Adding Open Payment to Your Fare Media Mix

A Genfare White Paper

GENFARE

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The introduction 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 fare media, including contactless EMV (cEMV) bank cards and mobile wallets such as Apple Pay, Google Pay, and Samsung Pay, enable riders to pay transit fares with the same credit and debit cards and mobile wallets they use for other purchases.

Open payment promises to be the most significant change in fare collection since the introduction of agency-issued smart cards more than 20 years ago. Contactless payment media are just now being rolled out in the U.S. but are in wide use in other countries. It is easy to imagine open payment media becoming the most common way to pay a transit fare.

As the provider of a comprehensive, easy-to-use open payment solution intended for agencies of all sizes, Genfare has prepared this white paper to address questions transit operators are likely to ask themselves 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?

"At PalmTran we understand the payments marketplace is rapidly evolving and that our riders are going to expect us to accommodate the convenient payment methods they've found useful in other aspects of their lives. That's why we've made the commitment to open payment acceptance while continuing to support our in-house electronic ticketing programs. We want to be ready for whatever direction the market takes."

– Clinton Forbes, *Executive Director of Palm Tran*

What is Open Payment?

In transit, open payment means enabling riders to pay the fare using the same contactless bank cards and mobile wallets they use for other purchases. These "tap and go" media are ideal for transit because using them is fast and secure. Here's how they work:

- **Contactless EMV bank cards.** cEMV bank cards are one of two kinds of EMV bank card, so named because they contain an electronic chip compliant with a standard developed by Europay, Mastercard, and Visa. Unlike contact EMV bank cards, which must be inserted into a card reader, cEMV bank cards, identifiable by a "radio wave" symbol (see illustration), must simply be presented to 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. cEMV technology, which is expected to become the standard for all major payment card brands, is the primary reason open payment is now practical for transit.

Figure 1.Contactless bank card symbol

- **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.

How does open payment work?

The standard approach for accepting open payment media is defined by the major payment card brands. Here's how it works in the Genfare solution (see Figure 1 below):

1. 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. 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 processor. The processor 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. 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 are rejected the next time they are presented. To remove a card from the deny list, the cardholder must pay for rides obtained using the denied card.

This procedure allows rapid boarding while keeping cardholder data secure and minimizing the impact of denied cards. For more detail, see "Infrastructure Upgrades" below.

Open payment offers many advantages to transit agencies and their riders:

- **Riders don't need to pre-purchase agency-issued (closed-loop) fare media and can simply "tap and go."** Although cEMV bank cards are still being rolled out, they will eventually become the standard consumer payment card. First-time or occasional riders can pay the fare with whatever they have in their pockets, removing a significant barrier to transit use and potentially boosting ridership.

- **Same trackability, perks, and customer relationship management opportunities as with agency-issued closed-loop smart card media.** For example, in Genfare's solution, fare capping, in which riders are automatically granted daily, weekly, or monthly passes if they pay for enough single trips within a specified time, can be configured just as easily for open payment users as for riders with agency-issued closed-loop smart cards. Fare capping facilitates equitable mobility, providing all riders with equal access to the benefits of electronic fare payment regardless of their financial resources. Likewise, all open payment transactions are individually recorded, facilitating response to customer service inquiries and tracking of the agency's fare media usage patterns.

- **Reduced fare collection expense.** As riders adopt the usage of open payment fare media, the cost and overhead associated with cash handling and the maintenance of agency-issued closed-loop smart card issuance will decline. That said, many unbanked and underbanked riders will always use cash, and Genfare does not foresee the day when cash acceptance can be dispensed with entirely – see additional discussion in "What is the best way to integrate open payment into my agency's long-term plans?" below.

Early adopters of open payment media on transit are likely to be the same ones who use mobile tickets – visitors, occasional riders, and those interested in new technology. Over time, however, tap-and-go technology will appeal to a wide market due to the security developed around the solution and ease of use. This is especially true of cEMV bank cards and mobile wallets. Within a few years, most people with credit or debit cards will have a cEMV bank card in their possession, and using that card on transit will require no setup whatever – they'll simply present the cEMV bank card to the reader on the farebox or validator and take a seat.

