations into other apps; a lot of ride-share companies are going to start selling our transit passes," she said. "I mean, once you open that up, you can connect with so many other services in your area. So it's sky's the limit." MP

Denver's RTD is among the most progressive of transit agencies in the U.S., supporting mobile ticketing in it's own app, trip-planning app Transit, as well as being the first U.S. agency to sell tickets in the U.S. through the Uber and Lyft apps.

Post-Covid: Using MaaS Platforms to Ease Fears

MAAS

With pandemic fears fueling demand for less crowded transit vehicles and more social distancing, providers of early MaaS apps aim to give riders more information they need to stay safe.

While use of public transit is returning, it could take years before ridership returns to pre-Covid levels, if it ever does. Many customers have changed their lifestyles and won't come back. But others who might return remain anxious about boarding buses or trains in a post-pandemic world.

This has given mobility-as-a-service app providers or those trying to become full-fledged MaaS platforms an opportunity to use their large databases of aggregated transit data to help wary customers avoid crowded buses, trains, stops or stations.

One of them is Moovit, which bills itself as the world's largest urban mobility app. Moovit recently rolled out its crowdedness-monitoring feature to all 3,400 cities its app is available in globally, following a test at more than 70 agencies it launched in February. The feature enables app users to rate the level of crowdedness at stations and on board buses and trains.

Moovit's Yovav Meydad, chief growth and marketing officer, told *Mobility Payments* earlier that the company has been hearing lots of demand from transit agencies

> ***"Users wanted to know that they're not going to arrive at crowded bus stops ..."***

that want to offer their customers more information on the latest scheduling changes or route detours, as well as crowdedness.

"As social distancing has become a big topic, suddenly users wanted to know that they're not going to arrive at crowded bus stops or go onto crowded bus lines, so the ability to report crowdedness via the Moovit app is very relevant these days," he

Budding MaaS app Transit launched its predictive crowdedness feature for 30 transit agencies in 2020, including in Boston and Los Angeles

Mobility app providers have been seeing growing demand for predicting crowdedness levels on buses and other transit vehicles and facilities.

said, adding that users are also looking for real-time arrivals so that they are "waiting the least amount of time at the bus stop, and they just don't want to be standing among a group of people."

Moovit, which was acquired in 2020 by Intel to advance the latter's MaaS strategy, is also having a lot of discussions with agencies that want apps to provide on-demand transit service. With the latter, users can reserve seats and plan trips on on-demand transit vehicles. It also enables transit operators and authorities to make use of their vehicles that have been idled because of the pandemic.

When Prediction is Close Enough

Another trip-planning app, Transit, said as Covid cases were growing in the U.S. in the fall of 2020, that it had more than 30 agencies using its "predictive crowdedness" feature, including those in such large agencies as MBTA in Boston and Metro in Los Angeles, as well as smaller agencies in Ohio. It's not only in the U.S., with agencies in such countries as Australia also using the feature. Metro, which replaced its own mobile app with Transit in May, introduced the crowdedness information feature in August. That feature is also expanding for Transit.

App users in participating cities usually can get information on whether the bus they are waiting for is "not crowded" has "some crowding" or is "crowded." That reportedly corresponds to crowdedness levels of 0 to 33% seating capacity as not crowded, 34% to 85% as some crowding and 85% and above as crowded. The information can be provided elsewhere, as well. For example, in Boston, in addition to crowdedness information being provided in the Transit app, it's also available on the MBTA website and on digital signs at bus stops.

The crowding levels are not provided in real-time. A number of agencies collect the data using automated passenger counters, such as those using laser beams, to record customers as they enter a bus. With this data over a period of time, Transit said it could predict ridership trends, including the number of riders on a particular bus at a particular time and bus stop. Transit says its predictions proved accurate nearly 90% of the time, according to early tests.

> ***"We see this as something that probably will remain relevant in the future."***

Transit, which like Moovit, provides trip-planning, real-time arrival and booking and payments from a small but growing number of agencies. Moovit makes much of what it says is its network of more than 700,000 "Mooviters" that provide

crowdsourced information that it says makes the real-time information–and now crowdedness-observations–in its app more accurate. But Transit also claims to have a network of people self-reporting information, which it calls its "GO" riders.

And since crowdedness information from agencies isn't always available, either from lasers, camera or ticketing, Transit said last fall it was adding crowdedness monitoring to its crowdsourcing feature. This would supplement the data it receives from the agencies themselves–although the information on crowdedness from users is subjective.

Crowdsourcing Crowdedness

Among agencies using the real-time crowdedness information with the Transit app is the Regional Transportation Commission (RTC) of Southern Nevada, which it introduced the feature in January 2021.

The app mainly uses counts from RTC, showing crowdedness on buses based on on-board Covid capacity restrictions. There are three crowdedness levels, advising customers they would find "many seats," "some seats" and "very limited seats."

Transit said it supplements the RTC data with the GO crowdsourcing data, to show how crowded the riders "feel" the bus is.

Of course, customers of the agency, like those of many other agencies opening their vehicles to full capacity of late, still must follow mask and social distancing rules or guidelines .

Crowdedness information is becoming commonplace and, therefore, a must-have for agencies, provided either by third-party apps or by the agency's own app.

For example, Andy Shaw, senior product manager in the payments team at Transport for London, said the authority's journey-planning application has increased substantially in popularity. Customers want more real-time arrival information for their rides. They also want to know when stations are busiest and when they are quieter so they can choose the time that suits them, he said.

