



W E L C O M E



U.S. Department of Transportation
Office of the Assistant Secretary for
Research and Technology



Welcome



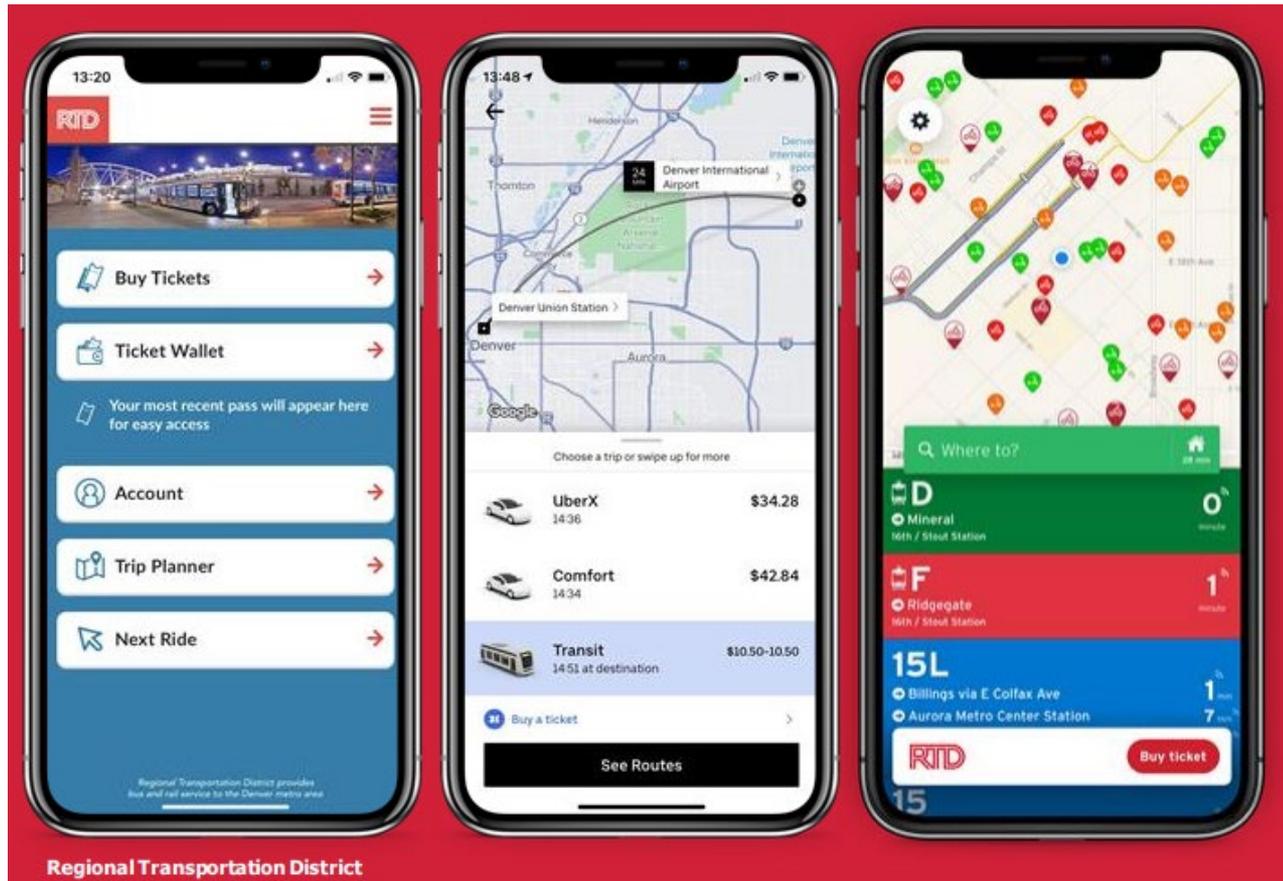
**Ken Leonard, Director
ITS Joint Program Office**
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www.pcb.its.dot.gov

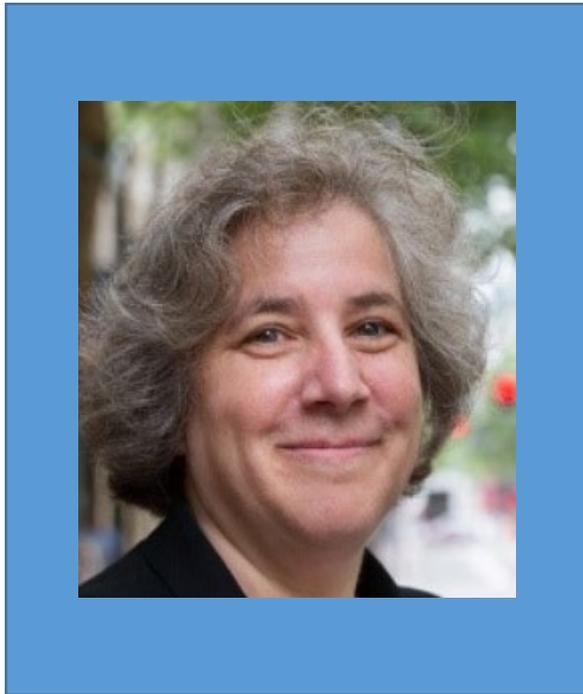
Module 21

Mobile Fare Ticketing/Payment





Instructor



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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

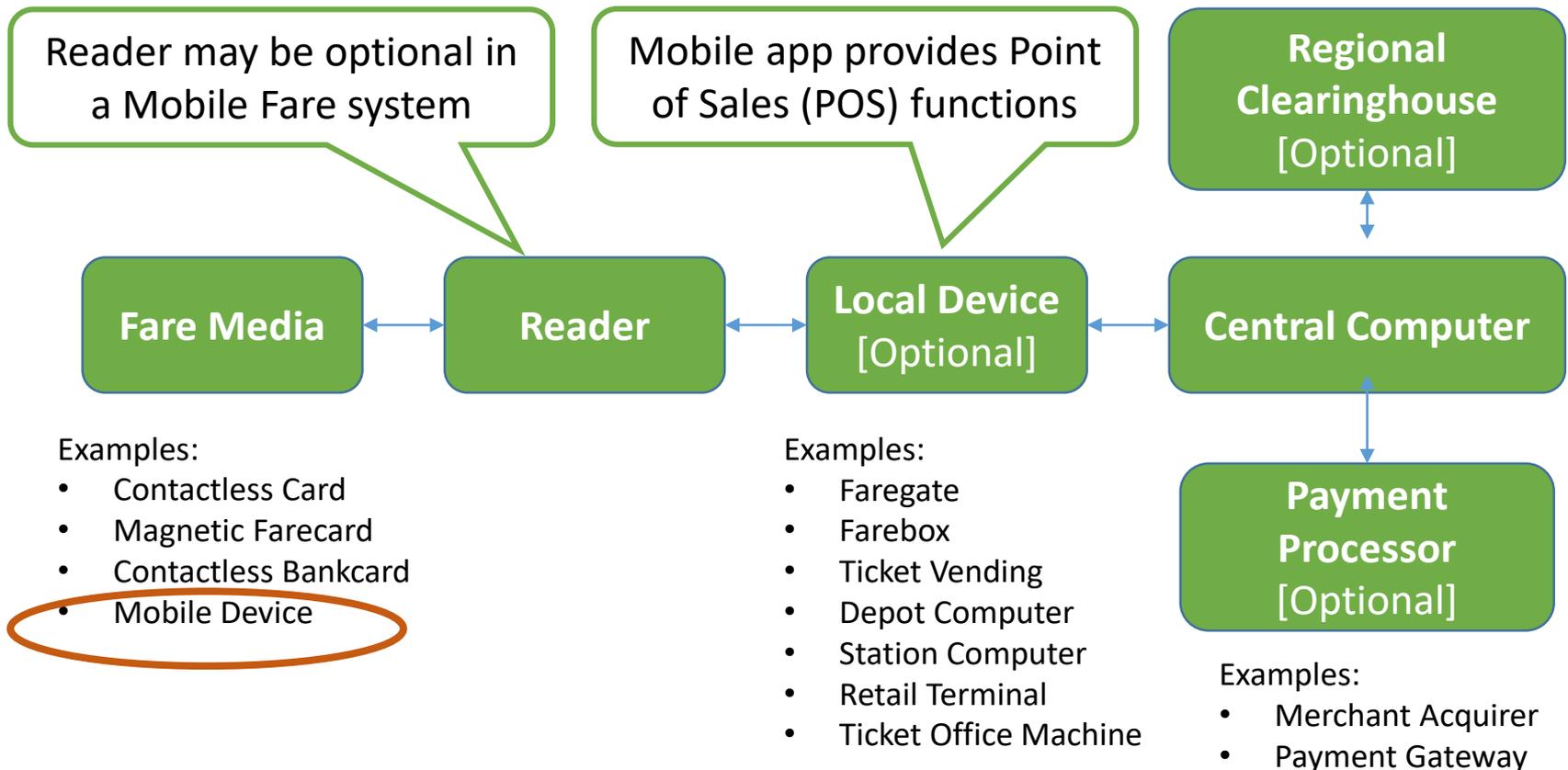
Review Electronic Fare Payment Systems (EFPS) concepts from Modules 10 & 12

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.





Mobile Fare Ticketing / Payment

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

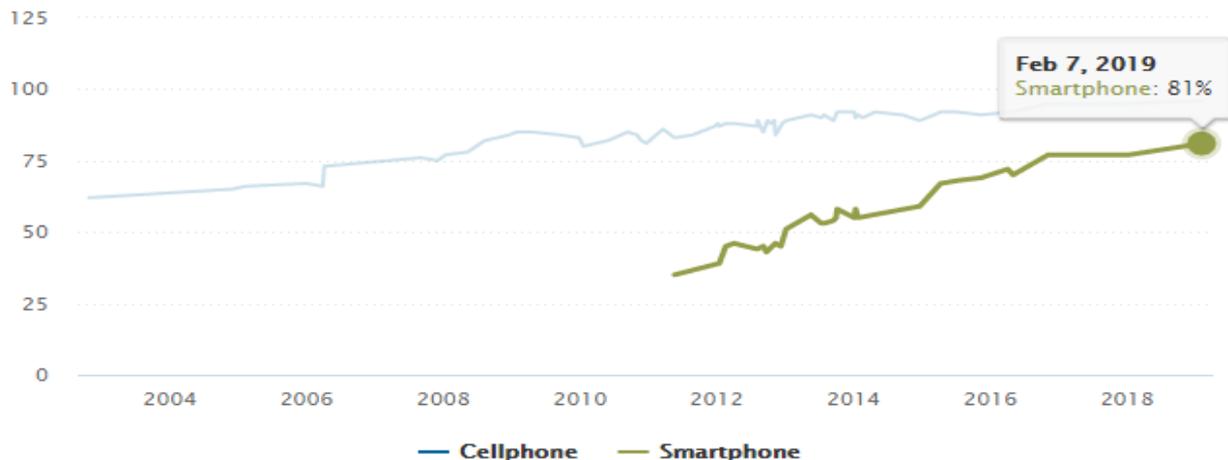
- Apple Pay
- Google Pay
- Various banks with virtual cards



Mobile Fare Ticketing / Payment

Growth of Mobile Devices and Mobile Fare Payment Apps

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



Source: Surveys conducted 2002-2019.

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

TRANSIT COOPERATIVE RESEARCH PROGRAM

TCRP SYNTHESIS 148

**Business Models for
Mobile Fare Apps**

A Synthesis of Transit Practice

Candace Brakewood
UNIVERSITY OF TENNESSEE, KNOXVILLE
Knoxville, TN

TCRP Synthesis 148 Business Models
For Mobile Fare Apps
(2020)

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 app use 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)*

Initial Activation



Activation



On Tap



*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



QR code displayed in mobile ticket
Source: Regional Transportation District (Denver)

Mobile Fare Ticketing / Payment Features

Mobile Fare Payment App Features, cont.

- 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

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

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.”



Relevant Standards

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)**.