Genfare believes open payment technology will eventually become one of the primary forms of transit fare payment. It offers the promise of simplified fare collection, in which all fare media are provided by third parties and agency-branded ticketing programs are no longer needed. Realistically, that day is a long way off. Nonetheless, contactless payment is certain to become increasingly common and riders will come to expect it. Agencies investing in open payment will enjoy immediate benefits while preparing themselves for the future.
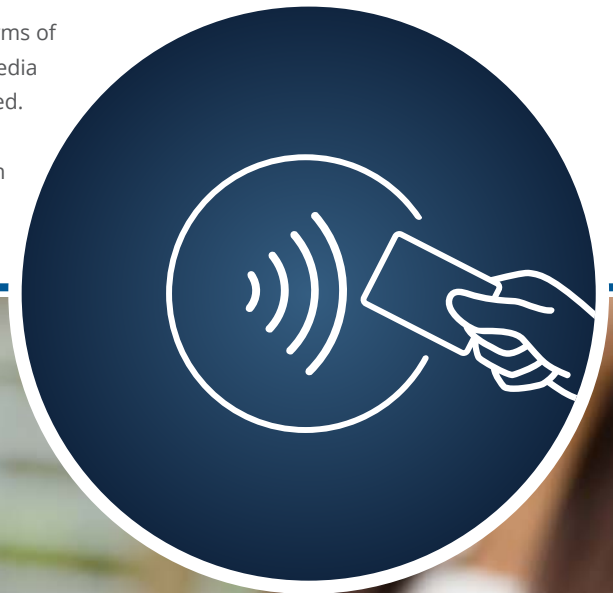
How can my agency securely implement open payment acceptance?

Open payment requires infrastructure investment, changes in back-office procedure, and careful planning and implementation. Genfare's open payment solution greatly simplifies the process. Important considerations include:

- 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. Genfare's open payment solution provides all of the fare collection hardware and services to ensure the solution is PCI certified.

- Infrastructure upgrades. Changes are needed to both onboard equipment and back office systems. Genfare's solution provides all necessary tools, including secure onboard card readers and the Genfare Link central data system. Existing Genfare fare collection systems can be readily upgraded, and systems from other vendors can also be accommodated.

- Payment processor. 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 Compliance

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. An important step is procuring a fully PCI-compliant payment solution from a firm like Genfare.

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.

All Genfare hardware and services used in electronic payments acceptance have 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 and transit vehicles must have an onboard cellular router to support real-time connectivity. In addition, a robust central data system is needed to support efficient handling of open payment transactions. Genfare's open payment solution provides a cost-effective way of dealing with all these concerns.

