

ADDING OPEN PAYMENT TO YOUR **FARE MEDIA MIX**

A GENFARE WHITE PAPER

GENFARE 

Preface

Genfare prepared this white paper in 2022, and updated it in 2024, to address questions transit agencies are likely to ask as they consider whether to accept open payment media:

- What is open payment?
- How does open payment work?
- Why should my agency accept open payment on the bus?
- How can my agency securely implement open payment acceptance?
- What does open payment acceptance cost?
- What is the best way to integrate open payment into my agency's long-term plans?



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Introduction: Open payment is rapidly becoming the standard of fare collection



Open payment may be the most significant change in fare collection since the introduction of agency-issued smart cards more than 20 years ago. The adoption of contactless payment bank cards and mobile wallets, coupled with the availability of onboard cellular data technology for transit vehicles, has made possible a new era in North American fare collection.

Open payment enables riders to pay transit fares with the same credit and debit cards and mobile wallets they use for other purchases. These “tap and go” media are ideal for transit because using them is convenient, fast, and secure. There are two main methods of making open payments:

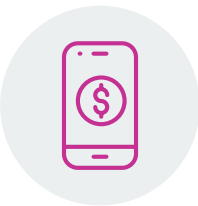
Contactless EMV bank cards

cEMV bank cards are one of two kinds of EMV (chipped) bank cards. Unlike contact EMV bank cards, which must be inserted into a card reader, cEMV bank cards, identifiable by a “radio wave” symbol, are simply tapped on or waved over the card reader target. Through near-field communication (NFC), a form of short-range radio, the reader extracts the card’s data, a process taking a half-second or less.

In 2022, more than 93 percent of card payments worldwide were made using EMV chip cards – that number is surely higher today. cEMV technology, which has become the standard for all major payment card brands, is the primary reason open payment is now practical for transit.

Mobile wallets such as Apple Pay, Google Pay, and Samsung Pay

Riders first link a credit or debit card account to their device’s mobile wallet, then make payments by presenting their device to the card reader on an appropriately equipped farebox or validator. The mobile device is read via the same NFC technology used by cEMV bank cards.



Riders expect open payment

Contactless payment media was already in wide use abroad but was relatively new to the U.S. in 2020 with the arrival of COVID-19. The pandemic accelerated adoption of the technology as consumers quickly developed a preference for low-touch payment methods to reduce the potential for virus transmission. The number of open-loop EMV cards used in transit ticketing in the U.S. has risen rapidly from 1 million in 2020 to a predicted more than 13 million in 2025.

Most large retail chains, independent retailers, restaurants, and service providers using modern payment technologies now offer contactless payment, making the technology familiar to consumers and easy to introduce to riders. In addition, cEMV is now the default for debit and credit cards issued by major banking and credit card institutions.

Riders like open payment because it simplifies the transit experience. Riders don't have to figure out fare structures, know where to get a transit card, download an app, or make sure they have the right amount of bills and coins on hand. They just get on the bus and tap their bank card or scan their mobile wallet, and rest assured they are paying the right fare with the payment method they already have in their pocket or wear on their wrist. Making it easy for riders to pay the fare – especially tourists, first time riders, or occasional riders – removes a significant barrier to transit use and boosts ridership.

With an estimated 12.8 billion EMV cards and mobile wallets in circulation in 2022, and likely more today, open payment clearly has a broad appeal.

As many benefits as open payments provide to riders, they present an even bigger opportunity for transit agencies to streamline their operations, reduce costs, and increase ridership and revenue.

Genfare believes the simplicity of open payment technology will eventually make it the primary form of transit fare payment.



88%
of people
say they expect a
contactless payment
option from their local
transit agency.

(Enghouse)

The benefits of open payment

“Three really big things happen when a transit agency goes to open payment,” says Vicky Tuan, Product Manager at Genfare. “One is the cost of cash collection goes down when less cash is collected. The next is reducing dwell time, which increases route efficiency. The third is that it increases opportunities for frictionless travel across borders or modalities with greater interoperability. These benefits, along with a few others, have major impacts.”



Vicky Tuan
Product Manager

Decreased cash collection

Collecting, validating, sorting, counting, and transporting cash is expensive and time consuming. For every dollar bill a rider inserts into a farebox, it costs the transit agency 10 to 50 cents to process it. As an ardent supporter of equitable mobility, Genfare does not recommend eliminating cash fares, but rather encouraging riders who have the ability to purchase electronic fares to do so.

