eFare Expansion Feasibility Workshop

Session 2 – Technical Requirements

January 2017

Hop Fastpass

Myhopcard.com

Agenda

I. Goals

II. Introduction to Hop Fastpass System Design

III. Technical Requirements

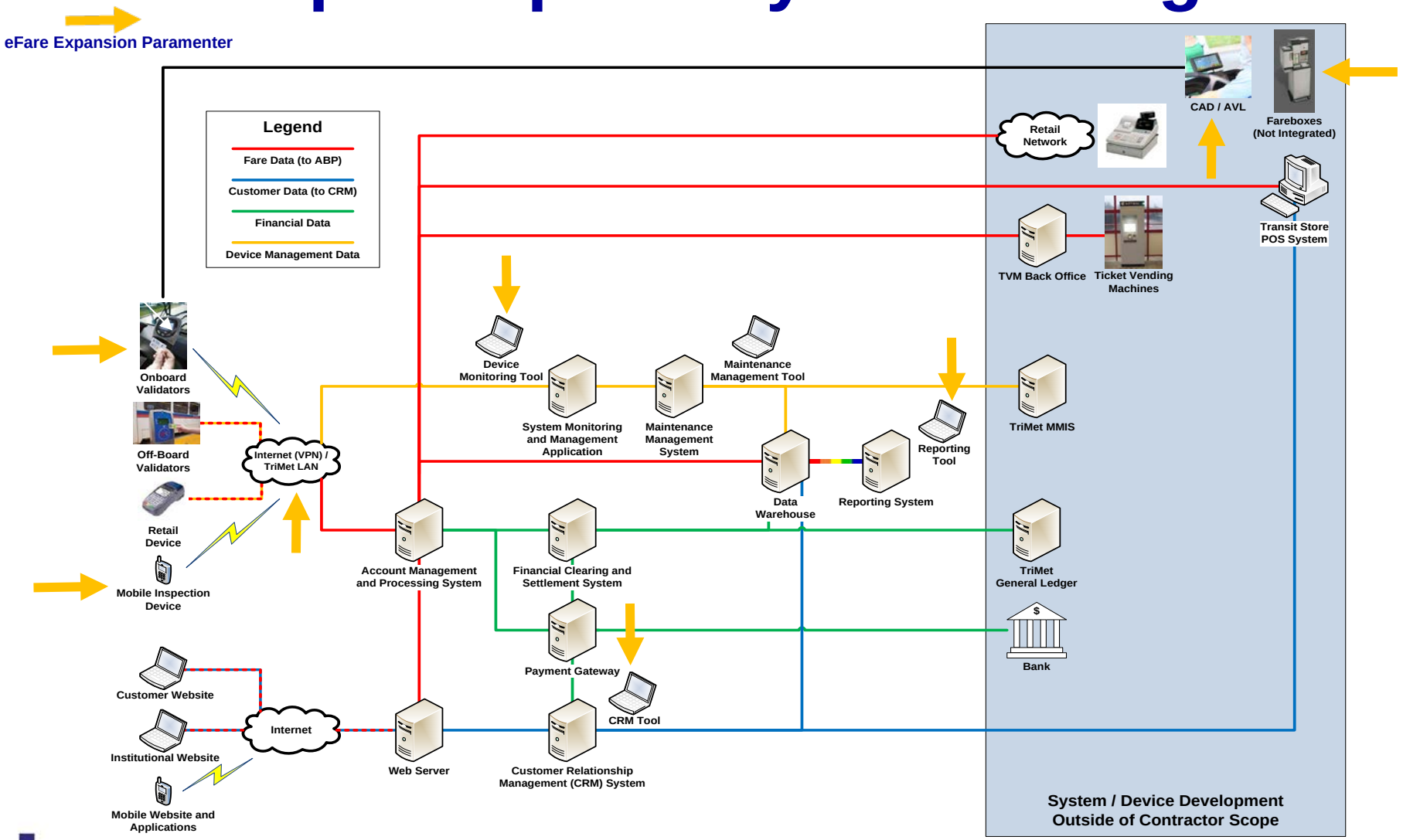
IV. Technical Options

V. Takeaways

Goals

- **Introduce Hop system technical components and requirements**
- **Identify likely implementation equipment and systems**