"To build that trust and that confidence to get back on the transit network, I think that's gonna be crucial as we go forward," said Shaw.

For those customers who want to make sure there is adequate space for social distancing on buses and trains, it will require vehicles with little crowding. That might be mandated by the government.

"Even at one meter social distancing, that restricts you to around 20% to 21% on the Tube (subway)," Shaw said. "I just have 30% on buses, so trying to find that balance is really key."

Encouraging Social Distancing

Demand responsive transport, or DRT, also allows agencies to control the number of persons allowed on board buses to meet social distancing mandates. And it's a way that transit agencies have made use of their vehicles that have been idled by the pandemic.

"You can define the maximum capacity of the vehicle," said Moovit's Meydad. "You can define that it's going to be 10 persons or 20 persons. And once the vehicle gets populated because people prebooked for seats, you can actually prevent others from booking."

Moovit introduced the prebooking feature in its app in Florence, Italy, working with transit authority there. Customers prebook their seats and get a QR code, which is a boarding "certificate" that customers present upon entering the bus

and confirmed by visual inspection by the drivers. If they try to prebook a seat that is already out of capacity, the system will refuse the booking.

Moovit has introduced something similar in its home base of Israel with Israeli Railways, with a voucher appearing in the Moovit app for customers who prebook,

> *"How long the, let's say this slow dance towards normal, is going to be, is hard to predict,"*
>
> **Sampo Hietanen**
> CEO and co-founder,
> MaaS Global

allowing them to enter the train station. While riders need to buy tickets separately with these services, the prebooking could be combined with ticketing, said Meydad.

"We see this as something that probably will remain relevant in the future," he said. "And it also gives the transit agencies the ability to be very flexible in the number of passengers that are allowed. Sometimes the law gets changed. Sometimes you're allowed 20 passengers in a specific train car, sometimes it's 50. So you can configure it as an operator and it immediately gets updated."

Slow Dance Toward Normal'

Sampo Hietanen, CEO of Finland-based MaaS Global, whose pioneering Whim app offers subscription, as well as pay-as-you-go, MaaS options, said some months ago that he's confident that public transit will come back.

But that won't necessarily be because such measures as social distancing or that touch-free ticketing will encourage wary riders to return, he said. Usage will return simply because people still want to live in big cities, where mass transit is one of the few viable means of transport for the main portion of their journeys.

But Hietanen, speaking to *Mobility Payments'* sister publication *NFC Times* last year, just after the height of the daily pandemic case counts and deaths had hit Finland, noted that use of public transit was down and bike and other micromobility subscriptions were up–enough to cover the lost public transit subscriptions.

Hietanen added, however, that after offering half price public transit-based subscriptions, the start-up received more commitments from customers to sign up for mobility plans than it had earlier lost to the pandemic.

Of course, it was still too early to tell just when public transit would fully come back, but Hietanen's early take on the aftermath of the pandemic was that customers would want a mix of multimodal options in MaaS Global's subscription plans.

"What I think for sure is that people have gotten more familiar with all modes of transportation–that it isn't just my own car or bus or train. Now it's the micromobilities, the bike share, all kinds of new methods, and even walking," he said, adding:

"I'm a big believer that this is how it is going to end up. How long the, let's say this slow dance towards normal, is going to be, is hard to predict." MP

By the Mobility Payments staff

More Major Transit Agencies Launch Virtual Closed-Loop Cards

CLOSED-LOOP PAYMENTS

More transit agencies are launching virtual versions of their closed-loop fare cards, working with the major Pays wallets

While the move to open-loop fare collection by transit agencies gets a lot of attention, some major agencies have been shunning the idea of accepting bank cards for fares while expanding ways their customers can pay with well-established closed-loop fare cards.

Over the past year, some large transit agencies in North America, Asia and Europe–working with major Pays wallets–have introduced mobile and wearables fare payments with closed-loop cards, including in Los Angeles, Washington, D.C., Chicago, Hong Kong, Tokyo, Slovakia and the UK county of Tyne and Wear. That adds to closed-loop cards that the Pays wallets, such as Apple Pay, Google Pay and Samsung Pay, already supported in China, Japan, the U.S., Australia and elsewhere. (See table on P43).

One of the latest agencies to enable customers to pay with their devices is the Metropolitan Transportation Commission, or MTC, serving San Francisco and the nine-county Bay Area region, which in May 2021 announced the launch of the closed-loop Clipper card on Android smartphones supporting Google Pay. It had added Apple NFC-enabled iPhones and Apple Watches the previous month. The launches include technology from NXP Semiconductors and Cubic Transportation Systems.

Spate of Virtual Card Launches

The Pays wallets, led by Apple, accelerated the pace of support for closed-loop cards starting in 2020, especially in the U.S. Transit officials noted last year that concerns about the Covid-19 pandemic influenced their decisions to introduce mobile payments and enabling reloading of their closed-loop cards in apps. They said the virtual cards would reduce interaction between customers and transit staff and vending machines.

But the support for the closed-loop cards by the Pay wallets had already been in the works. For example, Apple had announced plans to support the closed-loop Ventra

card in Chicago with its NFC-enabled iPhones and Apple Watches in March 2019, but the launch didn't happen until late October 2020.