It's clear that reducing the amount of cash collected by adopting open payment has many operational benefits to the transit agency, including:

Reduced maintenance of hardware

Most of the moving parts in a farebox or ticket vending machine are involved in the handling of bills and coins. Rollers and hoppers need regular cleaning, maintenance, and parts replacement to deal with the degraded bills, sticky coins, and the various flotsam that gets dropped into fareboxes from the bottom of the riders' pockets or purses. And that's not even considering fixing the jams that may occur when a crumpled bill or foreign object gets dropped into a farebox. Less cash coming in means lower maintenance and parts replacement costs, and less time a farebox is out of service.

Fewer trips through the vault lane

Imagine how much faster buses could return to the garage if they only had to have their fareboxes probed and emptied once or twice a week instead of daily. That means more time on the road, transporting passengers.

Paying with cash upon boarding takes 4.5 seconds.

Tapping a screen ⌚ **2.75 sec**

Swiping a card ⌚ **5 sec**

Better security

There are many places in the cash handling process where money can go missing, whether by theft or accidentally. When using open payment, every cent is accounted for, and no humans are touching the money. Today's encryption and tokenization methods are extremely secure, reducing the risk of a credit card data breach.

Faster access to revenue

Even when fareboxes are emptied daily, it can take a couple days before the cash is processed and banked. This keeps cash revenue and reporting lagging behind closed-loop cards and open payment transactions. With open payment, payments are processed in frequent batches and are available the same day, often within hours of when the card gets tapped.

Less staffing pressure

Transit agencies are challenged with filling open positions while anticipating a wave of retirements in the coming years. The less money there is to count and move, the fewer people agencies will need to staff the counting rooms, allowing them to focus on filling customer-facing positions from the limited pool of candidates.

Reduced dwell time

Statistics on dwell time suggest that approximately half the time a bus is in service is spent on boarding. When riders aren't searching their pockets for and inserting individual bills and coins, and drivers aren't answering questions and addressing issues related to cash collection, more time can be spent moving. Open payment is tap (or scan) and go, allowing riders to board faster and cutting back on driver interaction with passengers.

Reducing dwell time shortens the time it takes a bus to complete its route. This in turn, makes it possible to run the route more frequently without adding buses, increasing the capacity for riders as well as making the bus a more convenient and attractive choice for riders who have other options. The overall impact is increased ridership and revenue.

Greater interoperability

Open payment and the software that supports it simplifies the connection of adjacent transit agencies, bike and scooter share, parking, and other modalities that move riders along their journeys. When riders can easily and conveniently pay for first-mile/last-mile modalities or transfer from an urban transit agency's bus to a suburban bus or regional commuter rail without needing a wallet full of smart cards that don't talk to each other, the providers can more easily coordinate discounts, incentives, and trip planning. And that translates to increased ridership and while not adding the administrative burden of shared fare media.



5 more benefits of open payment

The reasons for transit agencies to adopt open payment go well beyond reducing cash and dwell time and increasing interoperability. It all adds up to a compelling reason to introduce open payment as soon as possible. By adopting open payment, your agency will:

1. Reduce reliance on fare media

As riders adopt the use of open payment fare media, the cost and overhead associated with the maintenance of agency-issued closed-loop smart cards or other fare media issuance will decline. With open payment, banked customers will no longer need to use dedicated fare media, so not only will you need to buy fewer cards, but your workers can also spend less administrative staff time distributing cards and performing customer service functions.

2. Have fewer discrepancies

Records of open payment transactions are logged in real-time and reported back frequently. The fares collected will more closely align with the ridership data. If something is off, administrators will know well before the bus returns to the depot for probing.

3. Easily apply fare structures

When a rider uses the same bank card or mobile wallet for every ride, **fare capping** and other fare structures can be applied just like they are with a smart card. This means riders can be assured they are paying the lowest fares for their rides.

4. Conduct real-time monitoring

Genfare Link, the software that supports open payment, is connected to the cloud, allowing for regular updates and security patches to be applied. Data is also connected continuously, so you can see irregularities or discrepancies on a route instantly and react accordingly. Genfare Link uses a buses' existing Wi-Fi router or CAD/AVL connectivity to transmit data in real time.

5. Reduce driver interaction

Open payment systems require just a tap or scan and communicate acceptance of payment with their displays and sounds, letting the driver focus on driving and not assisting passengers with paying their fares. The only time the driver may need to press a button with open payment is for the approval of student, senior, or other discounted fares.



