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Module 21

Mobile Fare Ticketing/Payment

Graphic courtesy of Regional Transit District - Denver
Instructor

Paula (Polly) Okunieff
Solution Architect
GO Systems and Solutions LLC
Learning Objectives

- Review Electronic Fare Payment (Module 10) and Advanced Electronic Fare Payment (Module 12) concepts
- Define concept of mobile payment
- Describe electronic fare payment business models
- Review Case Studies on emerging trends in implementing fare payment apps
- Understand challenges related to mobile technologies
Learning Objective 1

Review Electronic Fare Payment Systems (EFPS) concepts from Modules 10 & 12

Identify mobile fare within the context of EFPS
Mobile Fare Ticketing / Payment

System Architecture
A set of all components of an Electronic Fare Payment System (EFPS) and the methods used to send information between those components.

Reader may be optional in a Mobile Fare system

Mobile app provides Point of Sales (POS) functions

Fare Media

Examples:
- Contactless Card
- Magnetic Farecard
- Contactless Bankcard
- Mobile Device

Reader

Local Device [Optional]

Examples:
- Faregate
- Farebox
- Ticket Vending
- Depot Computer
- Station Computer
- Retail Terminal
- Ticket Office Machine

Central Computer

Regional Clearinghouse [Optional]

Payment Processor [Optional]

Examples:
- Merchant Acquirer
- Payment Gateway

Source: PCB Transit Module 10
Primary Purpose of the Mobile Fare Payment App

- **Point of Sale**
  - Sell payment products
  - Store payment products (ticket, period pass, stored value)

- **Proof of Payment**
  - Activate fare products
  - Validate access rights for conductor, inspector, operator, or gate/validator device
Mobile Fare Ticketing / Payment

Mobile Payment Systems Operator

Roles and Responsibilities

- Develops and operates a mobile payment system
- **Recruits issuers** and enables integration with their system
- Offers a mobile app and/or mobile wallet to cardholders that enables use of the mobile payment system
- Facilitates virtual card account setup by cardholders
- Performs front end **cardholder identification** (e.g., biometrics)
- Provides front end card data security (e.g., tokenization)

Examples
- Apple Pay
- Google Pay
- Various banks with virtual cards

Source: PCB Transit Module 12
Mobile Fare Ticketing / Payment

Growth of Mobile Devices and Mobile Fare Payment Apps

% of U.S. adults who own the following devices

PEW RESEARCH CENTER

Who owns cellphones and smartphones

Source: Pew Research- Mobile Fact Sheet (2020)
Mobile Fare Ticketing / Payment Features

Current Mobile Fare Payment App Characteristics and Features from Transit Cooperative Research Program (TCRP) Synthesis 148

App characteristics:
- Mobile platforms and devices
- System Status
- Transit Modes using mobile apps
- Fare Products offered
- Regional Integration
- Accessibility features

App features/functions
- Activation
- Validation approach
- Customer facing features
Mobile Fare Ticketing / Payment Features

Mobile Fare Payment App Characteristics

- Mobile platforms/devices
  - 100% responded with Android and iPhone/iOS

- System status
  - 77% (48) responded that the mobile fare app is a permanent deployment
  - Significant number of agencies launched fare app in 2017 (31%)

- Transit modes accepting mobile payment
  - Bus 84%
  - Demand responsive 29%
  - Commuter / light rail 24%
  - Ferry 11%
  - Heavy rail (subway) 2%
Mobile Fare Ticketing / Payment Features

Mobile Fare Payment App Characteristics, cont.

- **Fare Products Offered**
  - Regular single (95%) / multiple ride (69%)
  - Period passes (82%)
  - Reduced fare (90%)

- **Regional Integration**: do other agencies use the same app for payment
  - No integration (56%)
  - Yes (37%)
  - Trend is increasing to integrate payment into a regional app

- **Accessibility Features**
  - Large fonts, high contrast, features for people with visual disabilities and audio assist for people with hearing disabilities
  - Limited use of “wearables” (e.g., glasses or watches)*

*Including Metro Community Shuttles, Community Vans, Community Ride, Trailhead Direct, Via to Transit, Ride2 and Access service.