Apple had launched closed-loop cards on Apple NFC devices a month earlier with two other U.S. transit agencies. The Los Angeles County Metropolitan Transportation Authority, or Metro, said customers with Apple Pay could pay fares with a virtual TAP card issued by the agency. In the same week, the Washington (D.C.) Metropolitan Area Transit Authority, or WMATA, announced it had put its SmarTrip closed-loop card on Apple's NFC-enabled devices, as well.

WMATA at the time had confirmed plans to support Google Pay and did so earlier in June 2021. The launches of digital closed-loop cards are not only in Pays wallets. For example, Metro in Los Angeles has launched the TAP card in its own Android app.

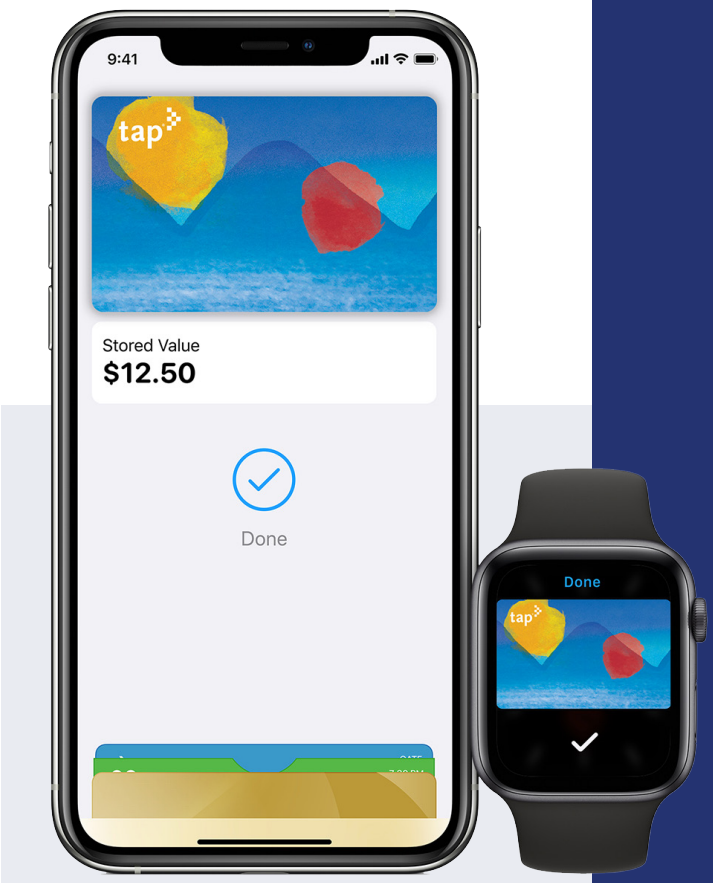
Apple and other Pays wallets are enabling users to tap without authenticating themselves with passcodes or biometrics and for some wallets, such as Apple Pay and at least some implementations of Samsung Pay, users don't even have to wake up their phones, though the devices must be turned on. They also work when the devices have shut down because of insufficient battery power.

Apple offers its Express Transit mode in all cities where it supports closed-loop cards, though not all cities where users can use Apple Pay to pay fares with open-loop credit and debit credentials. The former includes closed-loop cards in Tokyo, Beijing, Shanghai, Hong Kong, as well as Washington, D.C., Los Angeles, Chicago and San Francisco.

Riders tapping to pay fares with open-loop cards or credentials in wallets in London and New York City also can use Express Transit, but not in such open-loop cities as Sydney, Vancouver and the open-loop option in Chicago.

The Pays wallets can dispense with the authentication requirements they have for retail transactions for people paying fares because these transactions are low in value and are pay as you go, not season tickets. The latter would be more expensive and more risky without authentication.

Users must authenticate themselves when they are loading value to the cards, of course. The transit agencies usually enable users to add the virtual cards and reload them with value in both the Pays wallet and in a separate agency app. Users usually need to purchase transit passes in the separate app, in the U.S. In addition, for



Metro in Los Angeles, like WMATA in Washington, D.C., and Octopus in Hong Kong, launched their closed-loop cards on Apple NFC devices, but have no immediate plans to support open loop payments.

such agencies as Metro in LA, users can buy passes for bike share with their virtual closed-loop cards.

And Google plans to enable users to begin the purchase of digital versions of closed-loop fare cards directly in its trip-planning app, Maps, though the actual transaction, loading of value and storage of the cards will be in Google Pay.

