Preliminary Strategic Analysis of Next-Generation Fare Payment Options for Public Transportation

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2014 Revenue Management Summit
Research Objective

Produce a pragmatic report useful for transit industry practitioners to implement Next Generation Fare Payment Systems
Research Approach

1. Literature research
2. Targeted interviewing
3. Analysis of Real-world Findings
What does “Next Generation Fare Payment System” mean?
What do Transit Agencies call it?

- Open Standards Fare System- OSFP
- New Payment Technologies- NPT
- New Electronic Payments Program- NEPP
- New Fare Payment System- NFPS
- Electronic Fare Payment System- eFare
But what about…

MARTA

Breeze

TAP

Q Card

Charlie
Transit Payment System Progression:

- Closed System, Card-Based Architecture
- Regional Closed System, Card-Based Architecture
- Account-Based Architecture
- Acceptance of Open Payments
PAYMENT SYSTEM GOALS:
It's all about CUSTOMER CONVENIENCE!!!!

Move ... -> from collecting fares to enabling payment
Note to Self: -> to acting more like a retail merchant
Register for APTA Rev Mgmt Summit!!!
-> to private financing of equipment???

SYSTEM FLEXIBILITY!! I don't want to be locked into
my vendor... ★ Future-proof the system!!

Open Architecture.... HOW? What?
Typology- Interim Deliverable

Breakdown of fare payment options based on goals, priorities, and limitations for each transit agency.

Targeted review of:

1) Technology and system options
2) Transit operators' needs/requirements
### Payment Systems Functional View

<table>
<thead>
<tr>
<th>Fare Media Issuance and Management</th>
<th>Payment</th>
<th>Point of Sale</th>
<th>Transit Payment System Operation</th>
<th>Clearing and Settlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Issuance</td>
<td>- Media and fare product validity</td>
<td>- Front-end points for payment and reload, e.g.</td>
<td>- Distributed IT network performs data collection and forwarding. Data flows include:</td>
<td>- Financial reconciliation</td>
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<td>- Fare cost generation</td>
<td>- Fare gates</td>
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<td>- Registration</td>
<td>- Payment processing</td>
<td>- Fare boxes</td>
<td>- Device health and welfare</td>
<td></td>
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<td>- Third-party card sales</td>
<td>- S/W upgrades</td>
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- Media and fare product validity
- Fare cost generation
- Payment processing

Fare Media Issuance and Management
- Issuance
- Personalization
- Registration
- Revocation

Front-end points for payment and reload, e.g.
- Fare gates
- Fare boxes
- Vending machines
- Websites
- Third-party card sales

Distributed IT network performs data collection and forwarding. Data flows include:
- Transaction
- Device health and welfare
- Fare table
- Revocation lists
- S/W upgrades

- Financial reconciliation
- Business rules management
- Operational changes promulgation
## Closed Payment System, Card-based Architecture

<table>
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<tr>
<th>Description</th>
<th>Responsible entity</th>
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<tr>
<td>Transit only, stored value</td>
<td>Transit Agency/Contractor</td>
<td>Smart Card</td>
<td>Readers/Validators</td>
<td>Transit Agency System</td>
<td>Proprietary</td>
<td>Occurs in Agency system</td>
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<td></td>
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<td></td>
<td>Transit Agency/Contractor</td>
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</tr>
<tr>
<td>Performed at card-reader interface</td>
<td>Transit Agency/Contractor</td>
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</tr>
<tr>
<td>Fully integrated in reader/validator</td>
<td>Transit Agency/Contractor</td>
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</tr>
</tbody>
</table>

**Description**
- Transit only, stored value

**Responsible entity**
- Transit Agency/Contractor
Closed Payment System, Card-based Architecture, Regional System, Lead Agency

**Media Issuance and Management**
- Lead Agency Smart Card
- Lead Agency Smart Card
- Lead Agency Smart Card

**Payment**
- Lead Agency Readers/Validators
- Regional Agency 1 Readers/Validators
- Regional Agency n Readers/Validators

**Point of Sale**

**Transit Payment System Operation**
- Lead Agency System
- Regional Agency 1 System
- Regional Agency n system

**Clearing and Settlement**
- Lead Agency Central Computer System

**Responsible entity**
- Lead Transit Agency/Contractor
- Transit Agency/Contractor
- Transit Agency/Contractor
- Transit Agency/Contractor
- Lead Transit Agency/Contractor
Regional System, Regional Administrator

Media Issuance and Management:
- Regional Administrator/Contractor
- Regional Smart Card
- Regional Smart Card
- Regional Smart Card