Hop Fastpass System Design



Hop Fastpass Card Readers

- INIT-manufactured FEIG payment validators are the customer facing devices inside transit vehicles/on MAX platforms that are used to pay transit fares
- Certified PCI-DSS 3.0, allowing for the acceptance of open-loop payment
- Remotely configurable and monitored through a real-time INIT-developed application called MOBILEsymon
- Communication with the INIT backend occurs through Ethernet connected cellular-enabled data routers
- Provide a payment result within 500 milliseconds
- Can accept payment in offline mode

Hop Fastpass Card Readers

- Dimensions: 5.5 inches by 8.3 inches by 1.6 inches (width x height x depth)
- Weight: 2.43 lbs.
- Power Supply: 8 V – 33V; max 10 watts
- Display: 4.75 inches in diameter

Installed using quick-change bracket; device secured by lock

Technical Requirements

Transaction Data Communications Requirement:

- **A data tunnel provides access from the validator to the backend system**
- **Two Options:**
  - **Agencies use TriMet Access Point Network (APN)**
    - This is Streetcar's approach
    - Will require a VPN to access the backend
  - **Agencies use their own APN**
    - This is C-TRAN's approach
    - Used when operators have more devices onboard, such as closed-circuit cameras)
    - Establish a VPN tunnel to TriMet
- **Data contract with a cellular provider is required**

Technical Requirements

- **Hardware – on-board validators**
  - CAD/AVL integration or standalone solution
  - Can procure other validators, but INIT manufactured validators are more cost effective and an easier integration
  - If Open Payment is supported, INIT validators are required
- **May need to involve 3rd Party vendors**
  - ReadyCredit – to add retail stores to network
  - moovel – fare inspection app, if needed
    - Available on Android and iOS
- **Maintenance**
  - First line maintenance is required of the agency (Training is provided)
  - If first line maintenance doesn't resolve the issue, pop and swap the validator and send back to INIT
- **System Participant Interfaces**
  - Reports (web-based reporting tool)

Technical Options

- **On-board equipment - CAD/AVL integration**
  - Hop Fastpass and CAD/AVL integration supports a single sign-on, provides route and stop information and captures geo-location data
  - An integration allows the display of fare information to the operator
    - Fare Payment Result
    - Fare category associated with the transit account
  - API is vendor agnostic, but the INIT provided integration API (ISI) is needed
  - Integration is necessary to differentiate fares
    - Distance based fares
    - Type of service (e.g. local vs. express)
  - Integration allows for refined service planning capabilities
  - INIT can offer the basic version of the CAD/AVL system for driver/route login and fare payment results
- **On-board equipment – other integration options**
  - Farebox, mobile data terminal (MDT), or other integration option is possible
  - Achieve single sign-on
  - Utiliize INIT API

Technical Options

- **Fare Inspection Equipment**
  - Utilize moovel app for Android or iOS
- **Point-of-Sale Device –** ticket windows
  - Dedicated device for vending of value and cards, and providing customer service
- **TriMet Interfaces and Systems**
  - Device Monitoring
  - Revenue Management
  - Customer Relationship Management (CRM) Tool
  - Data Warehouse

Takeaways

- **Technical Requirements**
  - Communications – cellular provider; communications with TriMet
  - Hardware – on-board equipment (integrated or with stand-alone solution)
    - ***Consideration*** *– where will the validator work / equipment size?*
  - Retail – ReadyCredit; fare inspection - moovel
- **Technical Options**
  - On-board equipment integration
    - CAD/AVL
    - Farebox, mobile data terminal, other
    - ***Consideration*** *– what type of functionality needs to be supported (e.g., different fares for different routes), and is integration required?*
- **Maintenance –** first-line maintenance – operator responsibility
- **Fare inspection –** optional, utilizing moovel app
- **Retail & Sales** – optional with ReadyCredit (retail) or stand-alone device (ticket office)