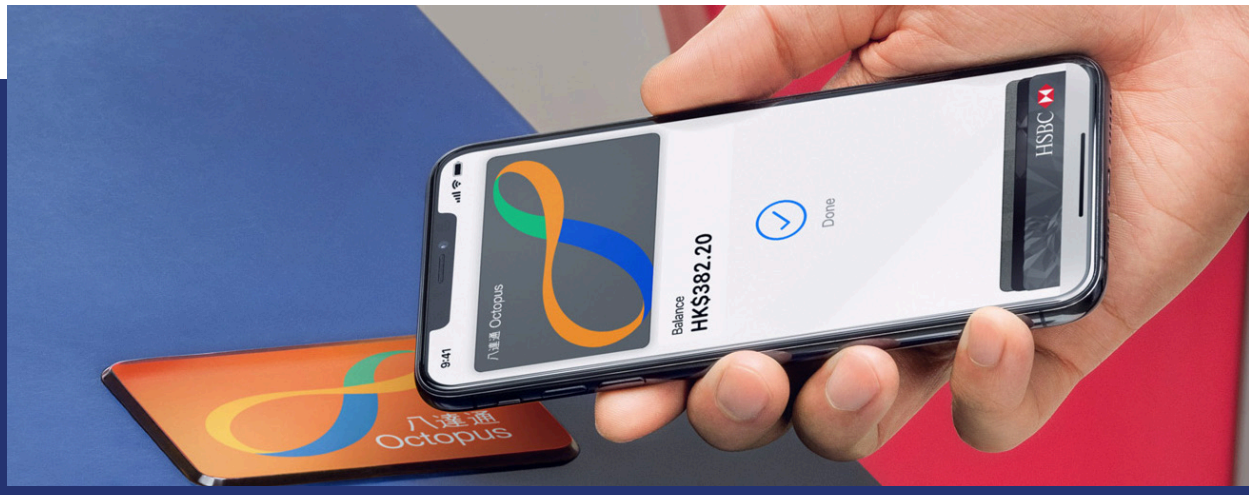
No Hurry to Support Open Loop

Some of the largest agencies in the U.S., including Metro, still appear to have no immediate plans to support payments of fares with contactless EMV credit and debit cards or bank card credentials on NFC devices.

"Open payment is a capability that will cost money to develop and includes parameters that make equity more difficult for our seniors, disabled, students and low-income riders," a Metro spokesman told *Mobility Payments,* referring to fare payments with contactless EMV bank cards.

That policy runs counter to a general trend for large transit agencies to move toward accepting contactless EMV payments, following high-profile launches of the technology in London and, more recently, New York City, among other places.

In addition to contactless EMV cards, customers also can pay with their bank card credentials loaded into Pays wallets. But Los Angeles is not alone in snubbing open-loop payments, which is being strongly backed by such payments schemes and Visa and Mastercard, along with banks. MTC in San Francisco earlier decided against supporting open-loop fare payments, at least for the near-term.



Hong Kong's Octopus card supports both Samsung Pay and, more recently, Apple Pay.

Instead, like Metro, MTC is focusing on its closed-loop payments card, Clipper, which is undergoing a $400 million-plus revamp by automated fare collection system vendor Cubic, including a 10-year operating agreement. And WMATA in Washington, D.C., while planning to introduce open-loop acceptance more than five years ago, cancelled the project.

In addition to saying the option is expensive, the U.S. agencies that are balking at open-loop note that it does not eliminate the need for maintaining their separate and established closed-loop cards for customers who have no bank cards or don't want to use them to pay

Suica in Japan was among the first closed-loop fare cards (also used for retail purchases) to be loaded onto Pays wallets, starting in 2016.

fares. Also, it's more difficult to support concessionary fares for senior citizens, students and disabled persons with open-loop cards.

And in such major cities in Asia as Tokyo, Hong Kong and Taipei, where closed-loop fare collection schemes like Suica, Octopus and EasyCard have substantial retail payments footprints. The cards generate revenue and are often used widely to pay for low-value retail, parking fares and also in some cases as an ID card. MP

By the Mobility Payments staff

Major Pays Increase Pace Adding Closed-Loop Transit Cards to Complement Open-Loop Payments

Apple Pay	Google Pay	Samsung Pay
Japan – **Suica, PASMO**	Japan – **Suica**	S. Korea – **T-money, Cashbee**
Beijing – **Yikatong**	Portland, Ore. – **Hop Fastpass**	Singapore – **ez-link**
Shanghai – **Jiaotong Yikatong**	West Midlands (UK) – **Swift**	Beijing – **Yikatong**
China – **T-Union**	Melbourne – **myki**	Shanghai – **Jiaotong Yikatong**
Hong Kong – **Octopus**	Tyne and Wear (UK) – **Pop**	Shenzhen – **Shenzhen tong**
Portland, Ore. – **Hop Fastpass**	Chicago – **Ventra**	China – **T-Union transit card**
Wash., D.C. – **SmarTrip**	San Francisco – **Clipper**	Hong Kong – **Octopus**
Los Angeles – **TAP**	Wash., D.C. – **SmarTrip**	Paris – **Navigo**
Chicago – **Ventra**	Slovakia – **Ubian**	Taiwan – **EasyCard**
San Francisco – **Clipper**	Moscow – **Troika** (planned)	Dubai – **nol** (planned)
Moscow – **Troika** (planned)		Sydney – **Opal** (trial)
Dubai – **nol** (planned)		
Sydney – **Opal** (trial)		

June 2021 Source: *Mobility Payments*

Queensland ABT Project to Give Customers More Ways to Pay

ACCOUNT-BASED TICKETING

Australian transit agency TransLink has been trialing a new account-based ticketing system. The agency says it plans to complete its rollout of the new system across the state by the end of 2022.

A new account-based ticketing system under development for Brisbane and the Australian state of Queensland represents one of the latest rollouts of account-based ticketing, a technology expected to eventually replace most card-centric fare collection systems globally.

Plans call for the Queensland project to be fully rolled out by the end of 2022, despite the challenges of working through the Covid-19 pandemic, according to transit agency TransLink.

The AU$371.1 million (US$278.7 million) Smart Ticketing project will enable TransLink to calculate fares in the back office, not on the card and terminal, giving the agency more flexibility to introduce a range of payments types or "tokens" for customers to use. That will include contactless EMV credit and debit cards, smartphones and wearables and TransLink's existing closed-loop payments service, the go card, which is being expanded.

The tokens could even include driver's licenses and student IDs, Martin Bradshaw, who heads the project as general manager for passenger transport strategy and technology for the TransLink division of Queensland's Department of Transport and Main Roads, told *Mobility Payments* and its sister publication *NFC Times,* through a spokesman. The state has already added contactless chips to its driver's licenses.