Relevant Standards and Practices

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



Relevant Standards and Practices

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

ACTIVITY



Question

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



Payment Methods

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
- Venza 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



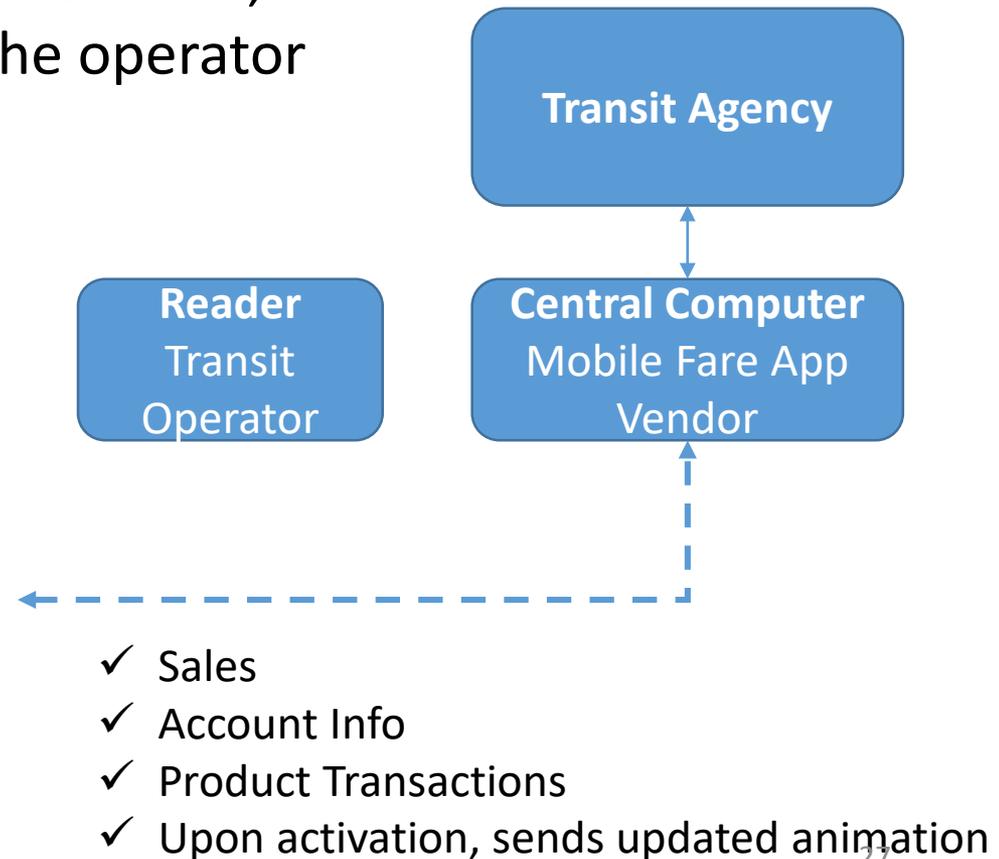
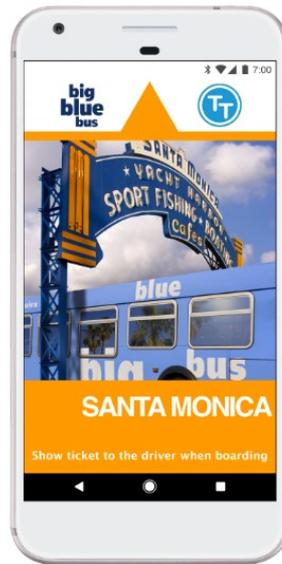
CapMetro QR product with V3
(source: Bytemark)

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

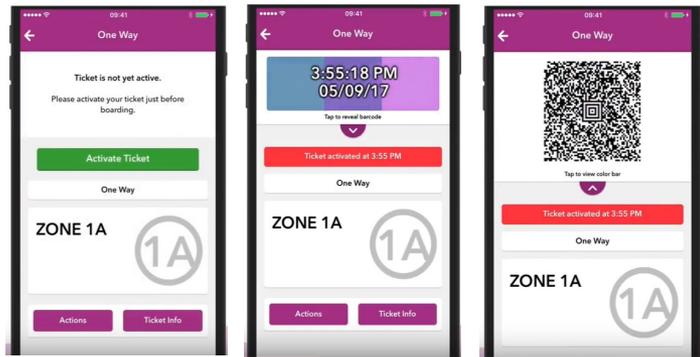


Fare Payment Proof of Purchase

Fare Proof of Purchase Method – QR Code

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

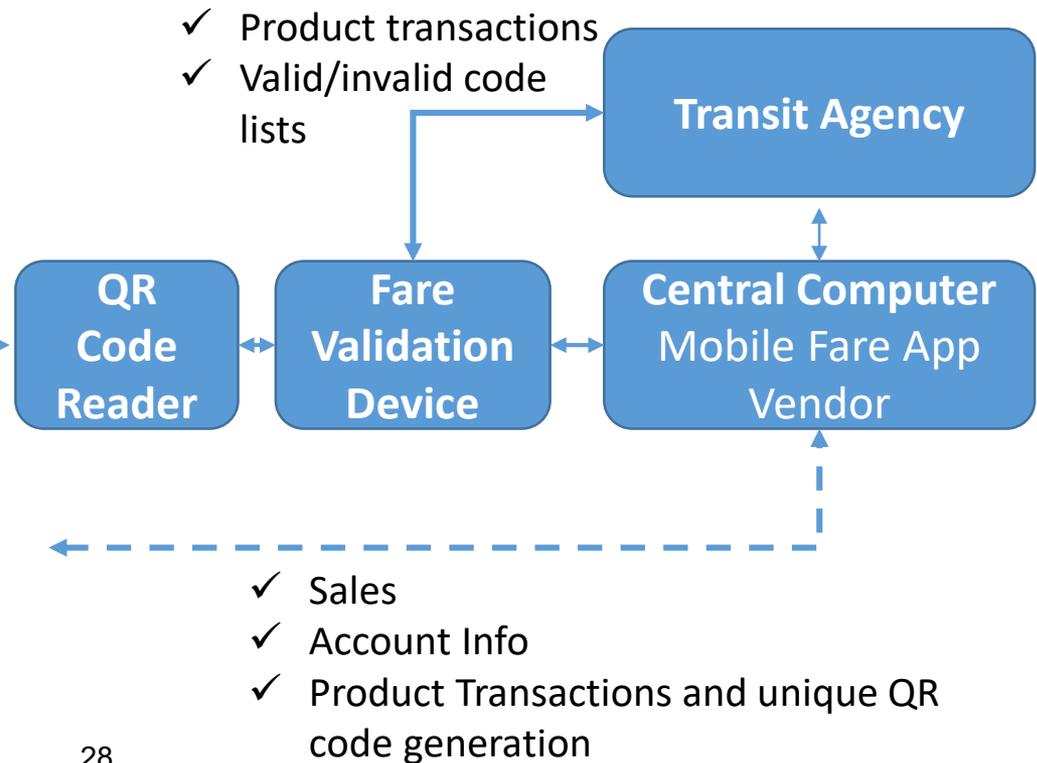
- Uses **ISO/IEC 18004:2015** Information – Automatic identification and data capture techniques – QR Code barcode symbology specification
- Requires **QR Code Generator**



Select ticket

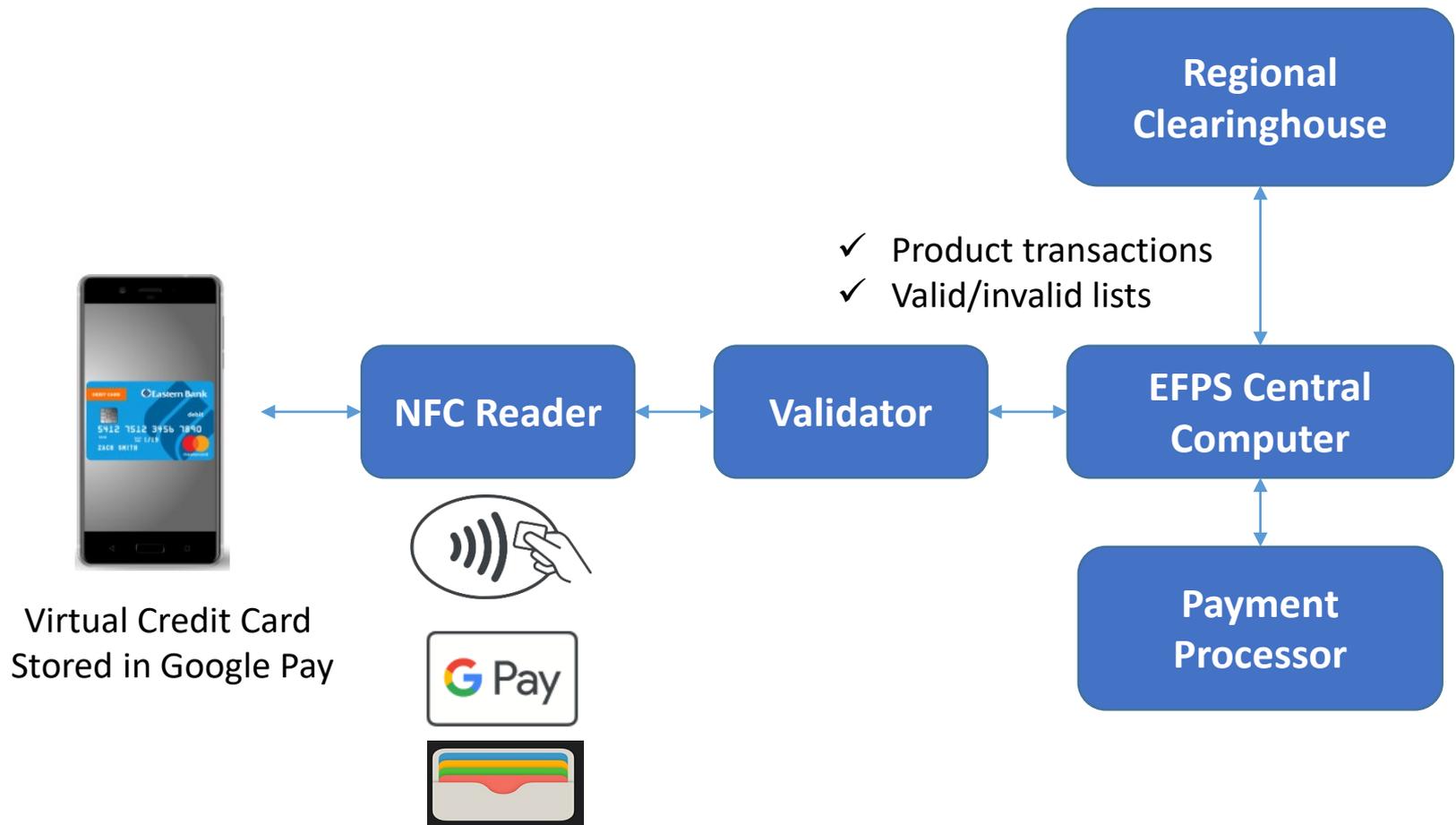
Activate

Present QR
to Reader



Fare Payment Proof of Purchase

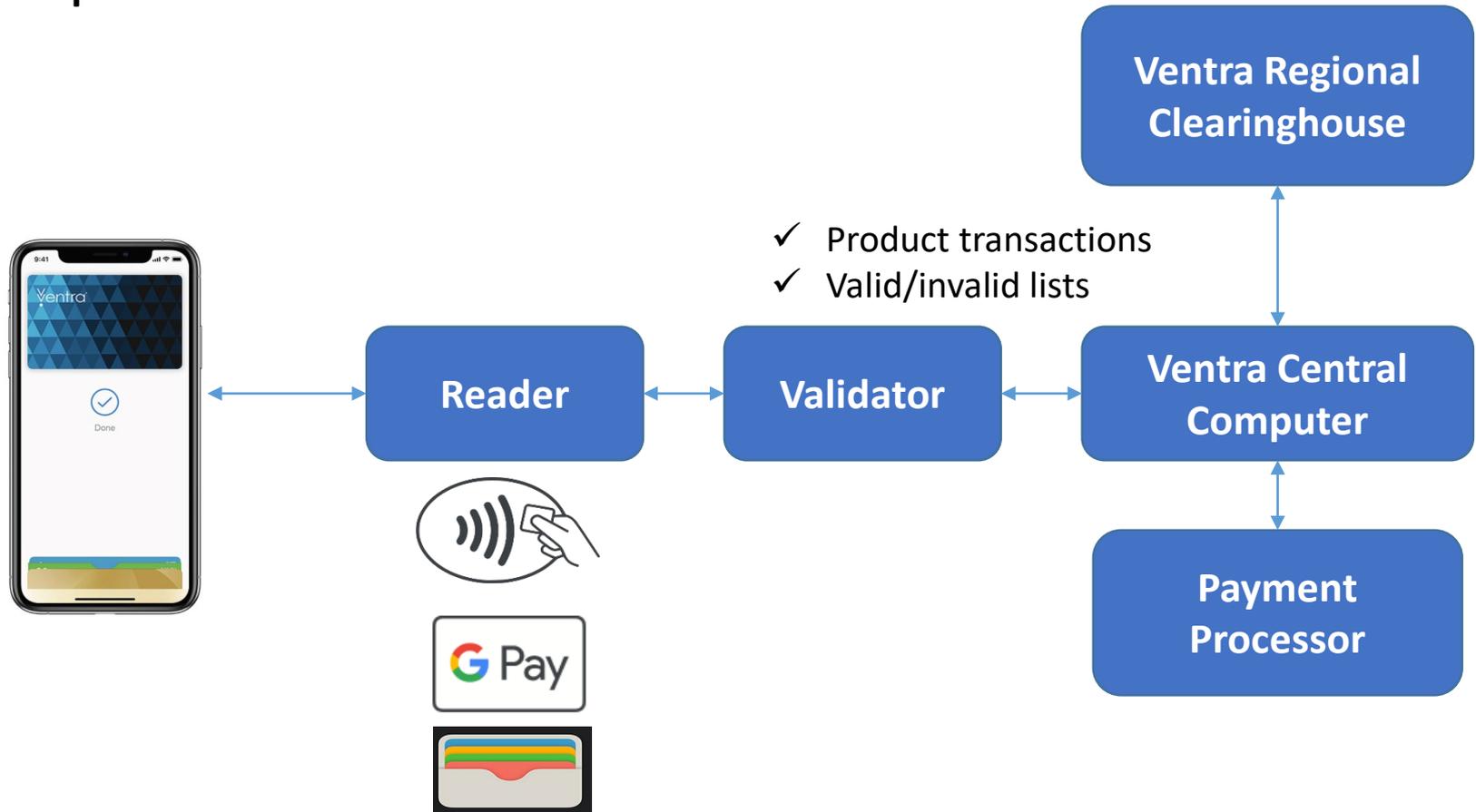
Fare Proof of Purchase Method – Mobile Open Payment