eFare Expansion Feasibility Workshop

Session 3 – Financial, Accounting, and Data

January 2017

Hop Fastpass
Myhopcard.com

Agenda

I. Goals

II. Participant Roles

III. Accounting and Reconciliation Overview

IV. Reports and Data

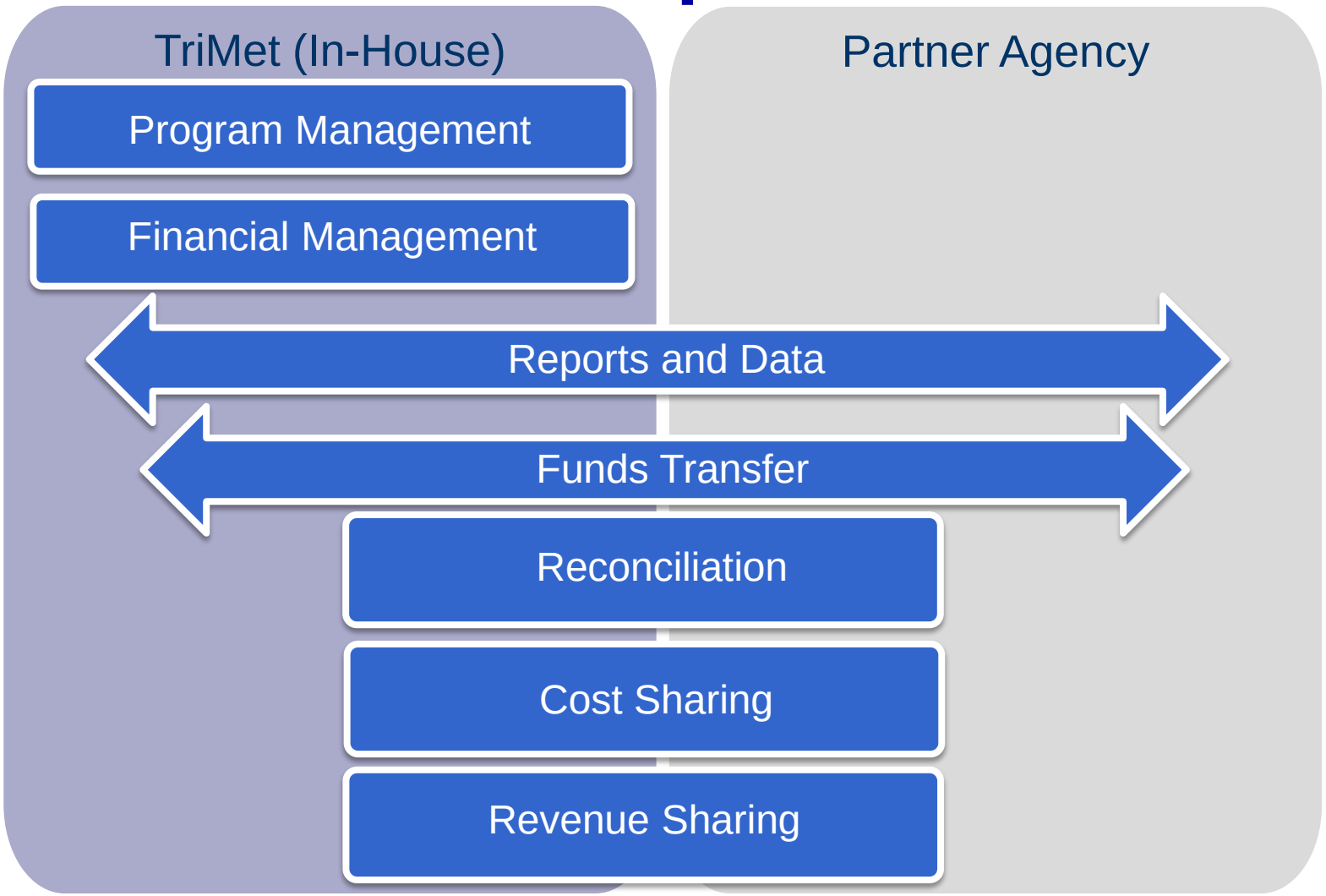
V. Funds Transfer Process

VI. Takeaways

Goals

- Provide an overview of financial roles of system participants
- Review data and reporting access and availability
- Any technical requirements