"This flexibility also extends to the delivery of new products, which can be built and applied to customers' accounts, opening the way to expansion to additional mobility providers," said Bradshaw through the spokesman, speaking in recent months. This means that the planned Smart Ticketing system could one day enable payments for such third-party mobility providers as bike and scooter rental agencies and car-share companies as part of a mobility-as-a-service platform.

Queensland, Australia, transit agency TransLink is trialing a new account-based ticketing system. The agency says it plans to complete its rollout of the new system across the state by 2022.

> *"This flexibility also extends to the delivery of new products..."*

Customers will also be able to continue to use paper tickets to pay for public transit.

U.S.-based Cubic Transportation Systems is building the new fare system. Cubic had implemented the go card, which launched in 2008, and the automated-fare collection company continues to operate and maintain the card-based system. The card now serves Southeast Queensland, the most populous region of the state and home to its largest city, Brisbane. The contract for the new Smart Ticketing system also includes operations and maintenance by Cubic.

Replacement Cycle Key

The go card infrastructure needed to be replaced, which is probably one of the main reasons the Department of Transport and Main Roads went for an account-based ticketing system with full replacement of more than 14,000 card readers on board buses and at train and ferry gates.

14,000
card readers on buses, gates

By comparison, the upgrade by Transport for New South Wales of the fare-collection system serving Australia's largest city, Sydney, and the surrounding region to accept contactless EMV credit and debit cards and NFC devices is not a full account-based system. Instead, it's a hybrid system, which, in effect, bolted certified contactless EMV readers onto the existing closed-loop Opal card infrastructure.

While the authority has introduced an account-based "Opal Connect" service to enable payments with registered Opal or bank cards in an app, which can be used to pay for on-demand rides and soon other multimodal transit, it would need to replace its terminals to have a full account-based ticketing system.

Opal, which only began rolling out around eight years ago, has some years to go before the replacement cycle for its terminal infrastructure comes due. Transport for London's high-profile contactless open-loop payments service also forms part of a hybrid system. That system won't go to full account-based ticketing until 2025.

Meanwhile, despite the success of open-loop payments in both Sydney and London, neither authority has plans to phase out their popular closed-loop cards. Transport for New South Wales, in fact, in December launched a trial of a digital Opal card to be used for fare payments with NFC payments services Apple Pay and Samsung Pay. It has another trial planned enabling 10,000 Opal card users to pay for rides with Uber, bike share and other transit modes, with discounts if they also use public transit within the hour.

Contactless EMV payments of fares have proved especially popular in the UK, with Transport for London reporting that contactless overtook its closed-loop Oyster card for pay-as-you-go transactions in mid-2018, only four years after the authority rolled out contactless across its entire transport network. This year,

"Under traditional card-based systems, fare changes can take up to six weeks."

Martin Bradshaw
TransLink's GM for passenger transport strategy and technology

with the pandemic and passenger fears of touching surfaces, use of contactless accounts for up to half of all journeys, including season tickets, according to Transport for London.

TransLink's Bradshaw, in his comments to *Mobility Payments*, said he expects that "over the longer term" a majority of TransLink customers will adopt EMV contactless payments, either with contactless credit and debit cards or with these credentials stored on NFC smartphones and wearables. He cited the ease of use of open-loop payments. Contactless EMV payments are already used for more than 90% of Visa-branded card payments in stores and other retail outlets in Australia.

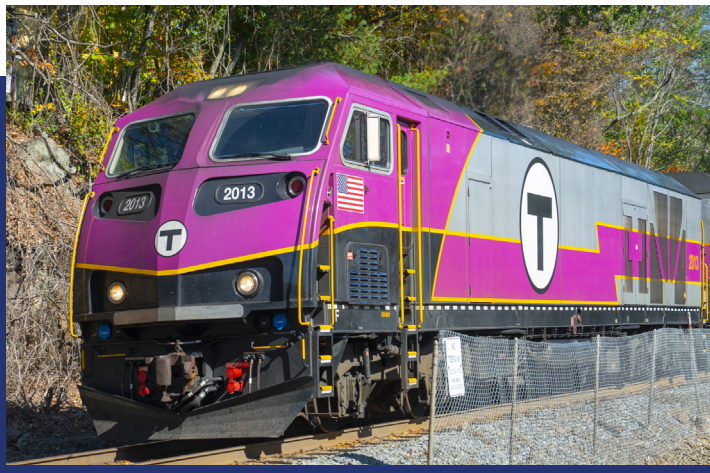
But Bradshaw is emphasizing that TransLink customers will be able to continue to use the closed-loop go card or paper tickets in the new system, if they choose. And with account-based ticketing, the go card will be easier for customers to manage, either on the web or with a planned mobile app. That includes topping up their card accounts and linking accounts among family members. The Smart Ticketing system will also expand acceptance of the go card beyond Southeast Queensland.

The go card will, in effect, become just another token that customers can use to access the system to pay their fares, all calculated on the back end. This will also ease management of fare policy by transit officials, since changes of the policies, issuing of refunds, etc., can be made in the back office.

"Under traditional card-based systems, fare changes can take up to six weeks to be tested and implemented for all device types across the network," noted Bradshaw.