Fare Payment Proof of Purchase

Fare Proof of Purchase Method – Transit Wallet

Example: Ventra virtual card





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

SUPPLEMENT

Mobile App Technology Terminology

Secure Element

Mobile providers use a *secure element* to protect personally identifiable information (PII)

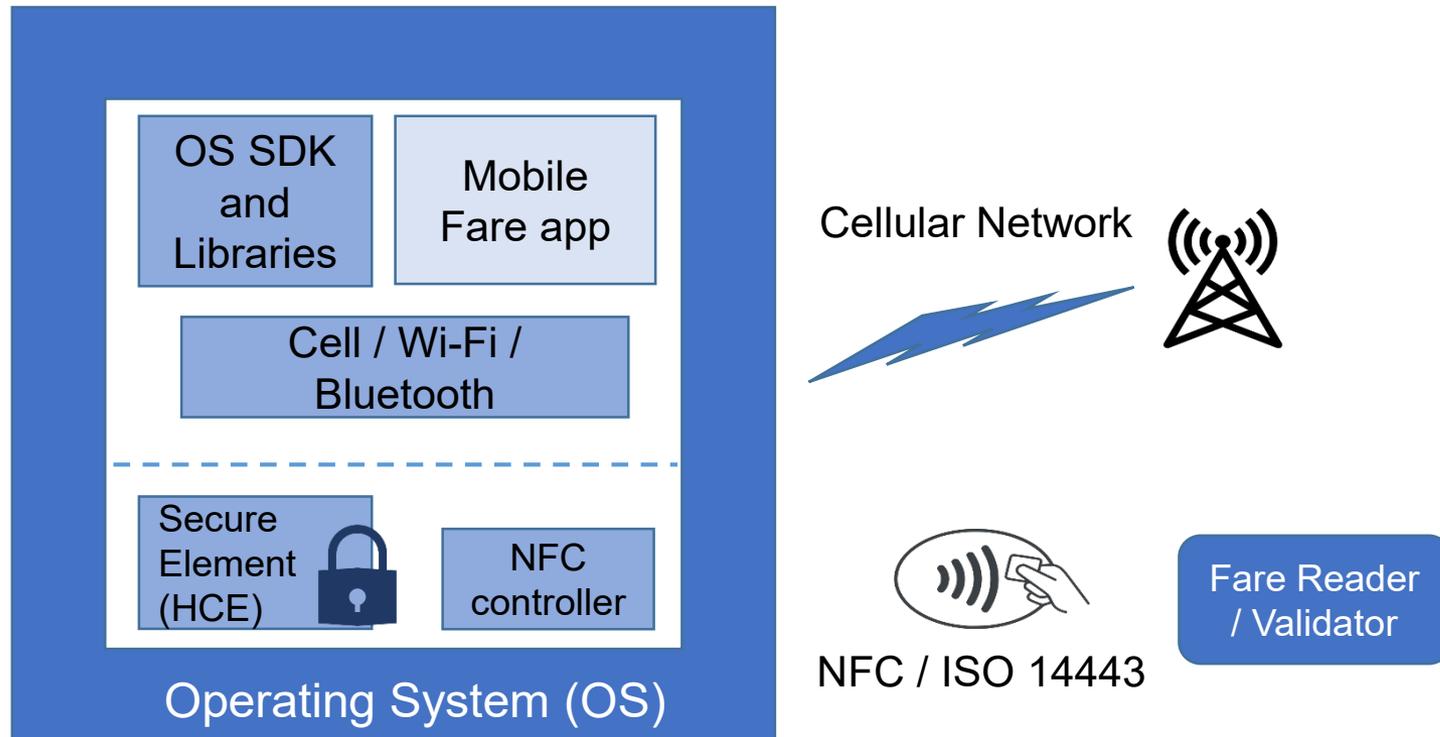
- **Secure Element** is a hardware storage device to secure PII.
 - Embedded storage (internal)
 - SIM / UICC Card (external)
 - SD Card (external)
- **Host-based Card Emulation (HCE)** is commonly used in place of a hardware-based secure element to secure the PII by using a unique alias or **token** 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

SUPPLEMENT

Mobile App Physical Architecture

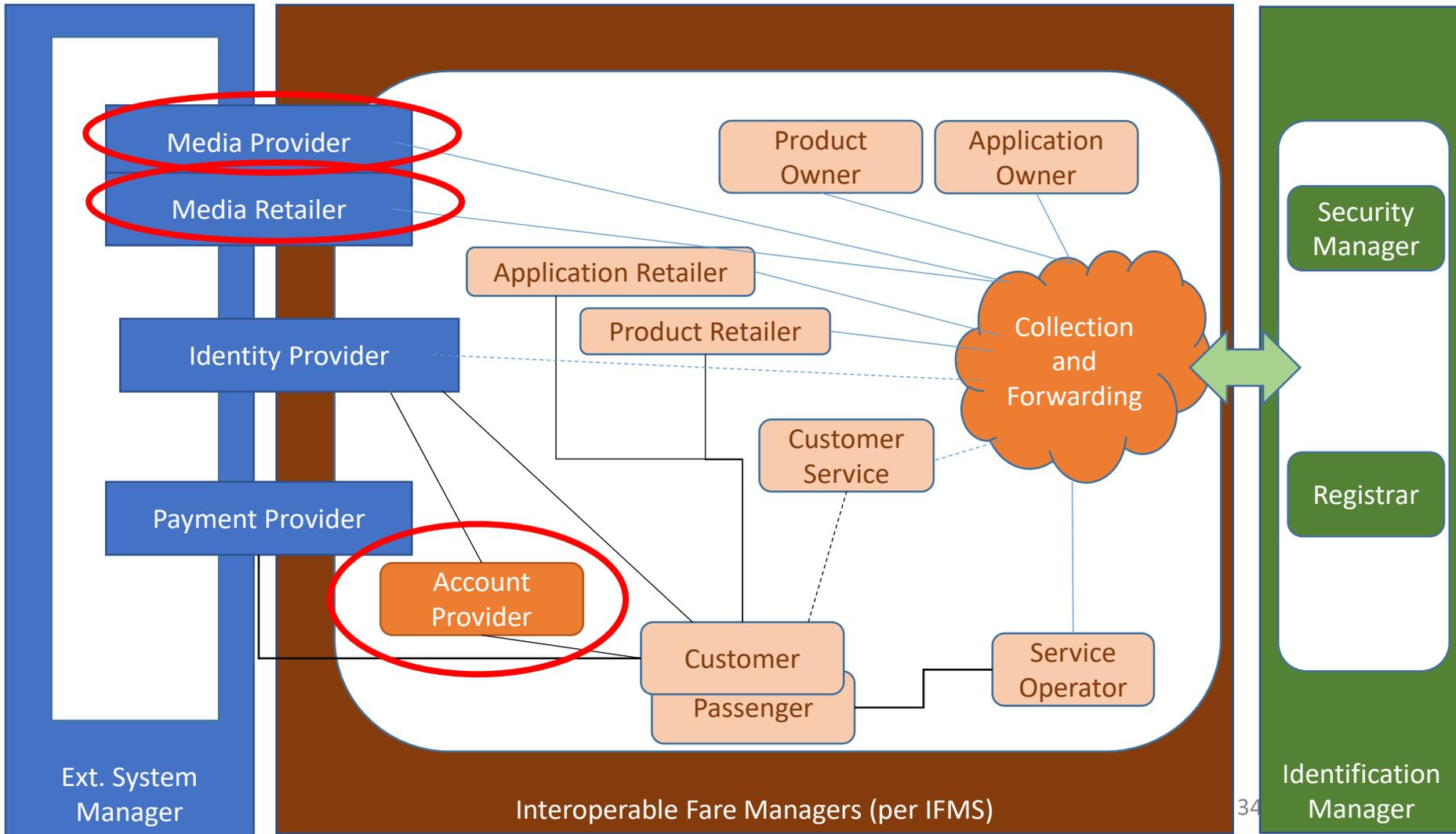
Conceptual View of Mobile App Physical Architecture

The NFC Controller channels the token directly to NFC Reader



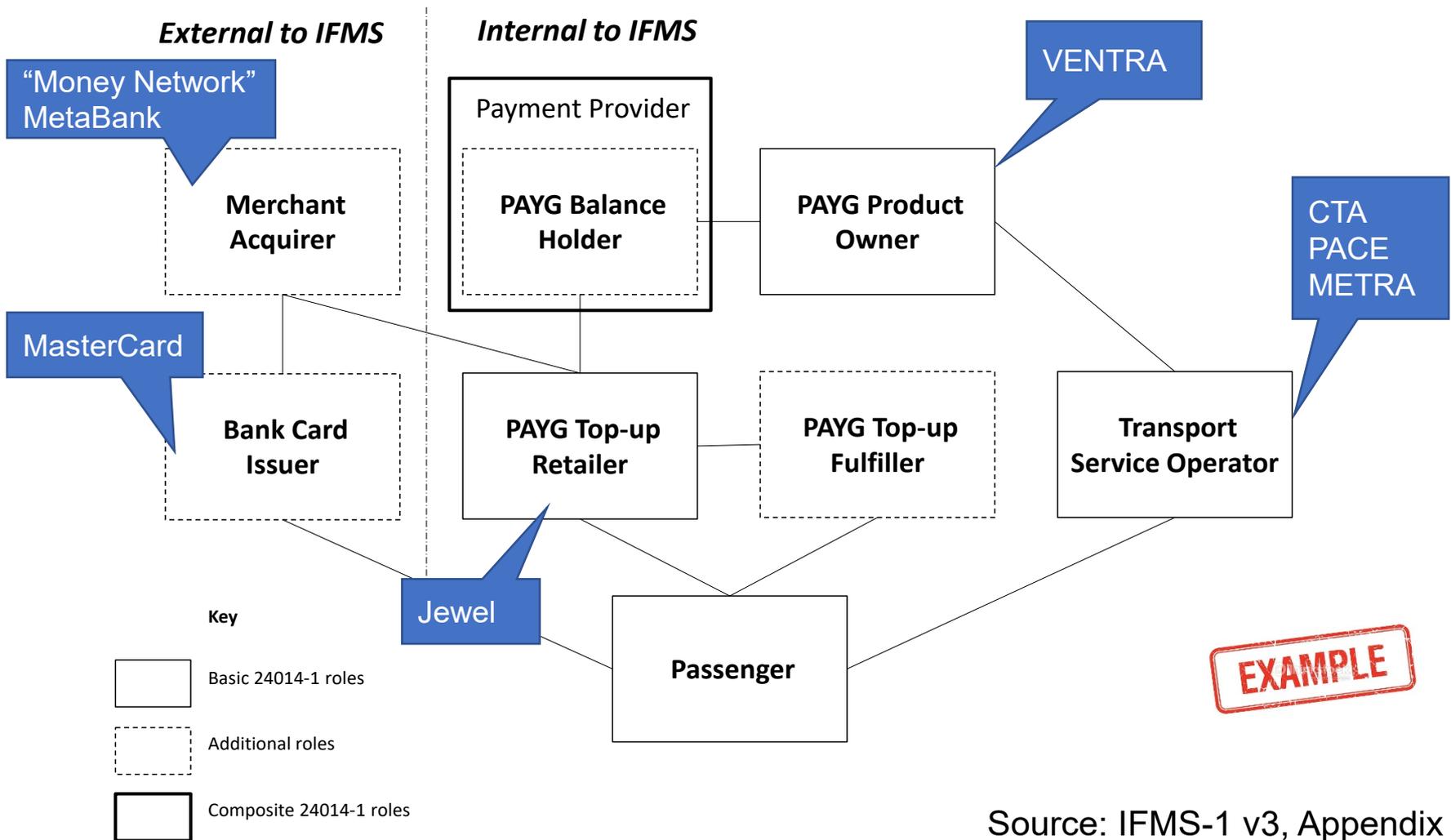
Fare Payment Role Based Architecture

ISO/Draft International Standard 24014-1 Public transport — Interoperable fare management system (IFMS) — Part 1: Architecture (version 3)