Source: King County Metro
Mobile Fare Ticketing / Payment Features

Mobile Fare Payment App Features

- **Activation**
  - “The process of making a mobile fare product valid for a given period of time”
  - May be activated on-line or off-line -- 50%
  - Must be on-line to activate -- 29%

- **Primary Validation Method**
  - Visual validation 87%
    - May also include Near Field Communication (NFC) (7%) or Quick Response (QR) / bar code (32%)
  - QR code 6%
  - At the time 0% used Bluetooth or NFC
Mobile Fare Ticketing / Payment Features

Customer Facing Features

- Real time transit information (29%)
- Transit schedules (34%)
- Trip planning (34%)
- Reporting (12%)
- Integration with MaaS specifically ridehailing / bikesharing (8%)

Source: CapMetro Mobile Traveler and Payment App
## Key Mobile Fare Ticketing / Payment Roles & Responsibilities

### Mobile Fare Payment App System Roles and Responsibilities

#### Table 2: Roles and Responsibilities

<table>
<thead>
<tr>
<th>Primary Responsibility For</th>
<th>Vendor</th>
<th>Agency</th>
<th>Other</th>
<th>N/A</th>
<th>Count (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment processing</td>
<td>85%</td>
<td>7%</td>
<td>8%</td>
<td>0%</td>
<td>61</td>
</tr>
<tr>
<td>Hosting the app</td>
<td>98%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>61</td>
</tr>
<tr>
<td>Customer service for riders</td>
<td>43%</td>
<td>56%</td>
<td>2%</td>
<td>0%</td>
<td>61</td>
</tr>
<tr>
<td>Marketing the app to riders</td>
<td>7%</td>
<td>93%</td>
<td>0%</td>
<td>0%</td>
<td>61</td>
</tr>
<tr>
<td>PCI Compliance</td>
<td>85%</td>
<td>7%</td>
<td>3%</td>
<td>5%</td>
<td>60</td>
</tr>
</tbody>
</table>

**Notes:**
- One respondent skipped this question, so n=61.
- Numbers are rounded to the nearest percent and therefore may not sum to 100%.

Source: TCRP Synthesis 148, Table 2.
Relevant Standards

International Standards Organization (ISO)/ International Electrotechnical Commission (IEC) 14443

Contactless integrated circuit cards – Proximity cards

- Widely adopted standard for short range communications between cards and readers
- Applies to physical and virtual cards
- Incorporated in all the leading contactless bankcard specifications

Source: Module 10 and 12

Definition of Virtual Card – “an electronic replica of a physical card and it usually contains a randomly generated credit card number [token] that change every time your credit card is used for a purchase.”
ISO/IEC 18092 and ISO/IEC 21481

Information technology, telecommunications and information exchange between systems, Near Field Communications, Interface and Protocol (NFCIP-1) and (NFCIP-2)

- Better known as near field communications (NFC)
- Defines methods to enable short-range mobile phones and readers
- Uses ISO/IEC 14443 communications protocols

Source: Module 10 and 12

In May 2020, the NFC Forum approved 4 specifications that provide faster and more robust data exchange methods than the older versions. Spec called Tag NFC Data Exchange Format Protocol (TNEP).
Specifications

Card Network Specifications apply to Mobile Virtual Cards

- Requirements apply to contactless/virtual bankcards, equipment and transactions
- Unique specification for each network
- Card network programs
  - Visa payWave
  - Mastercard PayPass
  - American Express ExpressPay
  - Discover ZIP
  - GooglePay
  - ApplePay
- May change with little advance notice

Source: Adapted from Transit Module 12
Card Network Operating Rules

- Defines rules for acceptance of cards and mobile payment linked to cards
- Unique rules for each network
- Updated semi-annually
- Not true specification per se

Source: Adapted from Transit Module 12
ACTIVITY
Who does the primary marketing of an agency’s fare app to riders?

**Answer Choices**

a) Vendor
b) Social Media
c) Agency
d) App Store
Review of Answers

a) Vendor

Incorrect. Only 7% of vendors promote an agency’s fare app.

b) Social Media

Incorrect. Although social media might help promote the app, the primary marketing is performed by the agency.

c) Agency

Correct! Respondents of TCRP Synthesis 148 responded that the agency markets the app to riders.

d) App Store

Incorrect. Although an app store might help suggest an app, the primary marketing is performed by the agency.
Learning Objective 2

Define concept of mobile payment
Mobile Payment Methods

**Virtual Wallets** – store virtual cards that emulate contactless bankcards (support ISO 14443 and NFC) stored in a mobile operating system “wallet”.