Roles and Responsibilities



Accounting and Reconciliation

- Capturing sales transactions (Institutional and Passenger)
- Capturing payment transactions (Institutional and Passenger)
- Processing usage transactions (Ridership)
- Recording deferred revenue
- Recognizing earned revenue
- Calculating shared revenue
- Sales channels (retail network, mobile account management app, interactive voice response system, customer website, institutional website)
- Payment codes (cash, credit, debit card, ACH)

Reports and Data

- **Pre-existing financial reports**
  - Under development – January 2017
- **Usage reports**
- **Report requests**
- **No data system integration**
- **Data available in CSV/XLS formats**
- **Data Warehouse (TriMet)**

Funds Transfer – Revenues and Fees

- **Monthly funds transfer**
  - TriMet-agencies
  - Supported by financial reports
- **Revenue and cost sharing**
  - Net out operating costs from revenues
  - Option – net out capital costs from revenues (pre-defined time period)

Takeaways

- **Monthly funds transfer**
- **Financial reports – available from TriMet**
  - Available in CSV/XLS formats
  - New report requests → TriMet support
- **Net out revenue and fees through financial settlement**
- **Data warehouse maintained by TriMet**

eFare Expansion Feasibility Workshop

Session 4 – Cost Structure

January 2017

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Agenda

I. Goals

II. Cost Overview

III. Cost and Revenue Sharing

IV. Cost Scenarios

V. Takeaways

Goals

- Provide an overview of capital and operating costs
- Introduce cost and revenue sharing
- Provide cost scenarios and examples

Capital Cost Overview

- **Direct Capital Costs**
  - Electronic validators
  - Vehicle inspection
  - Handheld fare inspection devices
  - Retail sales devices
  - Mounting equipment
  - Contactless card costs
  - Installation costs
  - Site preparation, if applicable
  - Technical assistance
- **Allocated Capital Costs**
  - Back Office hardware, software and licenses
  - Test environment hardware, software & licenses, if applicable
  - Training costs, if applicable
  - Documentation costs (O&M manuals, training guides, DVDS, etc)

Operating Cost Overview

- **Hop System Annual Operating Costs**
  - Call center operations
  - TriMet Labor (Program Management & Back Office Support)
  - Other TriMet Incurred Costs
  - INIT Software Escrow
  - INIT Software Maintenance Agreement
  - GlobeSherpa Maintenance Agreement
  - Retail Network Commission
  - Credit/Debit Sales Processing Fees

Cost Sharing

Cost Sharing

- **Capital – based on the Ridership Allocation**
  - Proportional amount of total ridership with respect to the group.

Ridership Allocation

Agency	FY13 *Ridership	Share of regional costs
TriMet	100,368,630	90.29%
C-TRAN	6,713,021	6.04%
Streetcar	4,078,639	3.67%
Total	111,160,290	100.00%

*Actual ridership, Aeriel Tran mot factored in yet.

Note: Used to allocate engineering costs by agency

- **Operational – based on the Tap Allocation**
  - Proportional amount of revenue ridership with respect to the group.

Tap Allocation

Agency	FY14 *Revenue Boardings	Share of regional costs
TriMet	79,000,000	90.54%
C-TRAN	6,250,000	7.16%
Streetcar	2,000,000	2.29%
Total	87,250,000	100.00%

*Revenue Boarding defined as the each agency's total number of eFare revenue boardings involving a fare payment transaction, divided by the total of all eFare revenue boardings by all agencies. The revenue Boardings above are an estimate for illustrative

Note: Used to allocate operating costs by agency

Example: Capital Cost Overview

Hop capital cost for allocation

- Software development, testing, documentation and integration for system integrator, mobile application provider, website provider, retail provider

  Implementation cost: ~$13M capital costs for Hop implementation

  Participant share based on **Ridership Allocation**

  Scenario: 250,000 trips = ~0.22% of total ridership → ~$30,000 share of $13M

Direct participant costs

- System software development and testing necessary for implementation
- On-board equipment (~$2,500/vehicle)
- Additional equipment (sales terminal, handheld)
- Training, marketing, etc.