Fare Payment Role Based Architecture

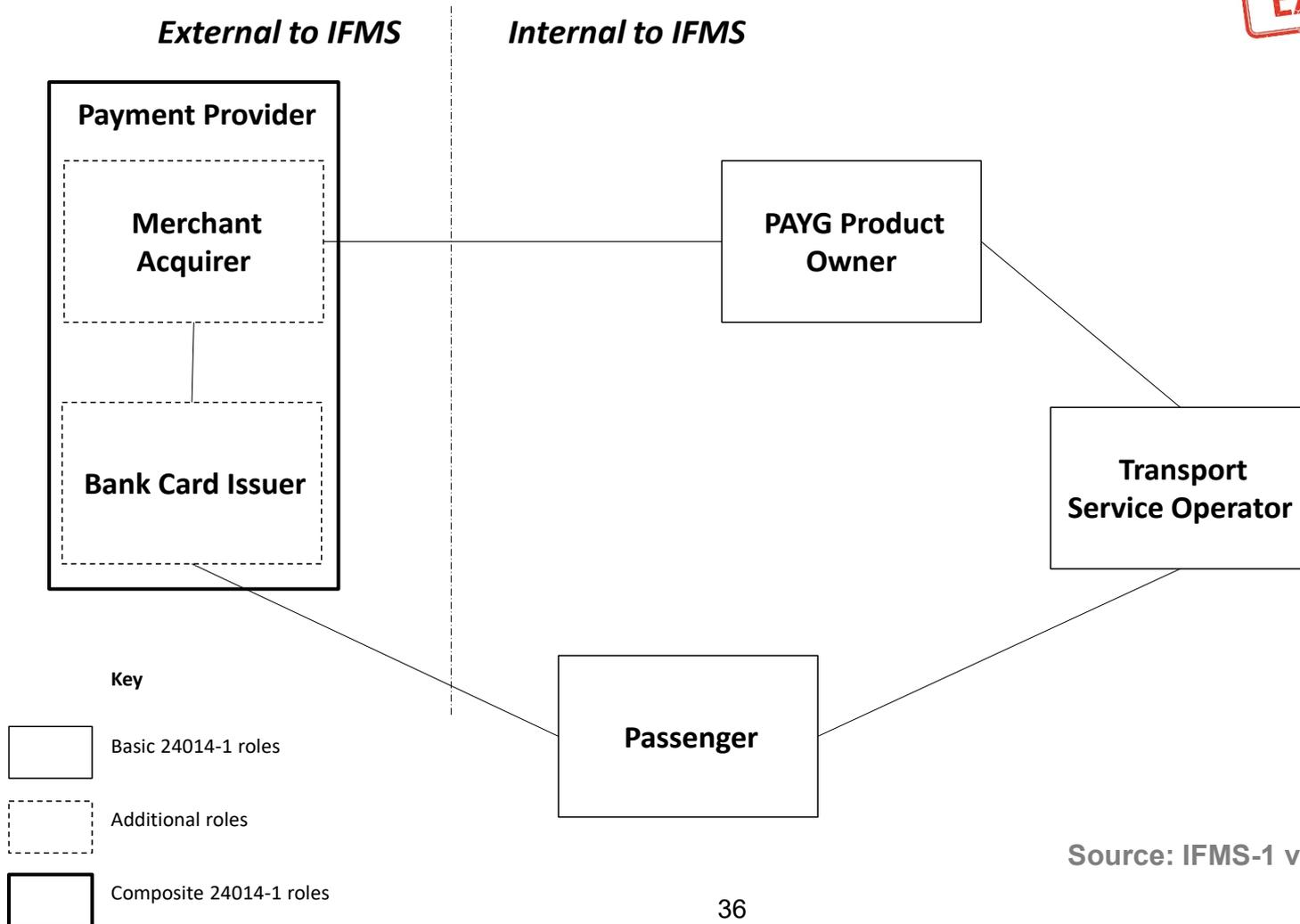
Open Payment (PAYG) with a Transit Wallet



Fare Payment Role Based Architecture

Open Payment with a Virtual Bankcard

EXAMPLE



Source: IFMS-1 v3, Appendix B

ACTIVITY



Question

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



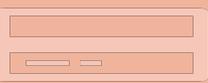
Shared App



White Label App



White Label with Validation Hardware



Open Payment App



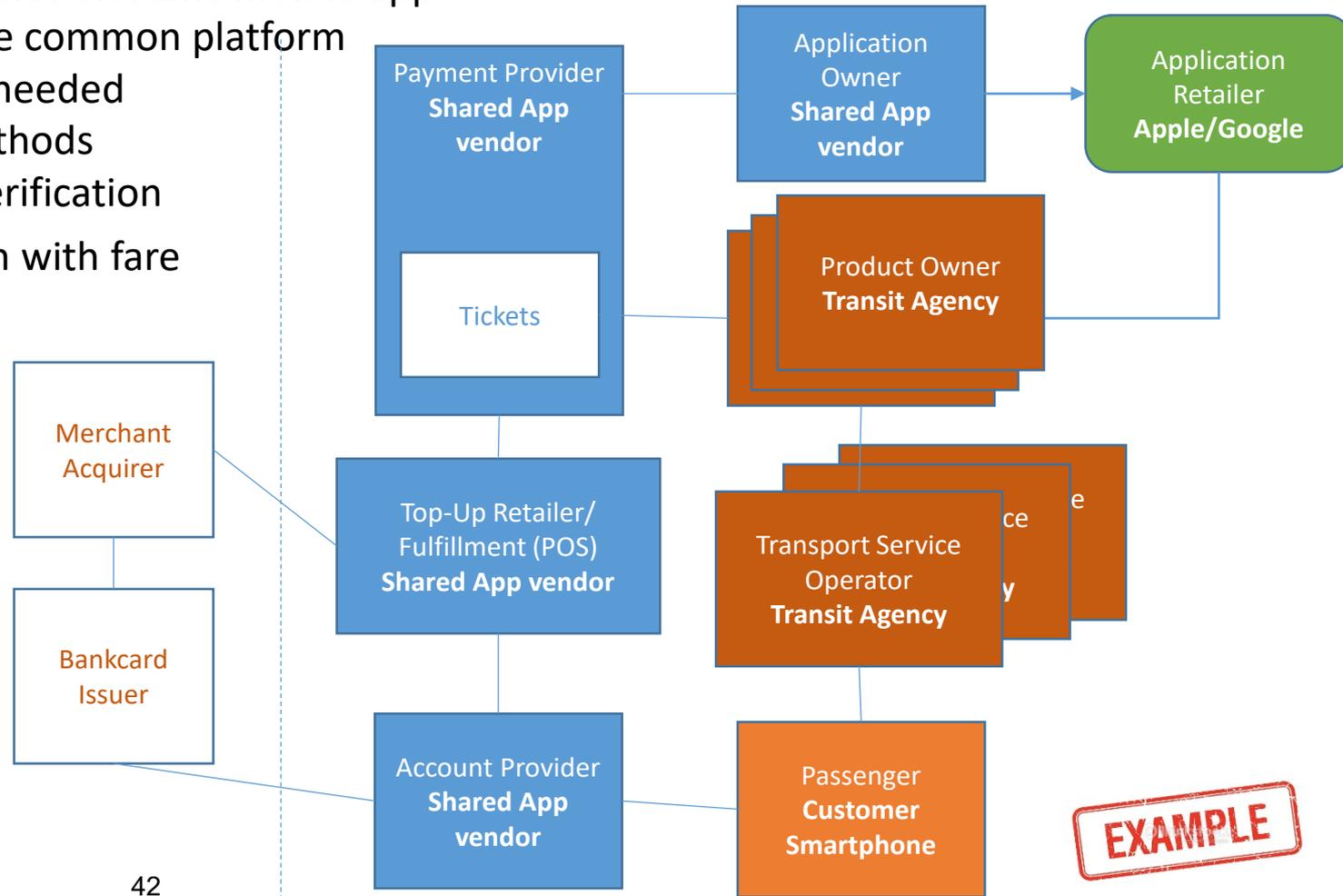
Software Development Kit

SUPPLEMENT

Mobile Fare App Business Models

Shared App

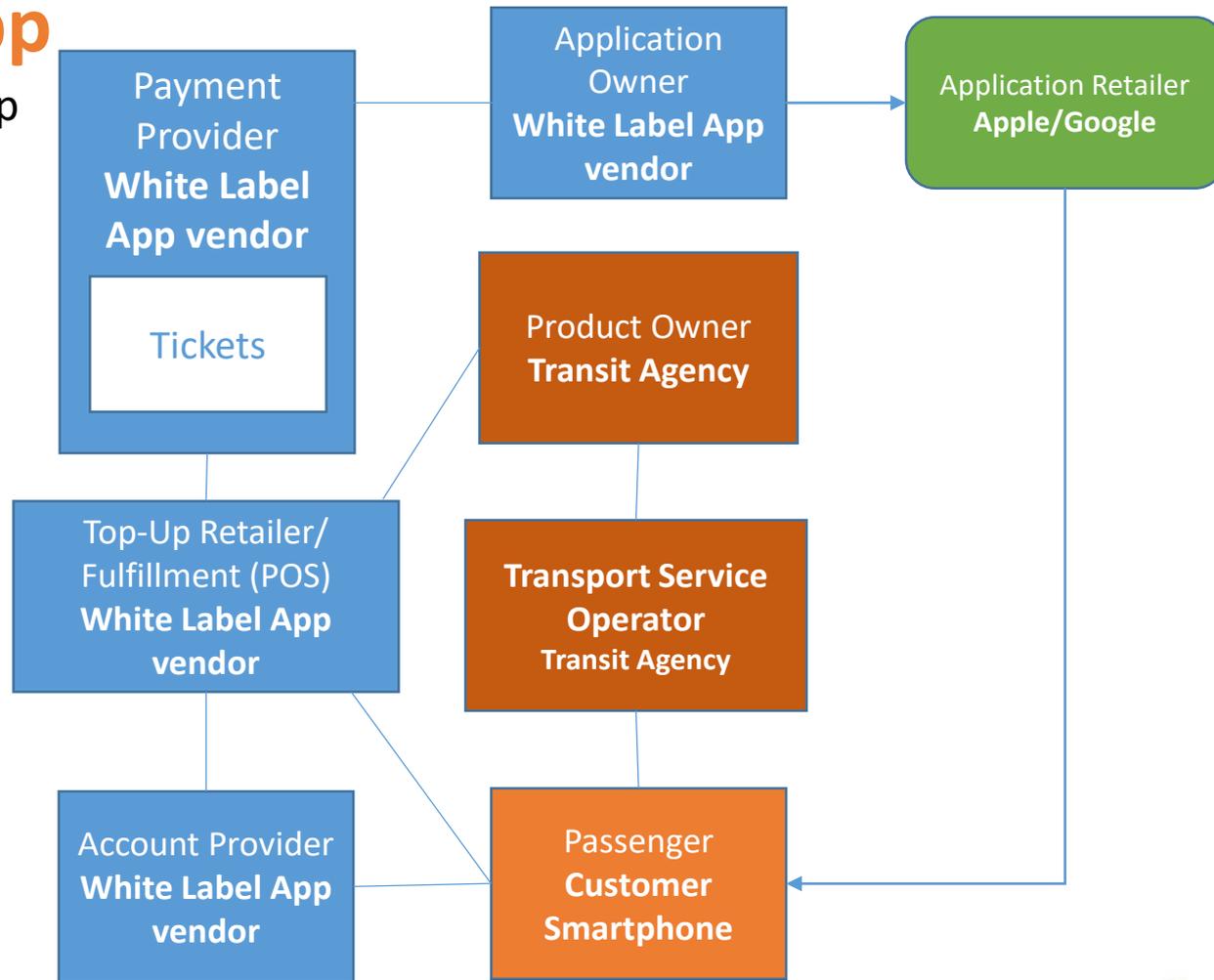
- ✓ Multiple agencies on same mobile app
- ✓ Agencies share common platform
- ✓ No hardware needed
- ✓ Validation methods
 - ☐ Visual verification
- ✓ No integration with fare system
- ✓ Turnkey / service subscription