- Bank cards such as PNC
- Ventra Apple wallet
- OMNY Google wallet

**Payment apps** – mobile app that provides sales, customer services and account management support to customers.

- CapMetro App (Capital Metro, Austin)
- TouchPass Mobile App (Victor Valley Transit Authority)

**Peer-to-peer payment apps** – mobile app that enables the electronic transfer of money between two bank accounts.

- Examples of apps: Venmo, Paypal.Me, clearXchange

**Cryptocurrency Apps and Wallets** – mobile apps to manage and pay for services using cryptocurrency

- Examples of apps: Coinbase, Blockchain
Fare Payment Proof of Purchase

Fare Proof of Purchase Methods

- Visual Verifiable Validation (V3) or “Flash” pass
- QR Code
- NFC (virtual card)
  - Transit Wallet
  - Open Payment

CapMetro QR product with V3
(source: Bytemark)
Fare Payment Proof of Purchase

**Fare Proof of Purchase Method – Visual Validation**

**Visual validation**, also called **Flash Pass**, is an animated ticket shown to the operator.

- Select fare product
- Activate fare product only when on-line
- Show operator

Source: Big Blue Bus website Bigbluebus.com
Fare Proof of Purchase Method – QR Code

QR (Quick Response) is a two-dimensional barcode.
- Requires QR Code Generator

![Diagram showing the process of selecting a ticket, activating it, presenting it to the reader, validating the fare, and the interactions between the QR code reader, fare validation device, Central Computer, and the transit agency.]

- Product transactions
- Valid/invalid code lists

Select ticket  Activate  Present QR to Reader

Transit Agency  Central Computer

Mobile Fare App Vendor

Sales
Account Info
Product Transactions and unique QR code generation
Fare Payment Proof of Purchase

Fare Proof of Purchase Method – Mobile Open Payment

Virtual Credit Card Stored in Google Pay

- Product transactions
- Valid/invalid lists

NFC Reader

Validator

EFPS Central Computer

Regional Clearinghouse

Payment Processor
Fare Payment Proof of Purchase

Fare Proof of Purchase Method – Transit Wallet

Example: Ventra virtual card

Source: Ventrachicago.com
Mobile App Technology Terminology

Mobile App Development Characteristics

**Walled Garden** – closed ecosystem in which all operations are controlled by the ecosystem operator.

**Deep Link** – relationship between multiple applications in which one app redirects users to another app.

**Application Programming Interface (API)** – set of communication protocols for exchanging information between one or more applications. Payment application owners sometimes provide *open APIs*.

**Software Development Kit (SDK)** – set of libraries, documentation or tools which may also include APIs that can be tailored by an app. Payment application owners sometimes provide an SDK.

Source: TCRP Synthesis 148
Mobile providers use a secure element to protect personally identifiable information (PII)

- **Secure Element** is a hardware storage device to secure PII.
  - Embedded storage (internal)
  - SIM / UICC Card (external)
  - SD Card (external)

- **Host-based Card Emulation (HCE)** is commonly used in place of a hardware-based secure element to secure the PII by using a unique alias or token to communicate with information stored in a cloud.

- **Tokenization** is the process used to generate a token for the information, storing the token in an HCE, and storing the PII in a more secure environment.

- **NFC controller** in mobile device directly routes data (transactions) from secure element to and from NFC card reader
Conceptual View of Mobile App Physical Architecture

The NFC Controller channels the token directly to NFC Reader

- Operating System (OS)
  - OS SDK and Libraries
  - Mobile Fare app
  - Secure Element (HCE)
  - NFC controller

- Cell / Wi-Fi / Bluetooth

- NFC / ISO 14443

- Cellular Network

- Fare Reader / Validator
Fare Payment Role Based Architecture

Open Payment (PAYG) with a Transit Wallet

Internal to IFMS
- Payment Provider
- PAYG Balance Holder
- PAYG Product Owner
- PAYG Top-up Retailer
- PAYG Top-up Fulfiller
- Transport Service Operator

External to IFMS
- Merchant Acquirer
- Bank Card Issuer
- “Money Network” MetaBank
- MasterCard
- “Money Network” Jewel

Key
- Basic 24014-1 roles
- Additional roles
- Composite 24014-1 roles

Source: IFMS-1 v3, Appendix B
Fare Payment Role Based Architecture

Open Payment with a Virtual Bankcard

External to IFMS

- Payment Provider
  - Merchant Acquirer
  - Bank Card Issuer

Internal to IFMS

- PAYG Product Owner
- Transport Service Operator

Passenger

Key
- Basic 24014-1 roles
- Additional roles
- Composite 24014-1 roles

Source: IFMS-1 v3, Appendix B
ACTIVITY
What payment access method is most proprietary?