How to adopt open payment



The standard approach for accepting open payment media is defined by the major payment card brands. This procedure allows rapid boarding while keeping cardholder data secure and minimizing the impact of denied cards. Here's how it works in the Genfare solution.

1. Confirmation

When a cEMV bank card or mobile wallet ("the card") is presented to the card reader on a farebox or validator, the reader confirms the card is authentic and checks it against a locally stored "deny list" of declined cards. If the card passes these tests, the rider is allowed to board, even though the transaction hasn't yet been approved by the issuing bank.

2. Encryption

Meanwhile, the reader encrypts sensitive cardholder data (card number, expiration date, etc.) using an encryption key. The encrypted transaction is then sent to Genfare Link®, Genfare's cloud-hosted central data system, which passes the encrypted transaction to the payment gateway. The gateway uses a matching encryption key to decrypt the data and send the transaction request to the issuing bank for authorization. It also tokenizes the transaction for tracking purposes in Genfare Link.

3. Acceptance

The issuing bank returns an accept or decline message to the payment processor, which relays it to Genfare Link. If the transaction is accepted, Genfare Link records the transaction in a central account database. If the transaction is declined, Genfare Link adds the card number to the deny list, which it broadcasts to all fare collection devices every few minutes. Cards on the deny list go into the debt recovery process next time they are presented. To remove a card from the deny list, the cardholder must pay for rides obtained using the denied card.

Important considerations

Adopting open payment may require infrastructure investment, changes in back-office procedure, and careful planning and implementation. Genfare's open payment solution greatly simplifies the process. Important aspects to consider include:

- ✓ PCI compliance
- ⚙️ Infrastructure upgrades
- 💰 Payment processing

PCI compliance

To protect cardholder data, agencies accepting open payment media must comply with the Payment Card Industry Data Security Standards (PCI DSS), which are mandated by the major card brands. PCI compliance is a serious matter – businesses that fail to comply may have their merchant services agreement suspended or revoked and may put themselves at risk of fines or legal action. A crucial step is procuring a fully PCI-compliant payment solution.

However, that's not necessarily the only step. If an agency has electronic payment processes that don't involve Genfare – for example, if it accepts credit card payments by phone – those processes must also be certified as PCI compliant. For this purpose, agencies typically contract with a qualified security assessor (QSA) approved by the PCI Security Standards Council. The QSA reviews the agency's procedures, indicates any changes needed to safeguard cardholder data, and certifies the agency as PCI compliant once all standards have been met. Genfare is happy to provide agencies with advice on PCI compliance.

Genfare has obtained and maintains PCI point-to-point encryption (P2PE) certification. This means the hardware and/or software used for electronic payments acceptance has been certified as compliant with the latest PCI standards. Genfare can supply customers with documentation explaining its PCI compliance methodology, which they may submit as part of their own efforts to demonstrate PCI compliance.

Infrastructure upgrades

Open payment on buses is simple for riders and easy for agencies to administer but involves complex behind-the-scenes technology. Fareboxes and validators must be equipped with special card readers, transit vehicles must have an onboard cellular router to support real-time connectivity, and dual ethernet cables are needed to provide direct communication with the central data system. Genfare's open payment solution provides a cost-effective way of dealing with all these concerns.

If your current fare collection hardware is nearing the end of its life, it just makes sense to include open payment technology when you replace it. But if you still have years left on your current fareboxes, you have options:

- Existing Genfare Fast Fare [fareboxes](#) can be upgraded to accept open payments by adding a kit.
- If you have a legacy Genfare farebox and are not ready to invest in Fast Fares, an Open Link Validator can be mounted to a stanchion or pole and connected to the farebox.

To protect cardholder data, a technique called point-to-point encryption (P2PE) is used. This involves:

A card reader installed in the farebox or validator that can read both open payment media and agency-issued (closed-loop) fare cards

An onboard cellular router to enable communication between the fare device and the central office while fares are being collected

Genfare Link, a sophisticated central data system, which routes and records all transactions

GenPay, a payment processing solution that validates electronic payments, collects funds from issuing banks, and deposits them in the agency's account



Genfare is a valued service provider on the Visa Global Registry

The Visa Global Registry of Service Providers acknowledges service providers that have shown their commitment to security by meeting the requirements of the PCI Standard. Genfare takes security seriously and is dedicated to safeguarding the payment industry.

Payment processing

In addition to the capital investment in upgrading or replacing on-vehicle hardware and subscribing to back-office software, open payment acceptance requires ongoing fees:

Infrastructure cost. This one-time upfront outlay varies depending on what infrastructure the agency already has. At minimum, card readers capable of processing open payment media must be purchased for transit vehicles. Agencies not currently using a hosted central data system will need to upgrade to Genfare Link. This involves a one-time set-up charge plus a monthly fee dependent on agency size and what services are provided.