'Innovation We Haven't Dreamt of'

On the other hand, with account-based systems, it might only take hours to process a refund or make other fare changes, said Australia-based automated fare-collection system expert Greg Ellis. With a card-based system, the agency has to load these changes onto all card-accepting terminals and vending machines–large agencies have thousands of these devices in the field. If it's a refund, for example, all those terminals could be waiting for a relatively few cards, or even just one card, to be tapped for the refund.



Boston's MBTA is spending nearly $1 billion on its new account-based fare collection system, which will include new ways to pay for all modes of transport, including commuter rail. Jiawangkun |Dreamstime

"That can be a very large amount of storage for every device waiting for that card to turn up," said Ellis. While terminals and readers in an account-based fare system do need to store blacklists or whitelists to, for example, stop a fraudulent card from being used, these lists require much less memory.

Ellis, speaking at a transport ticketing conference, organized by Asia-based business association APSCA, said that while card-based fare-collection systems,

> ***"Fare changes can take up to six weeks to be tested..."***

which arrived on the scene around 25 years ago, have served their purpose, especially when networks were slow and unreliable, the fare-collection industry is now "on the threshold of a major step change." Transit agencies now routinely tender account-based systems because of the flexibility they offer, including the ability to incorporate payments methods for third-party mobility providers.

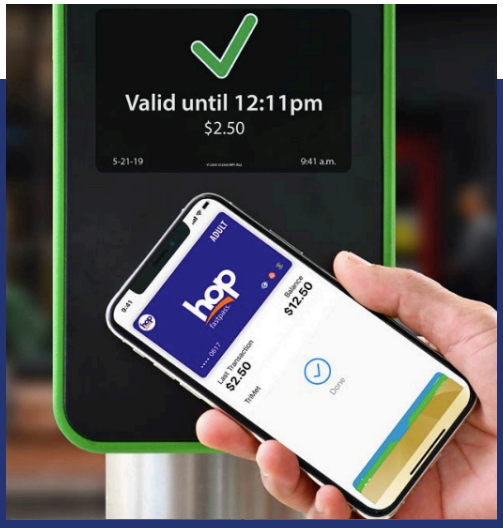
"It (account-based ticketing) really provides the basis for innovation we really haven't even dreamt of up to now," Ellis said. "We've always wanted to provide flexibility to our customers. Account based allows us to do that. Card based is much more difficult."

Offering More Discounts

Without having to rely on validators to load value onto cards, transit agencies can expand their use of online loads, said Lukas Hrdina of Prague Integrated Transport, speaking at a recent *Intelligent Transport* conference. That improves customer service. "The increased mobility of the tickets and the online nature allowed us to increase our sales channels," he said. "Previously, they could buy it in an online shop but they had to go to a validator and load it there. So this wasn't too comfortable for them."

Agencies also can more readily expand the fare discounts they offer, such as senior and student concessions and fare capping and loyalty programs, said Peter Schonewille, global solution lead for transit at UL Identity Management and Security, speaking at the same conference. Besides basing capping on the number of trips or the total amount of fares a customer accumulates in a given day, week or month, agencies also can use the total number of miles or kilometers the customer has traveled. "Of course, this is possible in a card-centric system, as well, but account-based systems make it much easier."

In addition, the ABT technology enables transit agencies to handle payments from third-party mobility providers, such as bike or scooter rental firm, even if they are privately held, using APIs.



TriMet of Portland, Ore., offers both open- and closed-loop payments with its account-based payments system.

And while open-loop payments can help agencies bridge multiple transport modes to offer payments, it is not the only "token" that can be accepted as part of an account-based ticketing system. EMV payments are not necessarily account-based from the transit agency perspective, since credit or debit card-paying customers are often anonymous to the agency.

"We do think the benefit is that software-based and central give us the ability to handle multiple modes in multiple forms of payment," said David Leininger, interim

president and CEO of the Dallas Area Rapid Transit in the U.S., which is going to account-based ticketing with open-loop and other forms of payments. "EMV is one expression of the way you pay. But really, from a transit agency standpoint, ABT is much broader than that."

Global Rollouts of ABT

Transit agencies have deployed account-based ticketing or are in the process of doing so in such major cities as Chicago, New York, Boston, Vancouver and Dallas in North America; Prague and Amsterdam in Europe and Singapore in Asia. Some smaller agencies have been plugging into software-as-a-service platforms, which can offer a form of account-based ticketing and various forms of payments, but the agencies must cede control to the platform provider and can't have truly customized features. Also, the platforms haven't been quite ready to offer open-loop payments.

The rollouts of the large fare-collection systems supporting ABT do not always progress smoothly, however. In Chicago, the Ventra account-based ticketing system was beset by problems after it launched in 2013. It had been rolled out on an accelerated schedule and all at one time, completely replacing the low-end closed-loop Chicago Card. The problems weren't necessarily caused by the back office. New York, which began rolling out its ABT-based OMNY system in May 2019, went more smoothly, after taking a phased approach. Cubic implemented both projects.

And in Boston, the Massachusetts Bay Transportation Authority in June 2020 finalized a "reset" of its overhaul for its fare-collection system by agreeing to increase its vendor contract with Cubic by nearly 30% to just over US$935 million and to add two more years to the rollout schedule–all in hopes of getting the project back on track.

Singapore's Land Transport Authority trialed what it then called its 'Account-Based Ticketing System" in early 2017, with open-loop payments–a first in Asia. *Tanteckken | Dreamstime*

Australia Plans Phased Rollout

In Australia, TransLink's Smart Ticketing project is introducing the new system to the nearly 40 transit operators it oversees, including 17 regional bus operators outside Southeast Queensland.