**Answer Choices**

a) SDK  
b) API  
c) Walled garden  
d) Deep link
Review of Answers

a) SDK
Incorrect. **SDK** is typically a toolkit for incorporating open functions into and information exchanges with another application.

b) API
Incorrect. **APIs** are open specifications for exchanging information between two applications.

c) Walled Garden
Correct! **Walled garden** refers to applications that are closed with the intention of securing and restricting access.

d) Deep Link
Incorrect. **Deep link** is a uniform reference link (URL) that accesses another application. This selection is also restricted and proprietary but not as restricted as the Walled Garden.
Learning Objective 3

Describe electronic fare payment business models
Mobile Fare App Business Models

5 Business Models
Described by TCRP Synthesis 148

- Shared App
- White Label App
- White Label with Validation Hardware
- Open Payment App
- Software Development Kit
Mobile Fare App Business Models

Shared App

- Multiple agencies on same mobile app
- Agencies share common platform
- No hardware needed
- Validation methods
  - Visual verification
- No integration with fare system
- Turnkey / service subscription
### White Label App

- Single agency mobile app
- No hardware needed
- Validation Methods
  - Visual verifiable
  - QR code method
- Limited integration with fare system
- Turnkey / service subscription

---

Note: removed External Systems from this diagram
**Mobile Fare App Business Models**

**White Label App with Hardware**

- Single/regional agency mobile app
- Hardware reader / validation
- Validation Methods
  - QR code method
  - NFC – Transit Wallet
- Limited integration with fare system
- Turnkey / service subscription

![Diagram of White Label App with Hardware]
Open Payment using Bankcard

- Transit’s role is as a merchant
- Hardware validation using NFC
- Requires external identity and financial authentication of payment
Multimodal mobility and event product integration
- Hardware validation using NFC
- Requires external identity and financial authentication of payment
Mobile Fare App Business Models

Software Development Kit

✓ Multimodal mobility and event product integration
✓ Hardware validation using either QR or NFC
✓ **Centralized payment** model

Diagram:
- Account Provider: EFPS, Tickets, Balance
- Application Owner: EFPS SDK
- Product Owner: Customer, Mobile App
- Transport Service: Operator, Transit Agency
- Passenger: Customer
- Top-Up Retailer/Fulfillment (POS): EFPS
- Collection & Forwarding: Validator/POS EFPS
- Transport Service Operator: Mobility Service Provider
- Account Provider: Mobility Service Provider, Balance Holder
- Application Owner: App Vendor, n

Example:
IFMS Use Case Categories

- Describes interaction between actors irrespective of
  - business model,
  - fare payment method, or
  - validation method

- Categories cover functionality associated with payment system
  - Define set of rules
  - Certification
  - Interaction with external objects (media, applications, ID services, payment/financial services)
  - Registration
  - Managing ID services
  - Management of customer accounts
  - Management of customer media
  - Management of applications
  - Security management
  - Customer service management
# Fare App Actors and Use Cases

## Use case name

<table>
<thead>
<tr>
<th>Use case name</th>
<th>Use and inspection of products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outline</td>
<td>The Service Operator checks and collects the data of a Customer Medium using the public transport service.</td>
</tr>
<tr>
<td>Triggered by</td>
<td>Service Operator</td>
</tr>
<tr>
<td>Actor(s)</td>
<td>Customer</td>
</tr>
<tr>
<td></td>
<td>Service Operator</td>
</tr>
<tr>
<td></td>
<td>Collection and Forwarding</td>
</tr>
<tr>
<td></td>
<td>Product Owner</td>
</tr>
</tbody>
</table>

## Use case description

A Customer who uses a product on public transport. The use case consists of several processes performed by the Service Operator:

- detection and verification of application;
- detection, selection and verification of product;
- verification of application and product according to security policies;
- processing of product data;
- communication between customer medium and Back Office;
- computation of product rules;
- collection of the product usage and inspection data;
- distribution of product usage and inspection data to the Product Owner through the Collection and Forwarding.