Payment processing fees. Open payment processing involves ongoing fees, which are typically billed monthly. These fees vary widely and can be complicated and confusing. When comparing vendor pricing, agencies should be certain they understand the total outlay required and confirm there are no hidden charges.

Open payment costs

The payment processor serves as the clearinghouse for authorization of payment card transactions. An important consideration in selecting a processor is setup – this can take a year or more if starting from scratch. GenPay, Genfare’s payment processing solution, reduces setup time to a few weeks.

PCI P2PE certification is a demanding process in which each element in the chain of transmission from onboard card reader to central data system to payment processor is rigorously reviewed. If any element is changed, the affected components must be recertified. This has important implications for the choice of payment processor and is a major advantage of GenPay.

Since GenPay has already been certified as PCI P2PE-compliant, it eliminates the need for lengthy certification. Genfare, acting as merchant, offers GenPay to agencies on a submerchant basis. Another advantage of GenPay is that it simplifies fee payment.

For agencies with in-house ticketing programs that also plan to accept open payment, GenPay is an easy, economical way to process transactions through all distribution channels, including smart cards, mobile ticketing, and paper or magnetic cards in addition to cEMV bank cards and mobile wallets.



Q. What happens if the bus travels through areas with spotty cellular service?

A. If the bus loses its cellular connection, riders may still use open payment at the farebox or free-standing validator upon boarding. The confirmation and encryption functions happen locally, so the reader can confirm the payment method is authentic and the associated card is not on the “deny” list, then encrypt the data. The PCI-certified EMV reader will store the encrypted card data and upload it to the cloud for acceptance by the bank when the connection is restored.



The cost advantage of GenPay



Among the advantages of GenPay, compared to other payment processors, are its simplicity and comprehensiveness.

Simple pricing structure. Some vendors charge separately for third-party fees, annual licensing, add-on services, their own transaction markup, and so on. In contrast, GenPay’s pricing structure is simple, consisting of a flat fee based on average ridership volume plus a fixed percentage of the amount per transaction. This charge covers both third-party fees and Genfare’s markup.

Some other vendors also charge a single fee per transaction, but the rate is considerably higher than for GenPay. Genfare imposes no additional charges for licensing and other services, nor is there a minimum annual fee, in contrast to some other vendors.

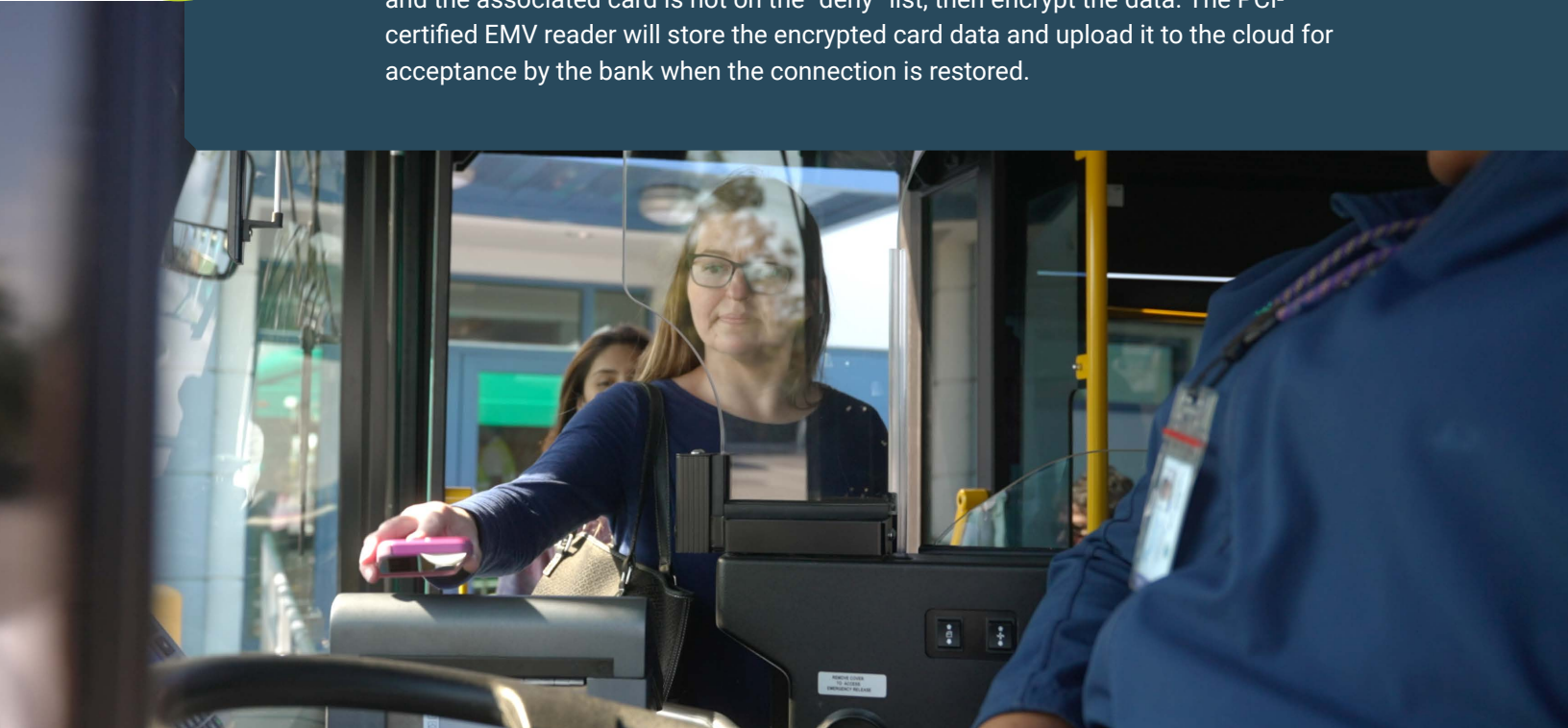
Fixed transaction fees. For other vendors, processing electronic fare payments involves multiple parties, each of which charges a fee per transaction. These fees, which are ultimately borne by the agency, include interchange and assessment fees, payment brand fees, gateway fees, and acquirer fees. Fees can vary