  Example: C-Tran, ~100 vehicles, direct cost: ~$450,000

Example: Operating Cost Overview

System costs for allocation

- Call center; TriMet PM, back office and other costs; Moovel web app; retail network commissions; credit/debit processing fees

  Estimate: ~$400,000 annual system operations costs

  Participant share based on **Tap Allocation**, assessed monthly

Direct participant costs

- Network communications
- Hop equipment maintenance costs (ongoing)
- Labor – finance & accounting, program management, etc.

Revenue Sharing

Revenue Sharing

- **Fare Allocation** formula accounts for inter-agency transfers and fare capping
- Applicable to **stored value** and **fare products** (based on rides taken).
- Allocated proportionately based on **where rides were taken by fare**.

Example 1

Boarding Rides, Fares and Revenue for Exan

Agency & Service	Base Fare	Fare Paid	Boarding Time	Boarding
TriMet Fixed Route	$2.50	$2.50	9:30 AM	1
Portland Streetcar	$2.00	$2.00	12:00 PM	2
Total	$4.50	$4.50		

Agency	Revenue
TriMet	$2.50
Portland Streetcar	$2.00

Example 2

Boarding Rides, Fares and Revenue for Exan

Agency & Service	Base Fare	Fare Paid	Boarding Time	Boarding
TriMet Fixed Route	$2.50	$2.50	9:30 AM	1
Portland Streetcar	$2.00	$0.00[1]	10:30 AM	2
Portland Streetcar	$2.00	$2.00	3:00 PM	3
Total	$6.50	$4.50		

[1] Transfer

Agency	Revenue
TriMet	$1.73
Portland Streetcar	$2.77

Takeaways

- **Capital cost**
  - Hop system capital cost sharing – proportional based on share of total ridership (Ridership Allocation)
    - Back office system development and testing, hardware and software development and testing/certification, web, mobile app, retail
  - Direct capital cost – equipment (on-board, sales terminal(s), handheld); additional back office system development; installation; training; launch
- **Operating cost**
  - Hop system operations cost sharing – proportional based on share of total revenue trips (Tap Allocation)
  - Direct operating costs – equipment maintenance, pm, accounting
- **Revenue Sharing**
  - Allocates revenue proportionally based on where rides were taken

Attachment – Capital Cost Detail

- **Allocated Capital Costs - detail**
  - **Capital Non-reoccurring Engineering Costs**
    - Back Office Systems
      - Technical services consulting (currently awarded to CH2M)
      - Maintenance management system
      - Customer Relationship Management (CRM) system
      - Applicable system integration costs, project management
      - Testing and documentation
      - Installation costs
      - Training costs
    - Data and Reporting
      - Financial clearing & settlement system
      - Data warehouse
      - Reporting system
    - Device Software
      - Transaction processor
      - Device monitoring system
      - Retail device software
      - Validator software
      - Handheld device software

eFare Expansion Feasibility Workshop

Session 5 –Customer Service, Operations, Launch Preparedness

January 2017

Hop Fastpass

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Agenda

I. Goals

II. Customer Experience

III. Operational Components

IV. Launch Preparedness

V. Takeaways

Goals

- **Overview of the Hop Fastpass customer touchpoints, operations and launch preparedness**
  - Customer experience: call center, cards, retail, etc.
  - Training, card distribution, enforcement
  - Launch preparation overview