Inspection consists of:

- simple detection,
- detection and verification, or
- detection, verification and further processing.
## Fare App Actors and Use Cases

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- distribution of product usage and inspection data to the Product Owner through the Collection and Forwarding.

Inspection consists of:

- simple detection,
- detection and verification, or
- detection, verification and further processing.

Same use case but using an open payment with bank card model.
ACTIVITY
What is a Software Development Kit?

**Answer Choices**

a) A stand-alone application that can be installed on a workstation

b) A first aid kit for your computer

c) A set of interfaces that can be used to exchange information between two applications.

d) A software library for building applications, interfaces, and user interfaces.
Review of Answers

a) Stand-alone application
   
   *Incorrect. A stand-alone application is already built.*

b) First aid kit for your computer
   
   *Incorrect. These are diagnostic tools.*

c) Set of Interfaces
   
   *Incorrect. These are APIs. APIs are a subset of an SDK library.*

d) Software library
   
   *Correct! An SDK provides interfaces and tools (including compiler, installation tools, and functions) to build software typically on a specific platform (like a mobile device running a specific operating system).*
Learning Objective 4

Emerging trends in implementing fare payment apps
RTD App Model

- Uses Software as a System (SaaS) Mobile Ticketing Platform (Masabi)

- Other Functionality – *deep link* to RTD Trip Planner and Next Ride apps

- Business Model: white label

- Modes
  - Regular bus,
  - FlexRide,
  - SkyRide, and
  - Train services

- Validation Method:
  - QR Code

- Potential for 40% in Ticket Vending Machines (approx. $4.5M savings in TVM replacement costs as customers shift to mobile fare app)
RTD App Implementation

RTD Denver Passenger Fare Sales - 2019

Trends by Category

Mobile Ticketing

 Courtesy of Tonya Anderson RTD, presented at Payments Conference 2020
Mobile Integration with Uber & Next Ride Apps
RTD App and Uber Integration

- Happened organically through existing contractual relationship with app provider
- Took advantage of the APIs developed by vendor’s SaaS Mobile Ticketing platform to integrate ridehailing service (Uber)
Smart Columbus

Common Payment System (CPS)

- Single-account, single-payment integrated mobility platform including reservations and payment
- Public sector will manage relationship with rider for trip planning and ticket purchasing across public and private transportation
- Payment component of open-source “Smart Columbus” trip-planning platform

Source: Smart Columbus
CPS APIs integrate with registering cash boxes on bus, taxi, limo, carpool, Via, bikeshare and carshare services, among others.
Dallas Area Rapid Transit

2013
GoPass 1.0
Ticketing
Trip planning
Special events
and offers
Regional app

2014
Admission Tickets
State Fair of Texas
Zoo
CFC
NCAA

2015
Deep Linking
Uber
Lyft
Zipcar

2016
Introduced Corporate and University passes

2017
FTA Grant Recipient

2018
GoPass 2.0
Real-time Cash-to-mobile Fare capping
Apple Pay
GoPass Wallet

2019
GoPass 3.0
Multimodal Microtransit
UberPool
Bird
Rideshare choices

Courtesy of Dallas Area Rapid Transit
Dallas Area Rapid Transit

Robust Trip Planning, Ticketing & Payment platform

Mature Multi-Agency Platform
- GoPass supports multiple Agencies across DFW region
- In operation since 2013, frequent feature additions
- Currently scaling to different regional partners
- White-label platform version also available

Multi-Modal Trip Planning
- Seamless end-to-end directions for Point A – B – C
- Real-time vehicle status updates
- Map interface displaying DART vehicles in motion
- Additional options for TNCs & Micro-Mobility (Uber, Bird)

Digital Payments & Cash to Mobile
- Cash-to-Mobile supporting unbanked riders (7-Eleven, Tom Thumb, Ace Cash Express & More)
- Google Pay, Apple Pay, All Major Credit Cards
- Digital Wallet solution for loading and storing value

Rider and Operator Safety & Security
- DART See Something-Say Something integration alerts authorities to incidents and protect rider safety
- Rider Alerts from Agency presented to flag issues to riders