Mobile Fare App Business Models

White Label App

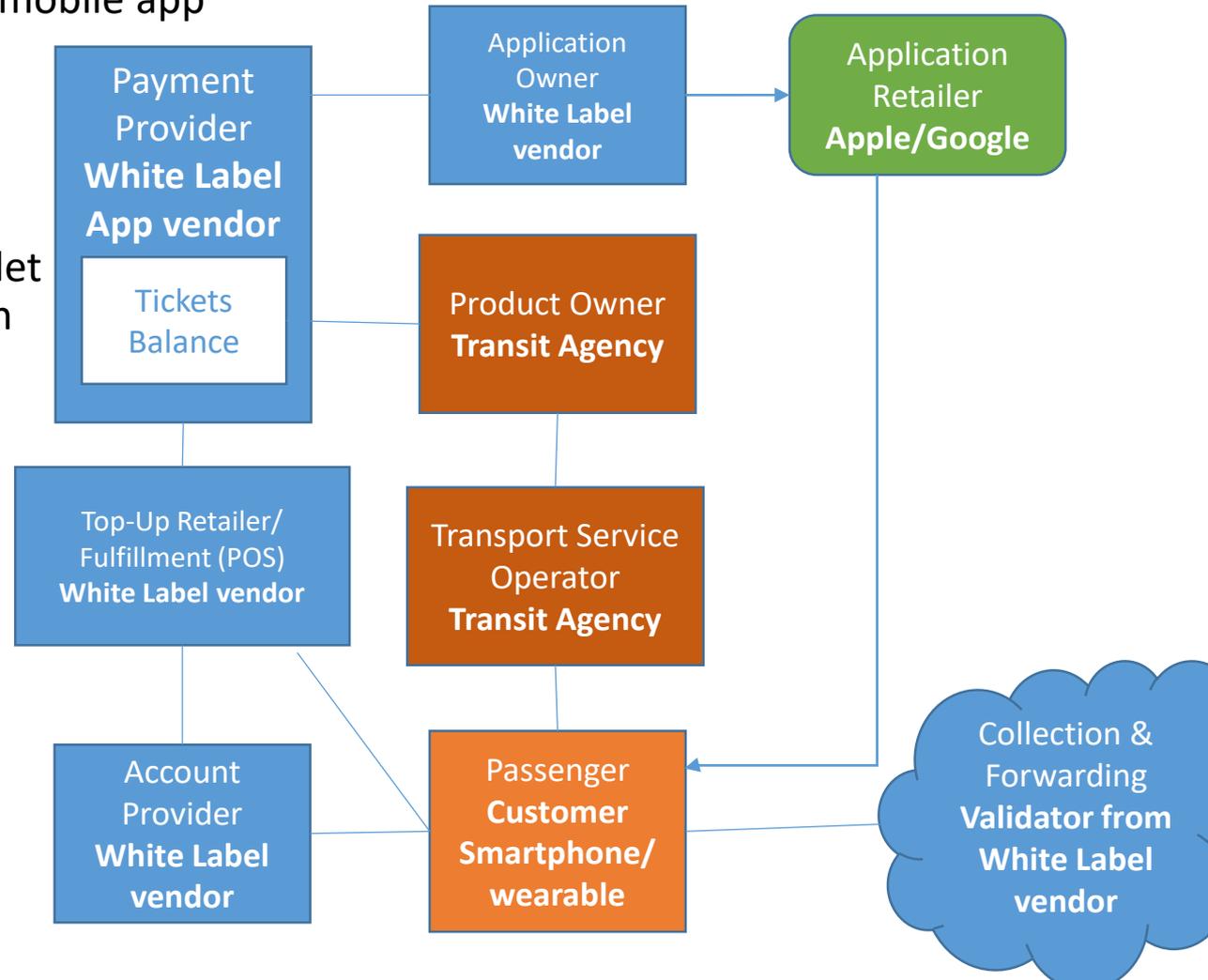
- ✓ Single agency mobile app
- ✓ No hardware needed
- ✓ Validation Methods
 - ❑ Visual verifiable
 - ❑ QR code method
- ✓ Limited integration with fare system
- ✓ Turnkey / service subscription



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



EXAMPLE

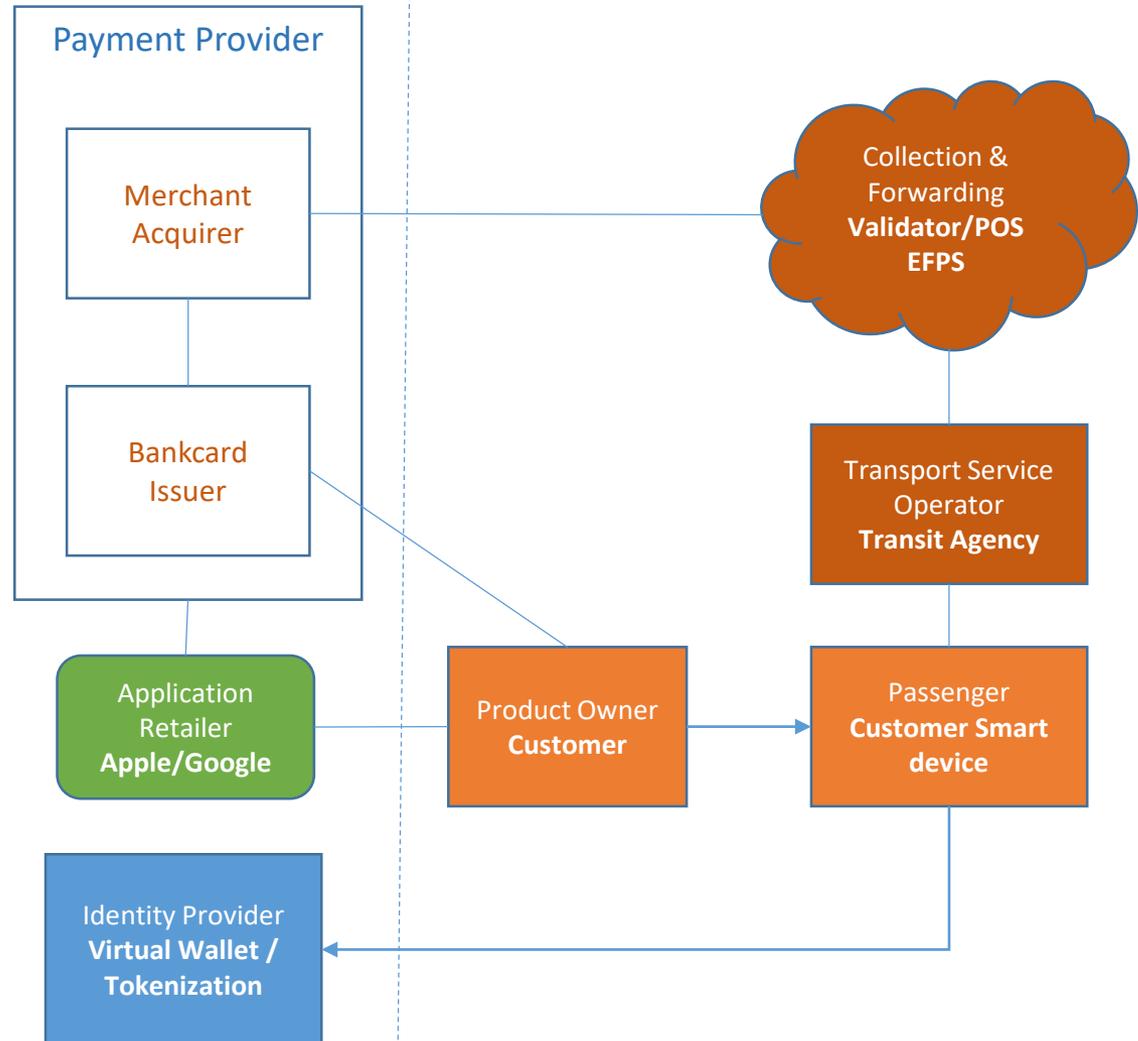
Mobile Fare App Business Models

Open Payment using Bankcard

- ✓ Transit's role is as a merchant
- ✓ Hardware validation using NFC
- ✓ Requires external identity and financial authentication of payment