Customer Experience – Call Center

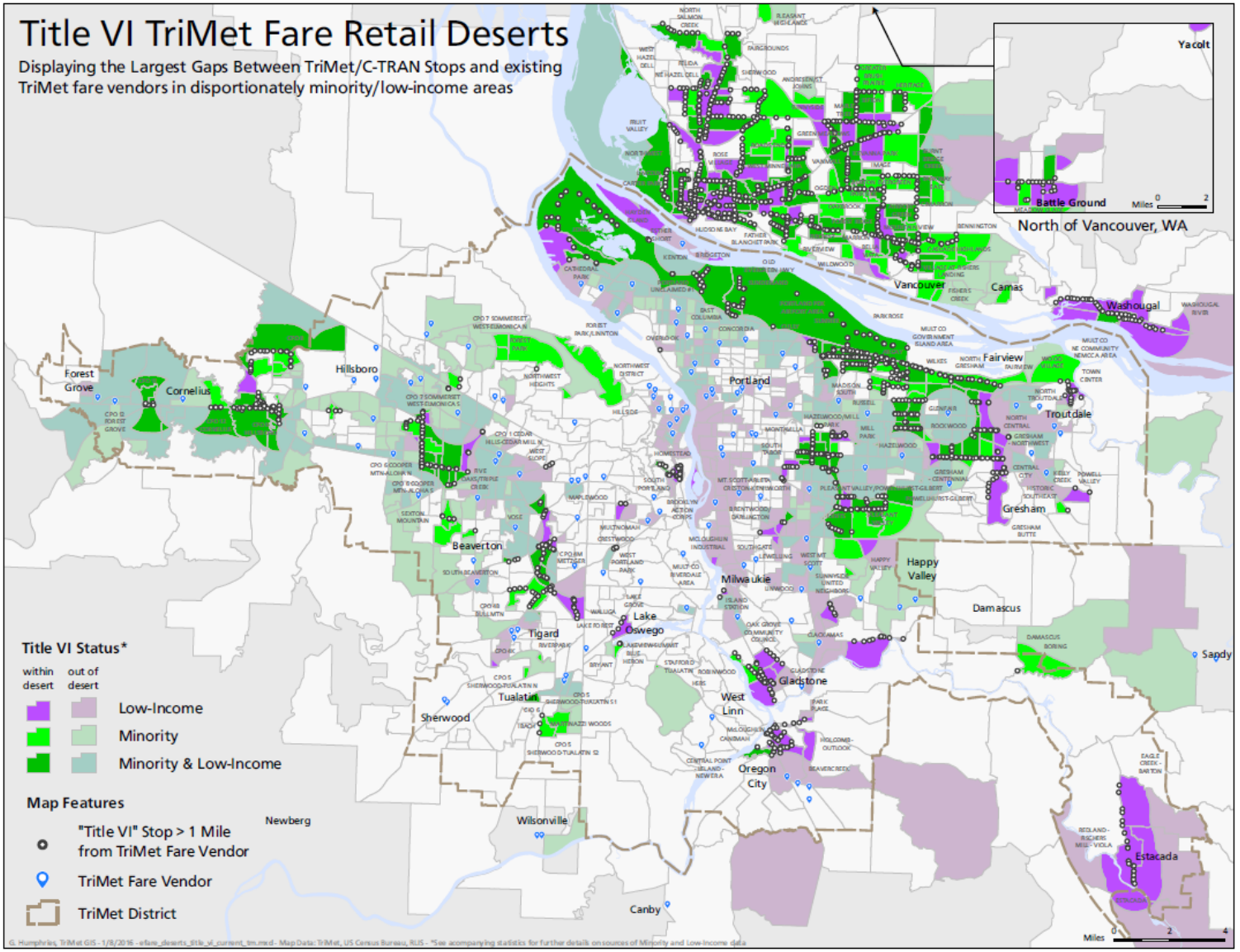
- **TriMet will operate the Hop Fastpass regional call center**
- **The call center will utilize a customer relationship management system (CRM) developed by INIT to:**
  - Create and modify customer accounts, including payment data
  - Load eFare value
  - View transaction history and fare calculation
  - Modify balances through transfers and refunds
  - Fulfill and manage orders
  - Track customer incidents