depending on card brand, issuing bank, etc., making it difficult to predict expenses.

In contrast, GenPay absorbs all variation in underlying charges – the transaction fee is solely a function of the payment amount. This makes it unnecessary for agencies to impose fare policies that favor one type of payment card over another.

Single vendor solution for all channels. Many vendors specialize in a particular type of fare collection service, such as mobile ticketing or vending equipment. Agencies offering a range of fare payment channels may be required to deal with multiple vendors and processors, adding to their administrative burden.

Genfare offers the full range of fare payment channels – including fareboxes, vending equipment, mobile ticketing, web portals, and more – with all electronic payments processed through the same service, GenPay. This makes customer service and other administrative tasks much simpler.





Conclusion: It's time to integrate open payment into your transit agency's long-term plans

How Palm Tran added open payment to its fare payment mix

Palm Tran, which serves 28,000 daily riders in rapidly growing Palm Beach County, Florida, recently committed to a complete digital transformation of its transit system. Palm Tran worked with Genfare to upgrade its fareboxes to Fast Fare fareboxes with the open payment functionality enabled alongside cash, smart cards, and mobile tickets. Today's riders can just reach into their pockets and use whatever form of payment they have on hand, making the boarding process stress-free and efficient.

Palm Tran's open payment solution also supports fare capping, which enables passengers to ride for free after they meet Palm Tran's fare equivalent to a daily, weekly, or monthly pass. The fare capping feature makes riding with Palm Tran a more equitable experience for riders who cannot cover the upfront cost of a discounted, recurrent pass or who are unsure about how much they will be riding during the pass period. Having open payment integrated into the fare collection system appeals to existing customers and attracts new ones by accommodating payment options they're already using in other parts of their lives.

This functionality helps Palm Tran quickly adapt to market changes by removing barriers to ridership. Riders don't need to have a Palm Tran smart card pre-loaded, exact cash, or the mobile ticket app downloaded to ride the bus;

open payment will automatically calculate the correct fare amount for them with just a tap of their preferred payment method. Doing so frees tourists and occasional riders from figuring out how to pay for their trip, which simplifies their itineraries, supports schedule punctuality, and encourages them to ride with Palm Tran again.

Palm Tran's digital transformation also included Genfare Link, a cloud-based revenue management system that links all phases of the fare collection cycle into a single SaaS platform. Instead of going to multiple systems to fetch information about the cash management cycle and rider data, Palm Tran can now access a single source of truth that streamlines backend operations and improves the customer experience.

Read more about Palm Tran's experience in [this case study](#).