External Systems

Internal to IFMS



EXAMPLE

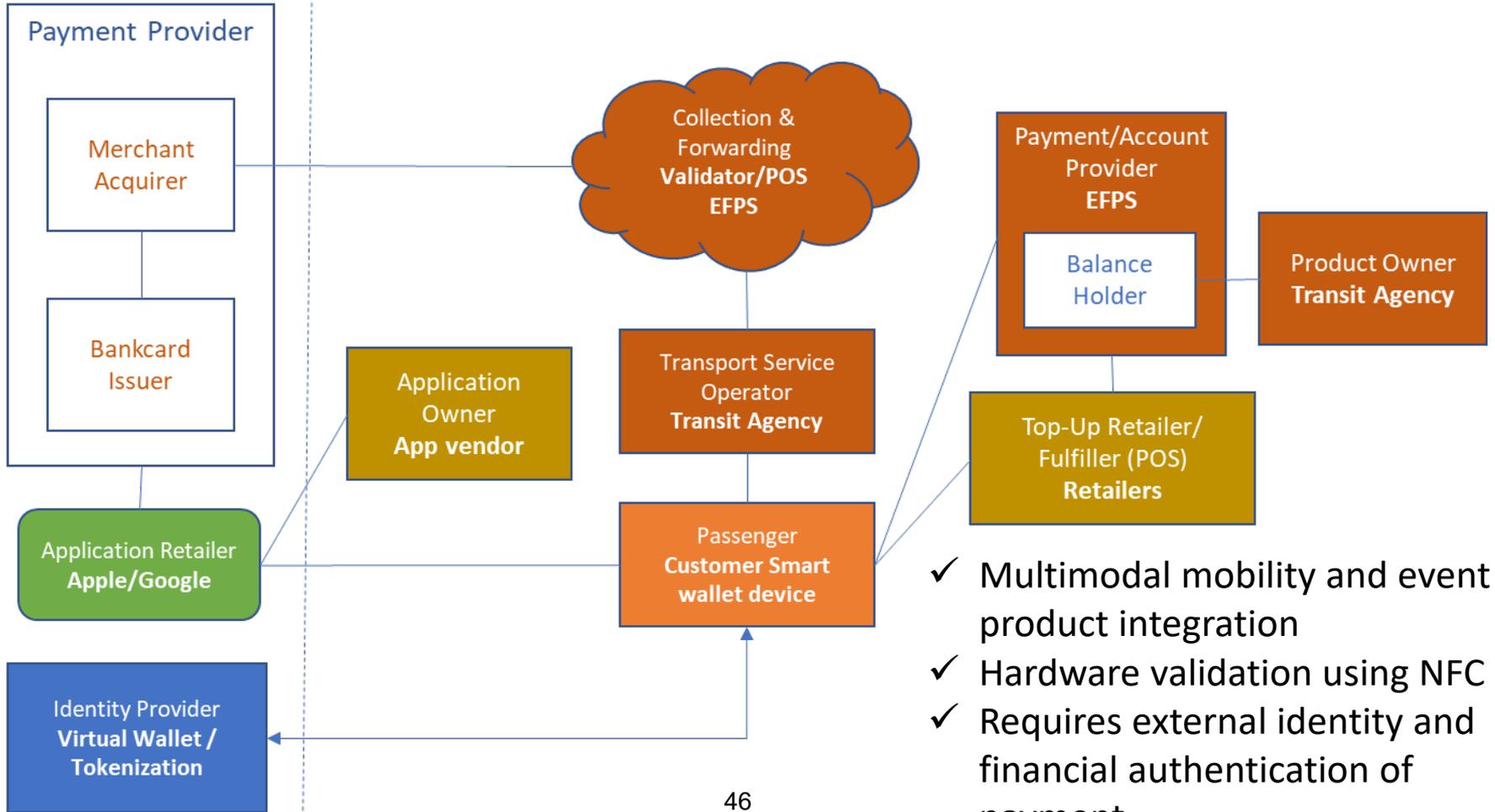
Mobile Fare App Business Models

Open Payment using Transit Wallet

EXAMPLE

External Systems

Internal to IFM System



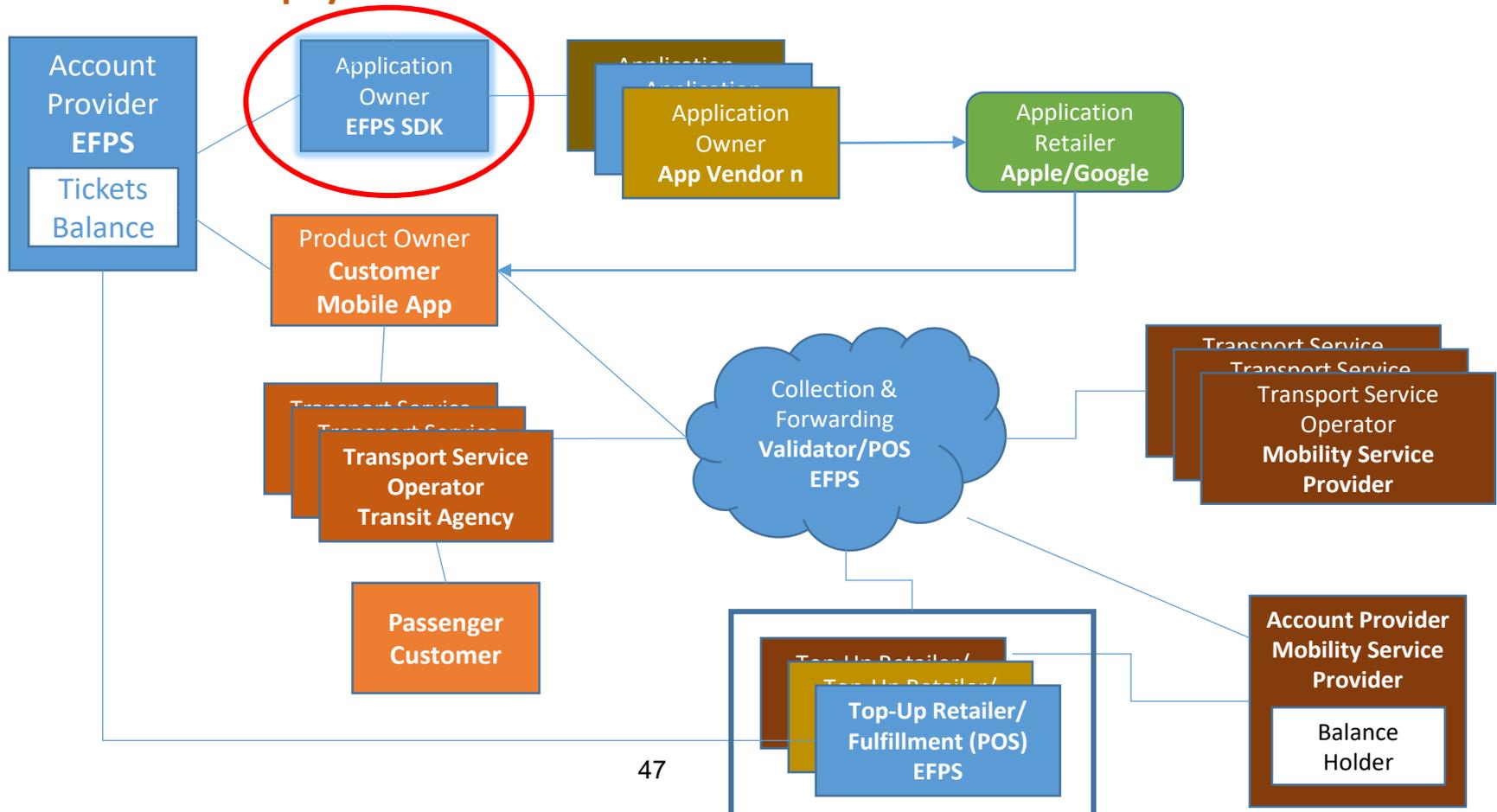
- ✓ Multimodal mobility and event product integration
- ✓ Hardware validation using NFC
- ✓ Requires external identity and financial authentication of payment

Mobile Fare App Business Models

Software Development Kit

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

EXAMPLE



IFMS Concept Model and Use Case Descriptions

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

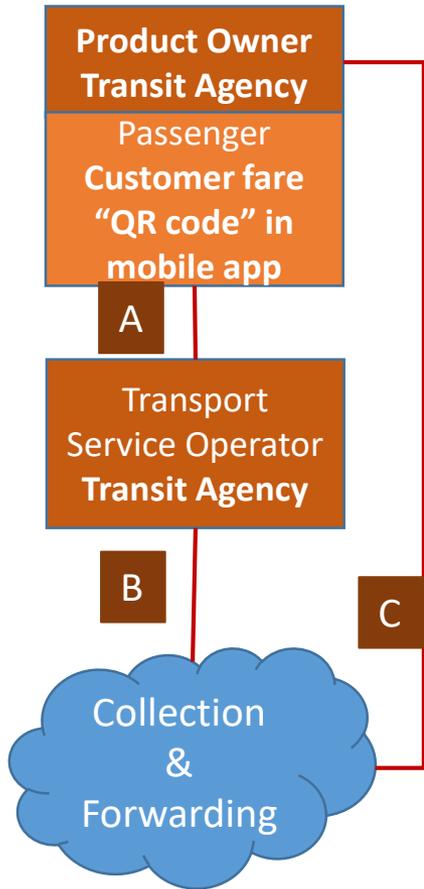
use case

“description of a process by defining a sequence of actions performed by one or more *actors* and by the system itself”

[Source IFMS, Section 2.36]

SUPPLEMENT

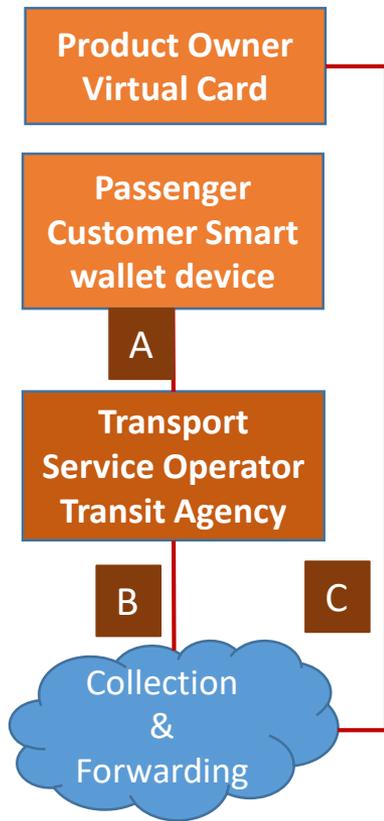
Fare App Actors and Use Cases



Example using a white label with hardware model

Use case name	Use and inspection of products
Outline	The Service Operator checks and collects the data of a Customer Medium using the public transport service.
Triggered by	Service Operator
Actor(s)	Customer Service Operator Collection and Forwarding Product Owner
Use case description	A Customer who uses a product on public transport. The use case consists of several processes performed by the
	A Service Operator: <ul style="list-style-type: none"> — detection and verification of application; — detection, selection and verification of product; — verification of application and product according to security policies;
	B <ul style="list-style-type: none"> — processing of product data; — communication between customer medium and Back Office; — computation of product rules; — collection of the product usage and inspection data;
	C <ul style="list-style-type: none"> — distribution of product usage and inspection data to the Product Owner through the Collection and Forwarding.
	B Inspection consists of <ul style="list-style-type: none"> — simple detection, — detection and verification, or — detection, verification and further processing.

Fare App Actors and Use Cases



Same use case but using an open payment with bank card model

Use case name	Use and inspection of products
Outline	The Service Operator checks and collects the data of a Customer Medium using the public transport service.
Triggered by	Service Operator
Actor(s)	Customer Service Operator Collection and Forwarding Product Owner
Use case description	<p>A Customer who uses a product on public transport. The use case consists of several processes performed by the</p> <p>A Service Operator:</p> <ul style="list-style-type: none"> — detection and verification of application; — detection, selection and verification of product; — verification of application and product according to security policies;
	<p>B</p> <ul style="list-style-type: none"> — processing of product data; — communication between customer medium and Back Office; — computation of product rules; — collection of the product usage and inspection data;
	<p>C</p> <ul style="list-style-type: none"> — distribution of product usage and inspection data to the Product Owner through the Collection and Forwarding.
	<p>B Inspection consists of</p> <ul style="list-style-type: none"> — simple detection, — detection and verification, or — detection, verification and further processing.

ACTIVITY



Question

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

CASE STUDY

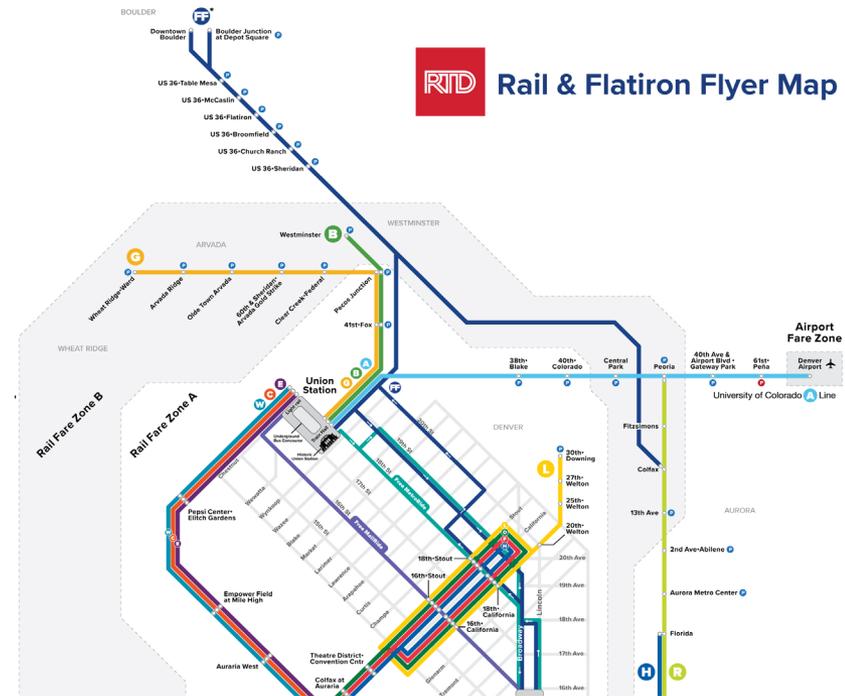


U.S. Department of Transportation
ITS Joint Program Office
Image Source: Thinkstock USDOT

Regional Transportation District -Denver

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)

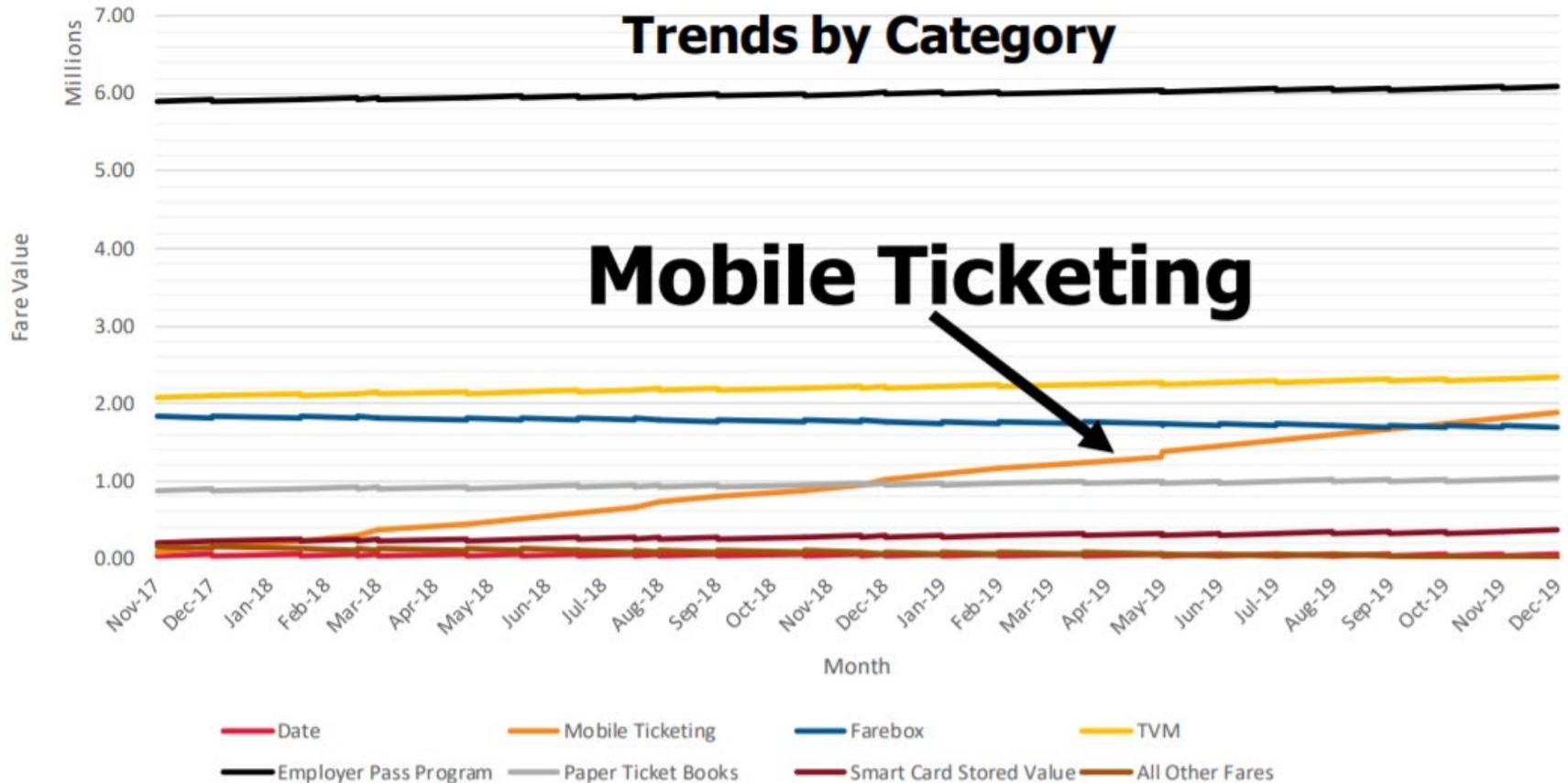


RTD Rail and Flatiron Flyer Map
Courtesy of Tonya Anderson RTD,
presented at Payments Conference 2020