Payment:
- Regional Agency 1
- Regional Agency 2
- Regional Agency n
- Readers/Validators

Point of Sale:
- Regional Transit Agency/Contractor
- Regional Agency 1
- Regional Agency 2
- Regional Agency n
- System

Transit Payment System Operation:
- Regional Transit Agency/Contractor
- Regional Agency 1
- Regional Agency 2
- Regional Agency n
- System

Clearing and Settlement:
- Regional Administrator or Contractor
- Regional Central Computer System
Proven, Reliable, Convenient
Account-Based Approach Pioneered at Utah Transit Authority
Account-based Fare Payment System

**Media Issuance and Management**
- **Description**: Media is a credential or token
- **Responsible entity**: Transit Agency/Contractor or Third parties
- **Smart Card**

**Payment**
- **Description**: Handled in central system. Divides system access and payment.
- **Responsible entity**: Transit Agency/Contractor

**Point of Sale**
- **Description**: Only validates fare media
- **Responsible entity**: Transit Agency/Contractor

**Transit Payment System Operation**
- **Description**: Payment performed here
  - Fare Calculation
  - Account Management
- **Responsible entity**: Transit Agency/Contractor

**Clearing and Settlement**
- **Description**: Occurs in the transit agency system.
- **Responsible entity**: Transit Agency/Contractor

**Transit Agency System**
- **Readers/Validators**
- **Transit Agency Computer Network**
Acceptance of Open Financial Payments

**Media Issuance and Management**
- Open Payment Media

**Payment**
- Performs only payment authentication
- Ubiquitous, Standards-based media; transit agency a merchant

**Point of Sale**
- Performs media validation
- “plug and play” POS

**Transit Payment System Operation**
- Fare cost generation
- Transportation account mgmt

**Clearing and Settlement**
- Financial reconciliation only

**Responsible entity**
- Issuing Banks
- Financial Payments Network

**Description**
- Ubiquitous, Standards-based media; transit agency a merchant

**Transit Agency System**
- Financial Payments Network
Open and Mobile Payment Acceptance
Taking Hold

CapMetro App.
Payment Media Capabilities

“Purpose built” for transit/transport fare/fee collection

Adaptable by transit/transport*

Customer Convenience

Data Collection

Fare Structure Flexibility

Security
System Architecture Flexibility

“Purpose built” for transit/transport fare/fee collection

Adoptable by transit/transport*

Customer Convenience

Data Collection

Procurement/Sourcing Flexibility

Migration/Partnering Capabilities

Fraud Prevention

Need for Standards

Implementation Risk
Acceptance of Multiple Payment Types

**Description:**
- Maximizes media flexibility

**Responsibility:**
- Various: Issuing Banks, Transit Agency, other Third Parties

**Media Issuance and Management**
- Open Pymt Card
- Transit Card
- Mobile Ticket
- Mobile Open Pymt
- Employer Credential

**Payment**
- Combo of open payments and closed payments processing
- Open: Financial Payments Network
- Closed: TA/Contractor

**Point of Sale**
- Multiple APIs for various payment types.
- Transit Agency/Contractor

**Transit Payment System Operation**
- Fare cost generation
- Transportation account mgmt
- Transit Agency/Contractor

**Clearing and Settlement**
- Combo of open payments and closed payments C&S
- Open: Financial Payments Network
- Closed: TA/Contractor
Regional Transportation Account

### Media Issuance and Mgmt
- **Transit Agency**
  - {1, 2, …n} Media
- **Parking**
  - {1, 2, …n} Media
- **Toll Media**
- **Other Partner**
  - {1, 2, …n} Media

### Payment

1. **Payment System Operation**
   - Agency {1, 2, …n} Account Mgmt
   - Parking {1, 2, …n} Account Mgmt
   - Toll System Account Mgmt
   - Card Share, Ride Share, etc. Account Mgmt

### Point of Sale

- Varies for each partner operator

### Payment System Operation

- Partner systems are independent.
- Operator/Contractor for each partner

### Clearing and Settlement

- Account linkage enables cross-modal convergence
- Account Linkage/Mgmt
  - Partner Clearing and Settlement
  - Benefit Mgmt
  - Incentives

### Description

- Partners’ media independent of others

### Responsible entity

- Various

- Varies for each partner operator

- Varies for each partner operator

- Operator/Contractor for each partner

- Varies
TODAY - Next Generation Fare Payment

- Architecture Flexibility
- Fare Media Flexibility

Future Proof System
Interview Practitioners

Mini-case studies

Analysis of Real-world Findings