Agencies considering whether to accept open payment may find it helpful to evaluate their current fare media mix and how they expect it to evolve over time. Points to keep in mind:

- Agencies that currently support in-house electronic fare media, which may include smart cards, mobile ticketing, or both, will likely wish to retain their existing programs while adding the option for open payment acceptance. To accommodate this, Genfare has designed its fare collection systems to accept all electronic media. The same card reader can be used to process closed-loop and open payment cards, and the Fast Fare farebox and Open Link Validator can both process barcoded mobile tickets.
- Agencies that don't currently issue their own smart cards, including many smaller operators, may find open payment lets them accept electronic payment while avoiding some of the investment needed for closed-loop smart cards, such as ticket vending machines or point of sale equipment. The administrative overhead required for open payment acceptance is the same as for any merchant accepting credit or debit cards.
- Agencies that use agency-branded mobile apps may eventually see their use supplanted by payments through mobile wallets such as Apple Pay, Google Pay, and Samsung Pay, but until the direction of the market becomes clear it seems wise to accept both – the capital outlay to accept barcoded mobile tickets is modest.
- Agencies collecting cash or using traditional fare media should not eliminate them when modernizing. Title VI of the Civil Rights Act of 1964 requires that transit agencies receiving federal funding demonstrate that fare collection improvements do not work to the detriment of disadvantaged minorities. At minimum, agencies choosing to accept open payment media will wish to continue taking cash, since a significant fraction of riders do not have bank cards or smart phones. It is also advisable to think twice before discontinuing traditional media such as magnetic cards, which continue to be useful to social service agencies needing low-cost tickets for distribution to their clients.

Components of Genfare’s open payment solution

Genfare’s open payment solution utilizes proven technology on all fronts, including an integrated suite of hardware, software, and services. The latest iterations of Genfare products are designed with interoperability in mind, allowing easy connection with existing hardware and software, no matter which company makes it.



Fast Fare farebox

Genfare’s Fast Fare validating farebox provides secure data processing and communications capabilities and is the ideal platform for open payment acceptance. Existing Fast Fares can be readily upgraded with a new card reader kit that can process both open payment media and agency-issued smart cards.



Open Link Validator

For agencies wishing to retain their older fareboxes, whether furnished by Genfare or another vendor, Genfare can provide its Open Link Validator (OLV). The OLV is a compact, freestanding device that can process open payment media, agency-issued closed-loop smart cards, and QR-coded documents such as virtual tickets displayed on a mobile ticketing application.



Onboard cellular router

The cellular router is usually provided by the agency and used by multiple onboard devices such as the CAD/AVL system in addition to the farebox or validator. The Genfare solution’s bandwidth requirements are modest and a new router generally isn’t needed. However, if desired, Genfare can provide a router and a rooftop antenna for optimal connectivity.



Genfare Link

Genfare Link, Genfare’s fare collection software hosted by Amazon Web Services, is the heart of Genfare’s open payment solution. It communicates at frequent intervals with all vehicles, routes transaction data, stores tokenized payment records in a central database, and provides the administrative interface needed to generate reports, respond to customer service inquiries, and manage the system.



GenPay

Genfare’s payment processing solution, GenPay, is a complete package developed in partnership with Chase Merchant Services, the leading U.S. provider of payment processing services. Chase acts as the payment processor (clearinghouse) for all open payment transactions accepted by Genfare equipment. All elements in the transaction authorization path from onboard card reader to Genfare Link to Chase have been certified as compliant with the PCI P2PE standard.

Genfare Link

Modular. Scalable.

Genfare Link can be all things to any agency because it’s built on a cloud-based, modular platform that adapts to your needs. We’ll collaborate with you design the configuration that makes the most sense for your agency today, then reconfigure as your needs change tomorrow.

Genfare Link modules:



Cash Link

The core configuration. Collect, track, and reconcile cash and coin across the system. Cash Link includes reporting and configuration of fareboxes and vaults.

Open Link

Add open payment, real time asset monitoring, and asset management.

Open Link is available as an add-on to Cash Link and bundles open payment capabilities with a robust asset management system. The Open Link module includes:

- Open payment
- Real-time monitoring/asset management
- Cellular probing
- GenPay payment processing
- Account-based fare media
- Fare capping
- Customer service capabilities

Mobile Link

Add mobile ticketing, trip planning, and customer management applications.

Smart Link

Sell and manage fares across smart cards, point of sale devices, and online customer platforms.

Partner with Genfare

Selecting the right partner to help make your plan a reality is key in ensuring its success. Contact us today for support planning your open payment program.



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