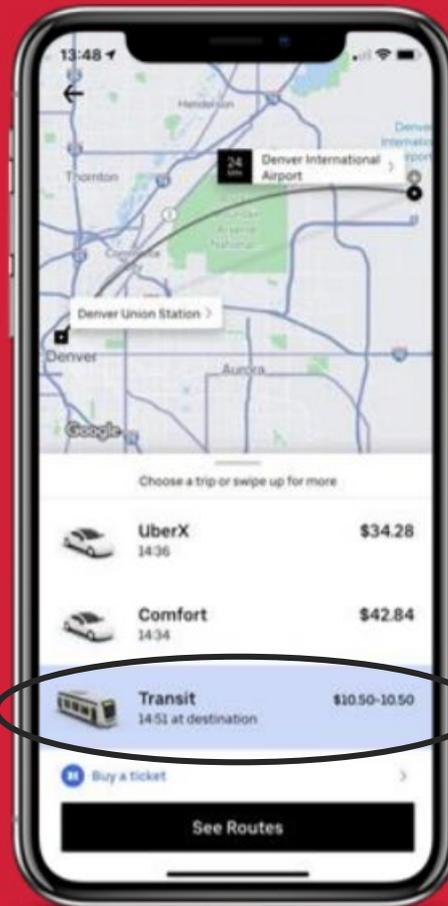
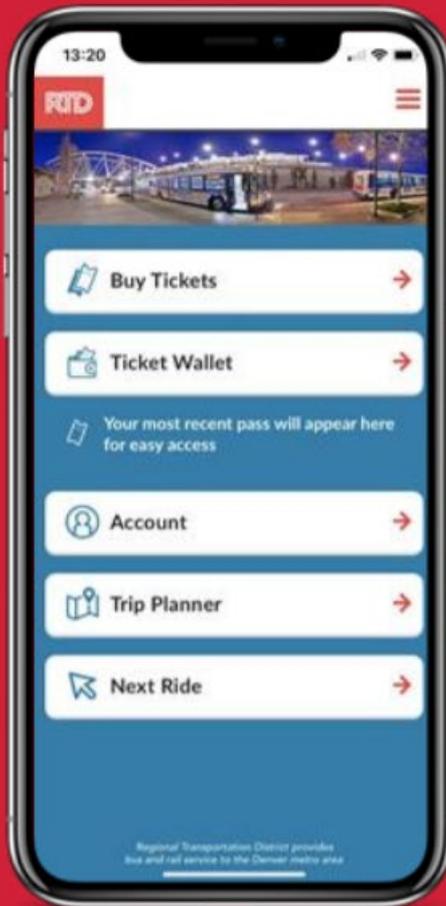
Regional Transportation District -Denver

RTD App Implementation

RTD Denver Passenger Fare Sales - 2019



Mobile Integration with Uber & Next Ride Apps

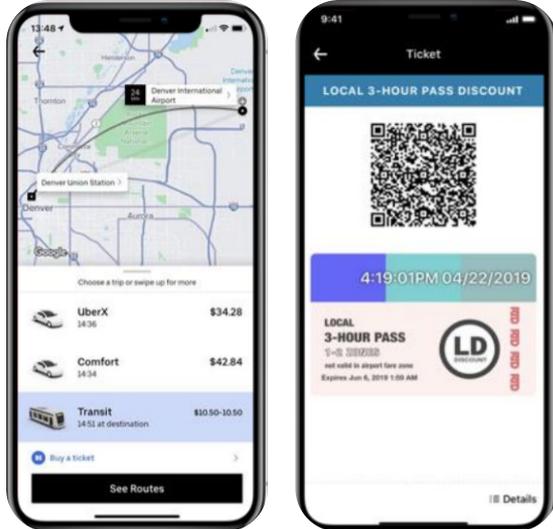


**3 ways
to buy
RTD
tickets**

Regional Transportation District -Denver

RTD App and Uber Integration

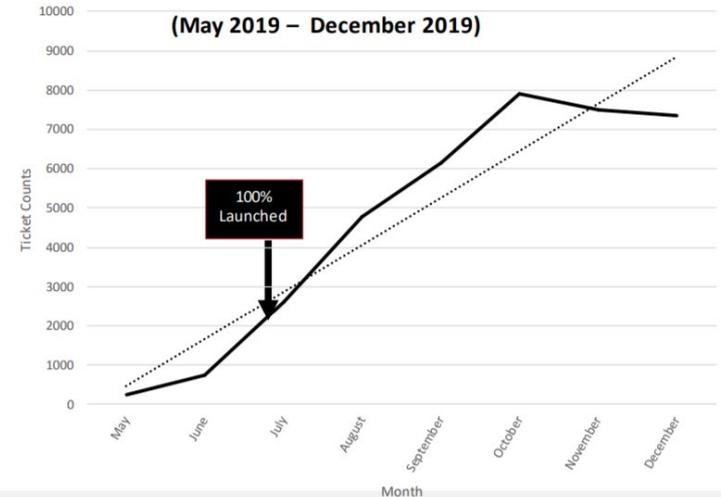
- Happened organically through existing contractual relationship with app provider
- Took advantage of the APIs developed by vendor's SaaS Mobile Ticketing platform to integrate ridehailing service (Uber)



RTD Denver Ticket Sales in the Uber App

44,000
Tickets Sold

16.5%
Month-over-Month
Growth



Courtesy of Tonya Anderson RTD, presented at Payments Conference 2020

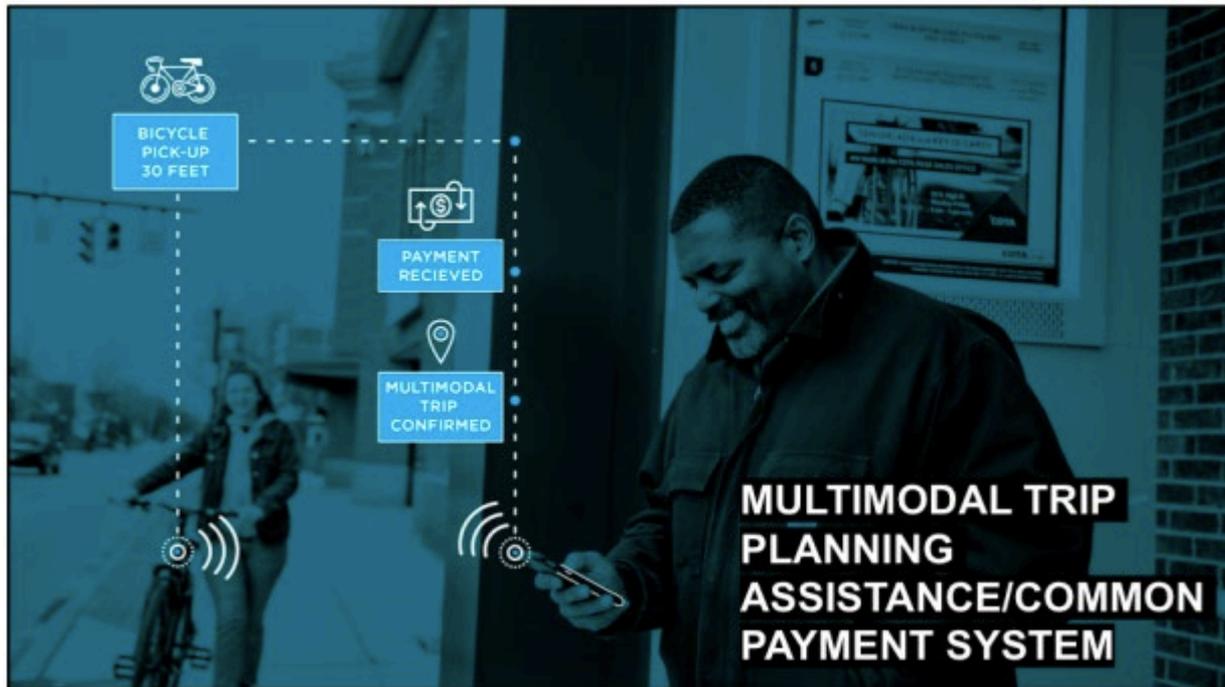
Common Payment System (CPS)

- ✓ 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 Enables the Mobility Marketplace

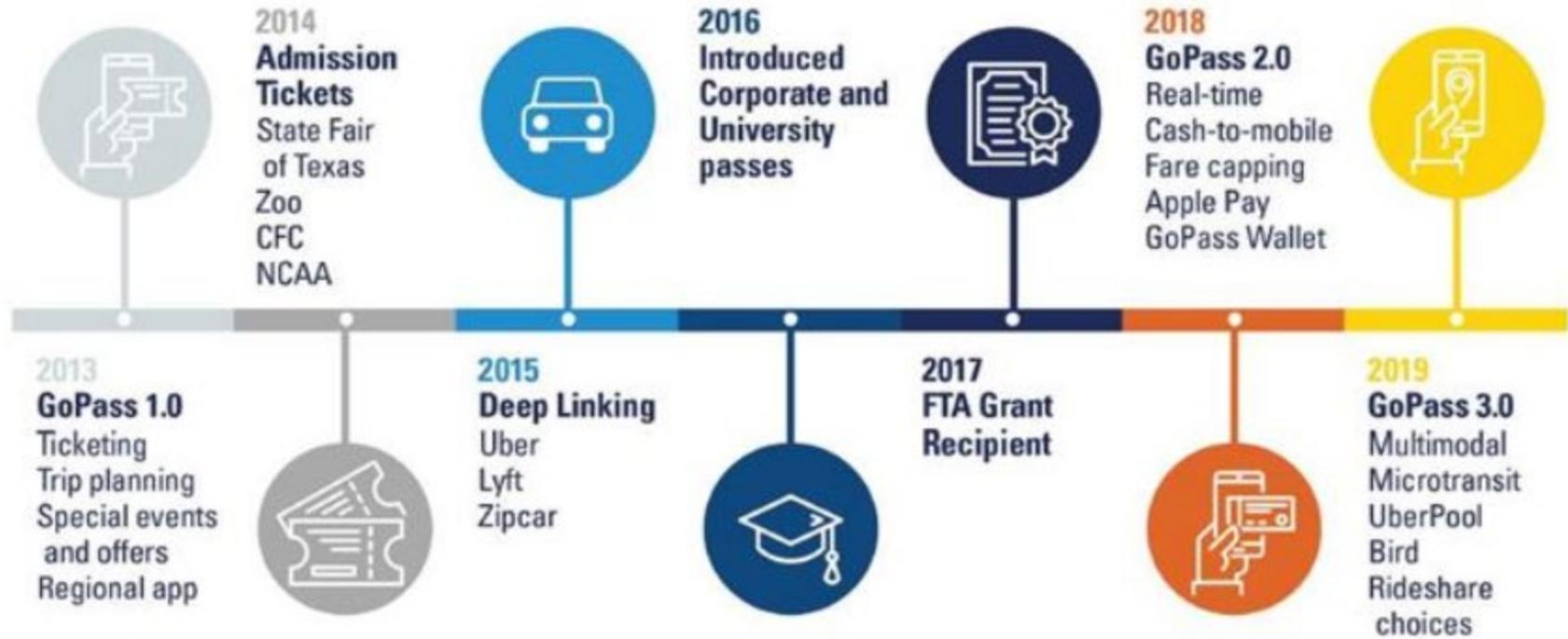


Source: Smart Columbus

CPS APIs integrate with registering cash boxes on bus, taxi, limo, carpool, Via, bikeshare and carshare services, among others.