To protect cardholder data, a technique called point-to-point encryption (P2PE) is used. This involves (a) a special card reader installed in the farebox or validator that can read both open payment media and agency-issued (closed-loop) fare cards; (b) an onboard cellular router to enable communication between the fare device and the central office while fares are being collected; (c) a sophisticated central data system, which routes and records all transactions; and (d) a payment processor, which validates electronic payments, collects funds from issuing banks, and deposits them in the agency's account.
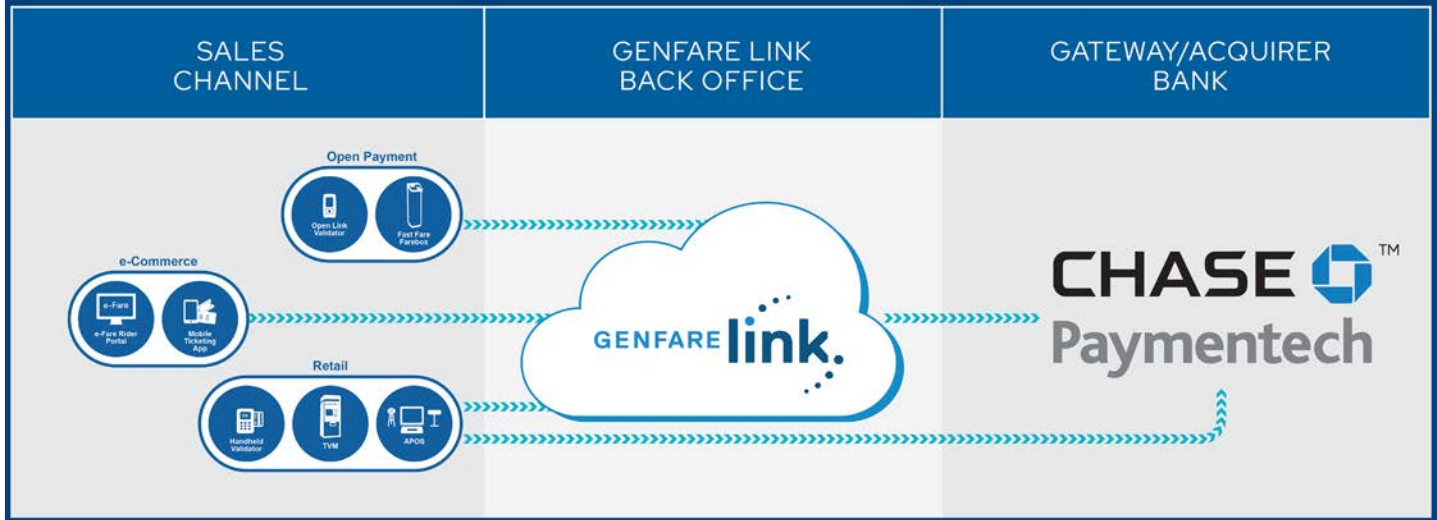
Genfare can provide most of the pieces of this puzzle:

- Farebox or validator. 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.

- 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 Genfare's 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.

- Central data system. Genfare Link, an advanced central data system hosted in the Amazon cloud, 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.

- Payment processor. 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.

Payment Processor

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 entire process must be recertified. This has important implications for the choice of payment processor and is a major advantage of GenPay.

GenPay eliminates the need for lengthy certification. Genfare, acting as merchant, offers GenPay to agencies on a submerchant basis. Since GenPay has already been certified as PCI P2PE-compliant, setup takes just a few weeks.

Another advantage of GenPay is that it simplifies fee payment – see further discussion in "What Does Open Payment Cost?" below.

For agencies with in-house ticketing programs that also plan to accept open payment media, 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. Figure 2 shows the data and money flows for a system utilizing GenPay and the full range of Genfare electronic fare media channels.

What does open payment acceptance cost?

Open payment acceptance involves capital investment plus 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, as described in the preceding section. Agencies not currently using a hosted central data system will need to upgrade to Genfare Link. This involves a one-time setup 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.

Among the advantages of GenPay, Genfare's payment processing service, are its simplicity and comprehensiveness, which eliminate many of the problems encountered in other solutions. These problems include:

- **Complex 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 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.

- **Varying transaction fees.** 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
  - Acquirer fees

Fees can vary depending on card brand, issuing bank, etc., making it difficult to predict expenses. To simplify matters, 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.

- **Separate processors – and separate fees** – for different payment 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 is the only U.S. vendor offering 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.

What is the best way to integrate open payment into my agency's long–term plans?

Agencies considering whether to accept open payment media 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. Many riders will likely adopt open payment media over time but the transition will be gradual. 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.

- Payments through mobile wallets such as Apple Pay, Google Pay, and Samsung Pay may eventually supplant agency-branded mobile ticketing apps, 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.

- 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 minority 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.

Genfare believes open payment is well worth the investment and warrants consideration by all transit agencies regardless of size or technical resources. Genfare's open payment solution offers simplicity and comprehensiveness unmatched by other vendors. Please contact Genfare for more information or to arrange for a demonstration of open payment technology.