Additional Rider Support
- Support to service riders in transit deserts through on-demand services
- Integrated Concessions for eligible riders (Low income programs, minors, seniors)
- Support for riders with additional needs (wheelchair, service animal)

Regional Events & Wayfinding
- Presents and sell tickets to key regional events such as State Fair and NCAA events
- Local events promotion and listings through App

Fully Integrated Microtransit
- GoPass includes full integration of GoLink™ Microtransit booking and payments, powered by Spare
- VIA Microtransit integration is planned for Q3 2020
- App intelligently offers Microtransit options for trips with origin or destination within defined zones, linking to transit hubs

Courtesy of Dallas Area Rapid Transit
Which of the following is an incorrect statement related to the RTD Mobile App?

Answer Choices

a) The RTD mobile fare app is implemented as a SaaS
b) RTD manages the interface with Uber
c) RTD uses visual verifiable validation of mobile fare products
d) All fare products offered on RTD’s mobile fare app are also offered on the Uber app
a) The RTD mobile fare app is implemented as a SaaS

Incorrect. This is a correct statement.

b) RTD manages the interface with Uber

Correct! Masabi (not RTD) manages the interfaces, settlement and other technical matters associated with integration with Uber.

c) RTD uses visual verifiable validation of mobile fare products

Incorrect. This is a correct statement.

d) All fare products offered on RTD’s mobile fare app are also offered on the Uber app

Incorrect. This is a correct statement.
Learning Objective 5

Understand challenges related to mobile technologies
Challenges to Implementation

- Validation and “Proof of Payment”
- Mobile Handset Performance
- Security and Personal Information
- Equity
Validation and “proof of payment”

Visual Verifiable Validation
- Does not collect ridership information
- May require on-line access and validate ticket to prevent fraud

QR Code
- As V3, does not collect ridership information
- When scanned, requires back office or active list update in real time
- Requires QR reader or inspection tool

NFC (Virtual Card, Open Payment)
- When read, requires payment gateway or active list authentication in real time (current card read/write is less than 300ms)
- Requires NFC reader or inspection tool
Understanding Challenges

**Mobile Handset Performance**

Handsets (and wearables) don’t work the same

- Antenna position
- Antenna size and quality
- Effect of nearby interference
- Power levels
- On all the time vs. only when activated (Android vs. older IOS)

**Impacts**

- Reading position
  - What is the optimal position and angle relative to reader
- Signal strength
  - Secure element handoff to NFC communications controller
  - Tap speed – handshake and transfer data
  - Tap distance from reader
Security and Personally Identifiable Information
Privacy Laws and Policies

- European Union’s General Data Protection Regulation (GDPR)
- California Consumer Privacy Act (CCPA)
- Health Insurance Portable and Accountability Act (HIPAA)

Adapted from IFMS, Appendix C Identity Management
Understanding Challenges

**Equity**
- Unbanked or underbanked
- Limited English Language
- Access to smart phone or cellular communications
  - Limitations using smart phone
    - Due to training or disability

Courtesy of Bonnie Epstein (PSTA)
What media type presents a challenge to collect ridership information?

**Answer Choices**

a) NFC
b) Flash pass
c) QR code
d) Open Payment
Review of Answers

a) NFC

Incorrect. NFC is validated by a card reader which records time and location.

b) Flash pass

Correct! A flash pass typically is not validated by a card reader which stores and records time and location.

c) QR Code

Incorrect. QR code is validated by a card reader which records time and location.

d) Open Payment

Incorrect. Payment transactions are validated by a card reader which records time and location.
Module Summary

Mobile fare payment standards use many of the same standards as card and account-based systems.

New payment technologies and standards are emerging that support mobile fare payment.

Although fare payment business models differ, open APIs and SDKs enable integration with multiple agencies, mobility services and providers.

Mobile payment methods that may be used for fare and ticketing are becoming more prevalent even as new challenges arise.

In deploying mobile fare apps, the important lesson is to adopt technologies that meet your business goals and data needs.
We Have Now Completed the Fare Ticketing/Payment Curriculum

**MODULE 10:** Electronic Fare Payment System

**Module 12:** Electronic Fare Payment/Advanced Payment Systems: Open Payments Acceptance
Thank you for completing this module.

Feedback
Please use the Feedback link below to provide us with your thoughts and comments about the value of the training.

Thank you!