Dallas Area Rapid Transit



Courtesy of 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

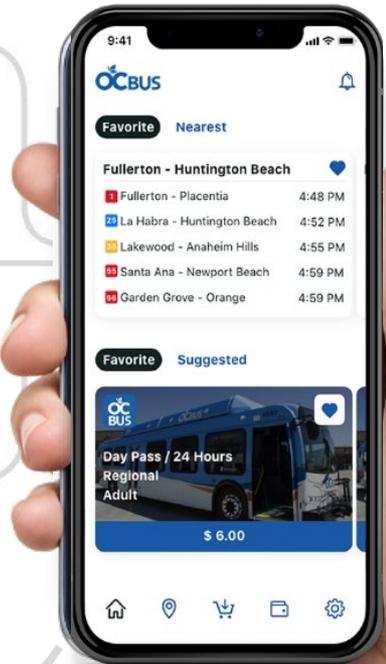
- ✓ Seamless end-to-end directions for Point A – B – C
- ✓ Real-time vehicle status updates
- ✓ Map interface displaying DART vehicles in motion
- ✓ Additional options for TNCs & Micro-Mobility (Uber, Bird)

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

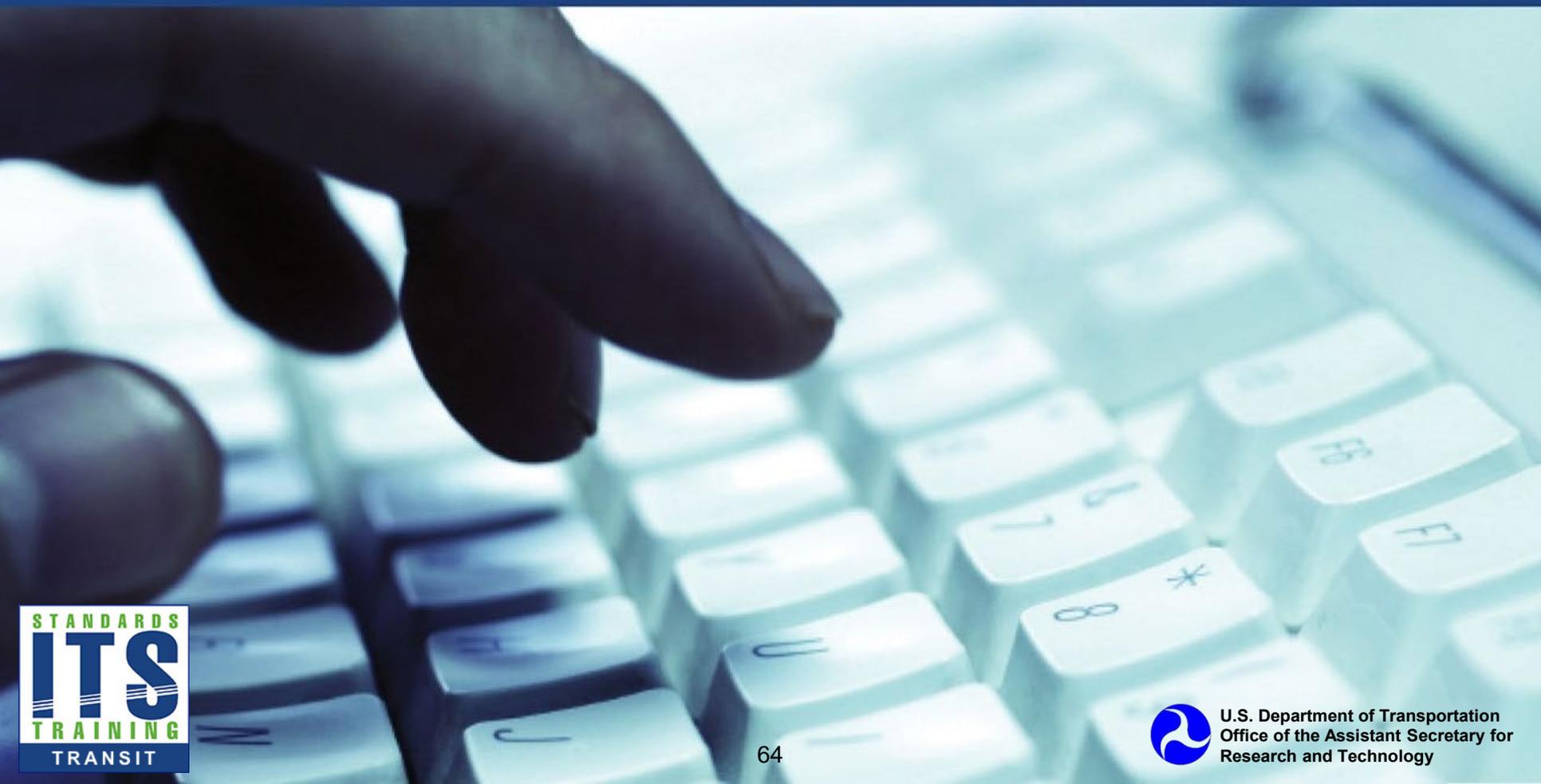
- ✓ GoPass includes full integration of GoLink™ Microtransit booking and payments, powered by Spare
- ✓ VIA Microtransit integration is planned for Q3 2020
- ✓ App intelligently offers Microtransit options for trips with origin or destination within defined zones, linking to transit hubs



Courtesy of Dallas Area Rapid Transit



ACTIVITY



Question

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

Review of Answers



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



Understanding Challenges

Challenges to Implementation

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

Understanding Challenges

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

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

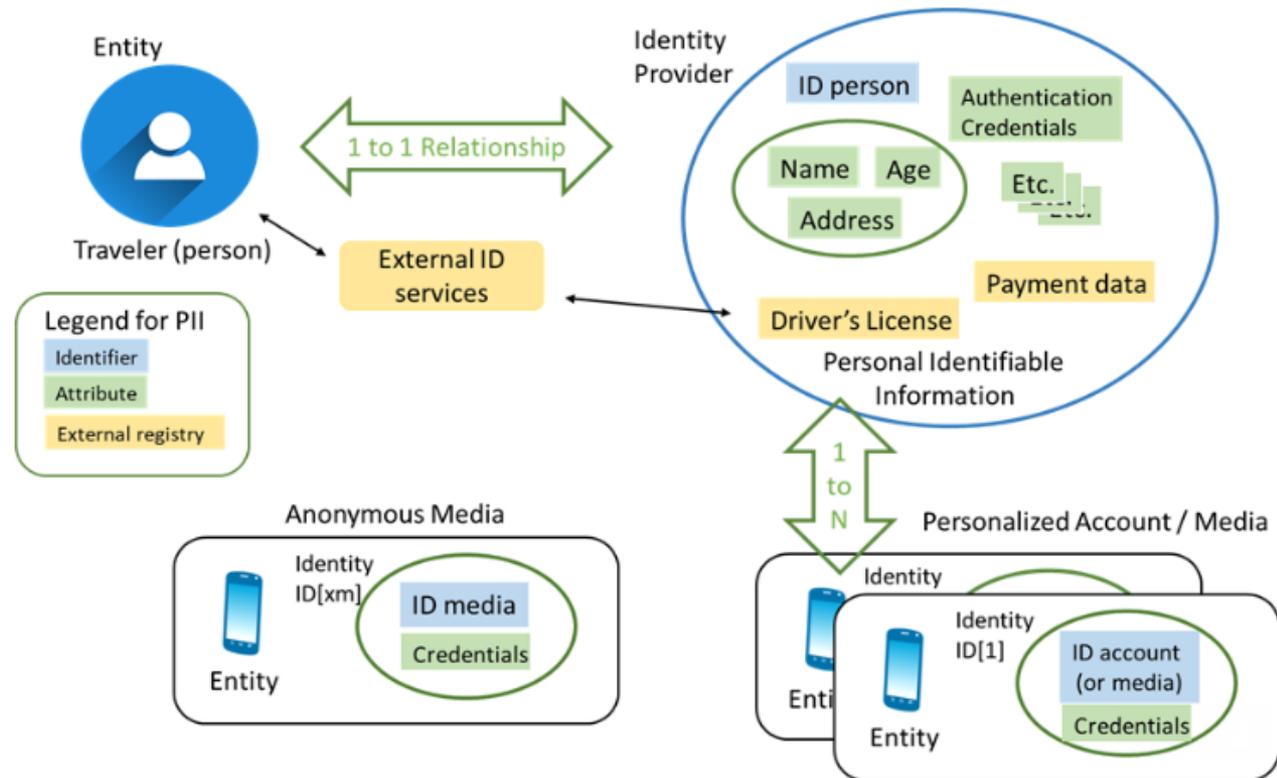
- Reading position
 - What is the optimal position and angle relative to reader
- Signal strength
 - Secure element handoff to NFC communications controller
 - Tap speed – handshake and transfer data
 - Tap distance from reader

Understanding Challenges

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

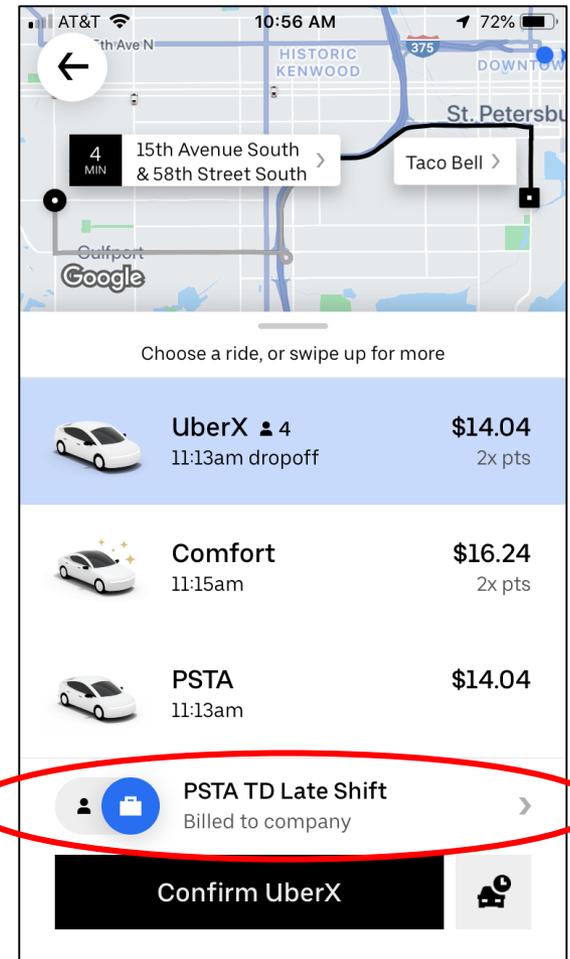
Understanding Challenges

Equity

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

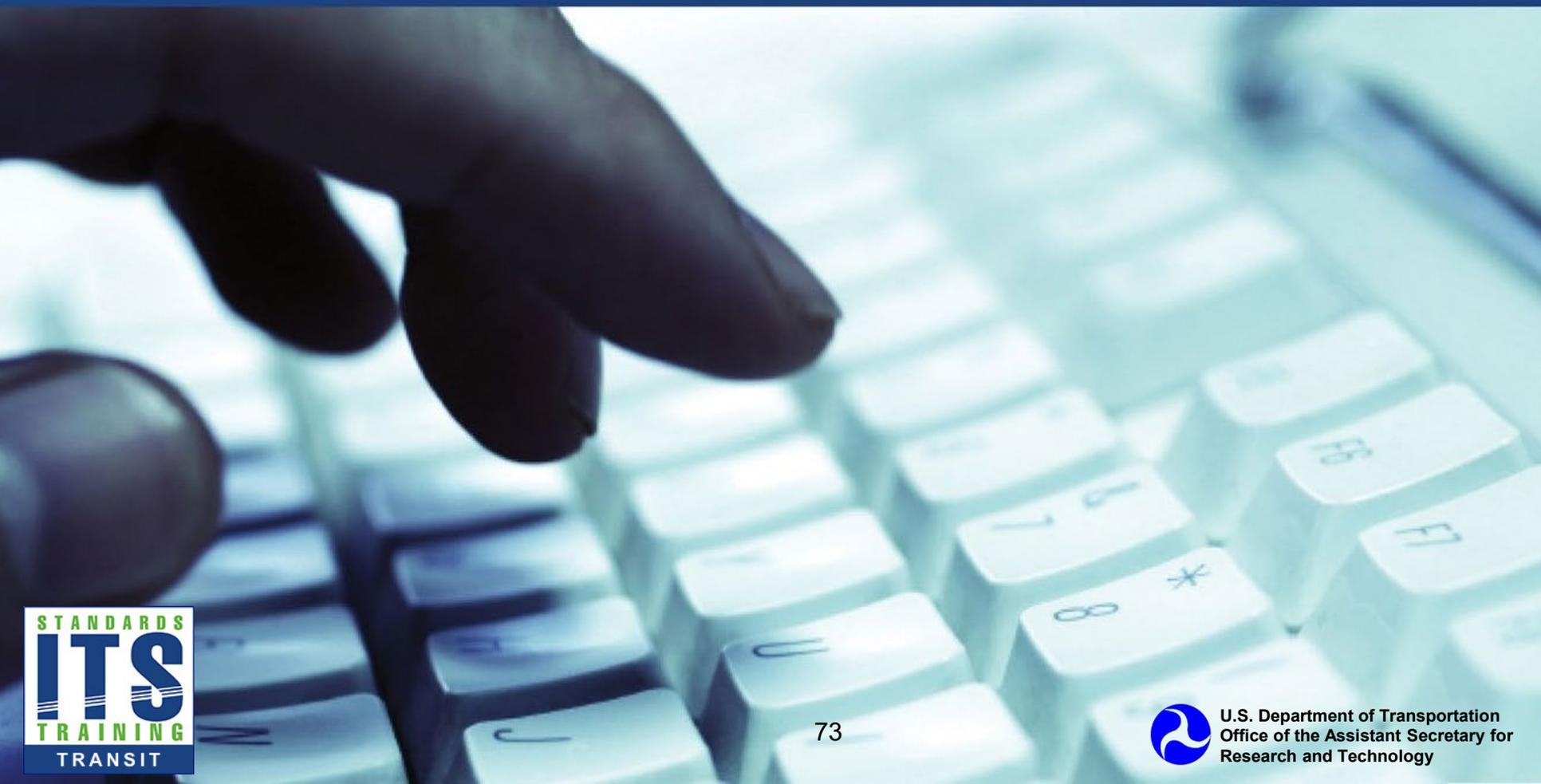


Mobile App for PSTA Direct Connect Program



Courtesy of Bonnie Epstein (PSTA)

ACTIVITY



Question

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!