TransLink launched a trial of the system in April 2020 on the G:link tram network serving the Gold Coast area south of Brisbane. The trial initially tested use of the go card on new terminals before expanding to EMV cards and devices in December 2020. From then until early March, TransLink said riders on the relatively lightly traveled tram network tapped their EMV cards and NFC-enabled phones and wearables for 60,000 trips.

The agency plans to progressively roll out the Smart Ticketing system by transport mode across Southeast Queensland and 18 regional population centers by 2022. Officials say they are using a phased approach to make sure the system works well before moving to the next phase. MP

By the Mobility Payments staff.

Taiwan's EasyCard Corp. launched its long-anticipated e-payments service and wallet in 2020, behind rivals.

Taiwan's Dominant Transit Purse Struggles with New E-Payments Landscape

TRANSIT WALLET

EasyCard Corp. remains the dominant contactless stored-value card in Taiwan, boasting market shares of nearly three-quarters of transit fare payments and retail transactions nationally amid competition from three other contactless closed-loop cards that vie for transit and low-value retail transactions across the island nation.

But competition is changing in Taiwan and in other Asian countries where e-purse payments providers have used their base of millions of mass transit-riding cardholders to expand into retail and other markets. EasyCard Corp. provides an example of the challenges these providers are facing.

For EasyCard, the Covid-19 pandemic, which cut fare revenue substantially in 2020 and again in May and June 2021, is occurring at a bad time for the company. EasyCard had already been seeing slow to nonexistent growth in retail transaction volume with its cards before the pandemic and that has turned to low single-digit decreases for some months.

What's more, EasyCard was late to the market in launching its e-payments service and wallet and faces an uphill climb to catch its rivals. At the same time, it has been unable for years to gain support for its closed-loop fare card with Apple Pay, by far the most popular NFC Pays service in Taiwan.

Ivan Chiu, deputy head of corporate strategy and administration for EasyCard discussed the company's digital initiatives and strategy during a session of the Next-Generation Cards Virtual Global Summit & Expo organized by Asia-Pacific business association APSCA.

Chiu noted that revenue for the payments company, which is partly owned by the city of Taipei and the city's MRT, or subway operator, Taipei Rapid Transit Corp., was hit hard by the pandemic. Transit ridership plummeted the first time in March 2020.

The company in the spring of 2020 launched a long-anticipated virtual EasyCard in the Samsung Pay wallet, following much development work and delays. The implementation was a significant technical achievement because EasyCard still largely uses low-end Mifare Classic for its cards and readers. The Samsung implementation stores EasyCard on a chip in a number of Samsung NFC phone models, including the Galaxy S8 and Note8 and later.

Samsung Pay, however, is not very popular in Taiwan, especially compared with Apple Pay. Yet EasyCard has been unable to get

its closed-loop card adopted by Apple for the latter's payments service, which launched in Taiwan in March 2017. That is despite interest by Apple in enabling closed-loop contactless fare cards in its wallet, which it has done in Japan, China, Hong Kong and the U.S. (The launch of the FeliCa-based Octopus card in Hong Kong by Apple in June 2020 was notably more than two years behind the launch of Octopus for Samsung Pay.)

Chiu acknowledged during the question-and-answer session that EasyCard has been talking to Apple for years. He didn't say why there is still no EasyCard in Apple's wallet. But a source told *Mobility Payments* he believes it's mainly a technical problem of putting EasyCard's low-end Mifare application on Apple's secure NFC chips. Other closed-loop fare cards that Apple Pay supports run on microprocessor chips.

And the EasyCard implementation with Samsung Pay is not without its problems. While the coupling between the phone and metro gate readers is strong and works even when the phone is out of battery power, that's not the case for readers at reload machines in stations, which barely read the virtual cards. In addition, a technical glitch combined with onerous government regulations makes registering a bank account for over-the-air top-ups difficult.

In any case, Chiu said he believes that for consumers, it "takes a long period to move from the card to the phone to make payments." People mainly use their phones for shopping, to access the internet, use social media and other network-based functions, he noted. On the other hand, most consumers continue to see stored-value cards as the most convenient way for paying for fares and small retail purchases.

Unlike in the West, electronic (contactless) stored-value cards, usually built off a base of transit fare collection, are used often in developed markets in Asia for low-value retail transactions. In addition to EasyCard in Taiwan and Octopus in Hong Kong, other examples include Suica in Japan and Tmoney and Cashbee in South Korea.

EasyCard, which launched 20 years ago, has more than 87 million cards on issue–nearly 10 million of which are used each month. EasyCard has steadily added to the range of uses for its cards over the years, including enabling users to pay for fares on four MRTs in Taiwan, as well as on buses and for national rail, high-speed rail, taxis, parking and bicycle rental. Thanks to interoperability pushed by Taiwanese officials, most transit operators can accept three other commercial stored-value cards, iPASS, icash and HappyCash.

EasyCard also can be used for certain ID functions in Taiwan, including as a library card. And it's accepted at thousands of merchant locations in Taiwan. The three other e-purses are also accepted at many of the same retail chains, such as at Taiwan's ubiquitous convenience stores.

But EasyCard is the most widely deployed e-purse by far and according to Taiwan's financial regulator, the FSC, Taiwan's EasyCard cards were used for NT$5 billion (US$175 million) in retail purchases in April 2021. That amounted 74.4% of retail sales from all stored-value cards in Taiwan. Volume was up that month from 2020, but had dropped slightly from the previous month. The impact of the pandemic probably explains at least part of that dip. But EasyCard has been experiencing weak growth in monthly retail sales volume for at least the past few years.

Pressure to Launch E-Wallet

Its stagnant retail transactions and limited growth potential for fare-based revenue

no doubt increased the pressure on EasyCard to launch an e-payments service and wallet–in order to stay competitive in Taiwan's tech-savvy, smartphone-obsessed market.

That would include a QR code-based e-payments service because while many merchants, especially small shops and night market vendors, don't accept any type of cards for purchases, some do accept QR codes. It would also include peer-to-peer funds transfers and expanded online payments.

Among those growing impatient for the new wallet were politicians in Taipei City, which has a controlling interest in EasyCard's Corp's parent company. EasyCard finally launched its Easy Wallet in 2020, after receiving an e-money license from regulators.

EasyCard's Chiu touted the move during his conference presentation in December, noting that the wallet expands EasyCard reach from cards to the mobile phones. "You can (send money) peer-to-peer or scan to pay in the retail sector," he said. "And with a token card system, you also can touch and go to take the MRT or buses with your Android phones. Moreover, you also can top up your EasyCard on your phone."

The Easy Wallet launch had followed years of trials and initiatives by EasyCard to introduce mobile payments, with the first mobile NFC trial involving EasyCard dating as far back as late 2007.

More than 10 years later, EasyCard was still experimenting with ways to bring mobile payments to customers, even trying out Bluetooth low energy to transmit payment details to terminals, before dropping the idea. A rollout of EasyCard on NFC SIMs issued by telcos a few years ago also fizzled out because of poor adoption by customers.

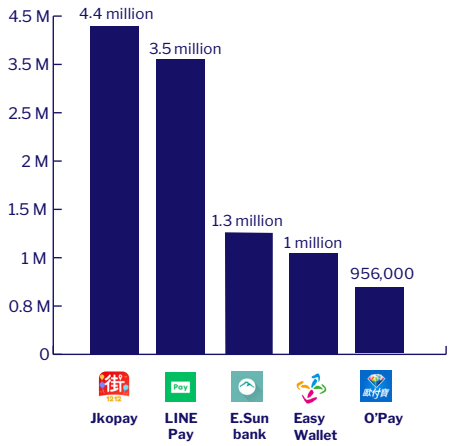
Late to the E-Payments Party

The move to open-loop fare payments in in Taiwan's capital, Taipei, has failed to gain much traction. That's perhaps because of the city's major stake in EasyCard Corp., which would likely lose revenue to bank-issued cards. The much smaller subway system in Kaohsiung, Taiwan's third largest city, does accept open-loop payments; as does the separate MRT network serving the country's major airport in Taoyuan.

It remains to be seen whether EasyCard will be able to catch up in the e-payments market, where it is very late to the party. Although it is seeing significant growth in transactions, after more than a year, the Easy Wallet still ranks fourth in number of users with a little more than 1 million, as of April 2021, according to the FSC. That is well behind leaders Jkopay, with 4.4 million users; and Line Pay Money, part of Taiwan's popular instant messaging service Line Corp., with just over 3.5 million users. Line announced an investment and tie-up

Top 5 E-Payments Apps in Taiwan

No. of Users



Mobility Payments Source: FSC for April 2021

with Kaohsiung-based IPASS Corp.–one of EasyCard's main rivals–in late 2017.

Line Pay, which officially launched in Taiwan in 2015, has been among the top e-payments providers in Taiwan. Line Corp. Taiwan said more than a year ago that it had 164,000 in-store and online merchants and service providers signed up to accept its QR code-based payments, which totaled just over NT$1.8 billion (US$64.7 million) sales volume for April 2021. Jkopay had just over NT$2.5 billion in retail sales volume. Together, they had more than 60% of all e-money retail payments in Taiwan for the month.

By comparison, Easy Wallet had NT$404 million in retail and related e-payments business in April. While that has been growing, it amounted to just 5.7% of total e-payments at retail for the month.

EasyCard would be well-placed to take advantage of its dominance in the transit fare payments market, and its Easy Wallet is supposed to enable users to tap their phones to pass through metro turnstiles and pay for fares on board buses. But it seems that the feature works infrequently, unless users have a Samsung phone and can load their card in Samsung Pay wallet, which can establish a link to the Easy Wallet.

EasyCard also has a problem when it comes to expanding use of the wallet abroad.

Line Pay Taiwan said shortly before the pandemic that it was planning to launch cross-border payments for Taiwanese consumers traveling to other countries where the Line app is popular, Japan and Thailand, as well as South Korea.

So far, EasyCard is offering only one cross-border payments service for Taiwanese cardholders who travel—once Covid-19 travel restrictions are lifted–to Okinawa, Japan. EasyCard's Chiu said there would be other cross-border deals focusing on EasyCard cardholders who don't have credit cards or prefer not to use them.

He acknowledged the changing landscape EasyCard is facing, with the past two decades seeing the company expand from fare collection to retail payments and now to account-based e-payments. He said there are plans to cooperate with more digital and financial payments providers, although he didn't elaborate.

The stakes are high, and if EasyCard does not adapt to the fast-changing world of digital payments, it could eventually find itself relegated to the role of a government-subsidized provider of fare payments, nothing more. MP

By the Mobility Payments Staff.

Taiwan's EasyCard launched its virtual card with Samsung Pay last year.

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