Customer Experience – Hop Cards

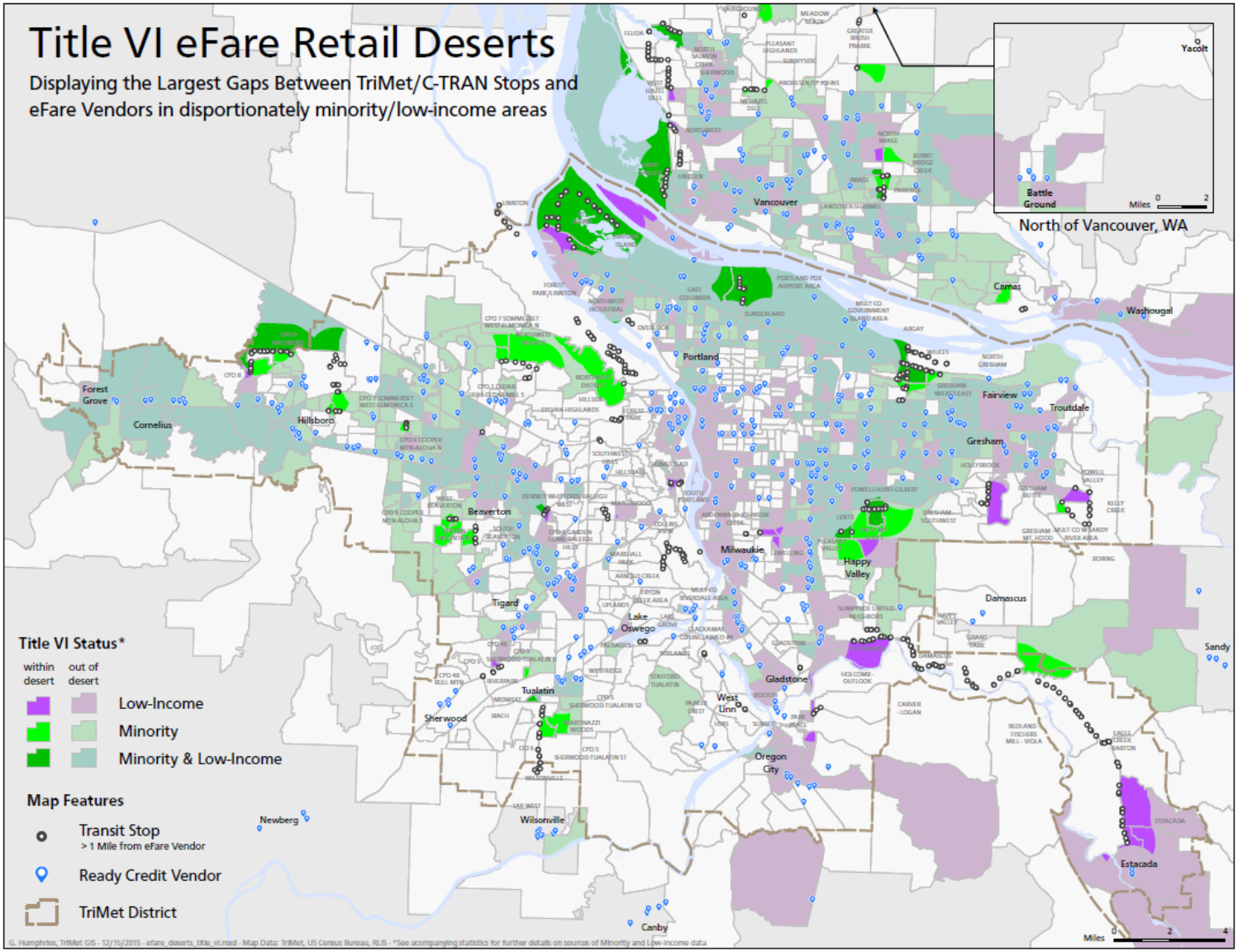
Hop cards can be reloaded through the following sales channels

- Retail Stores
  - ReadyCredit Corporation
- Consumer Website
  - The Brigade
- Account Management App
  - moovel
- Interactive Voice Recorder (phone)
  - Enghouse
- TriMet Ticket Office
  - Built in-house

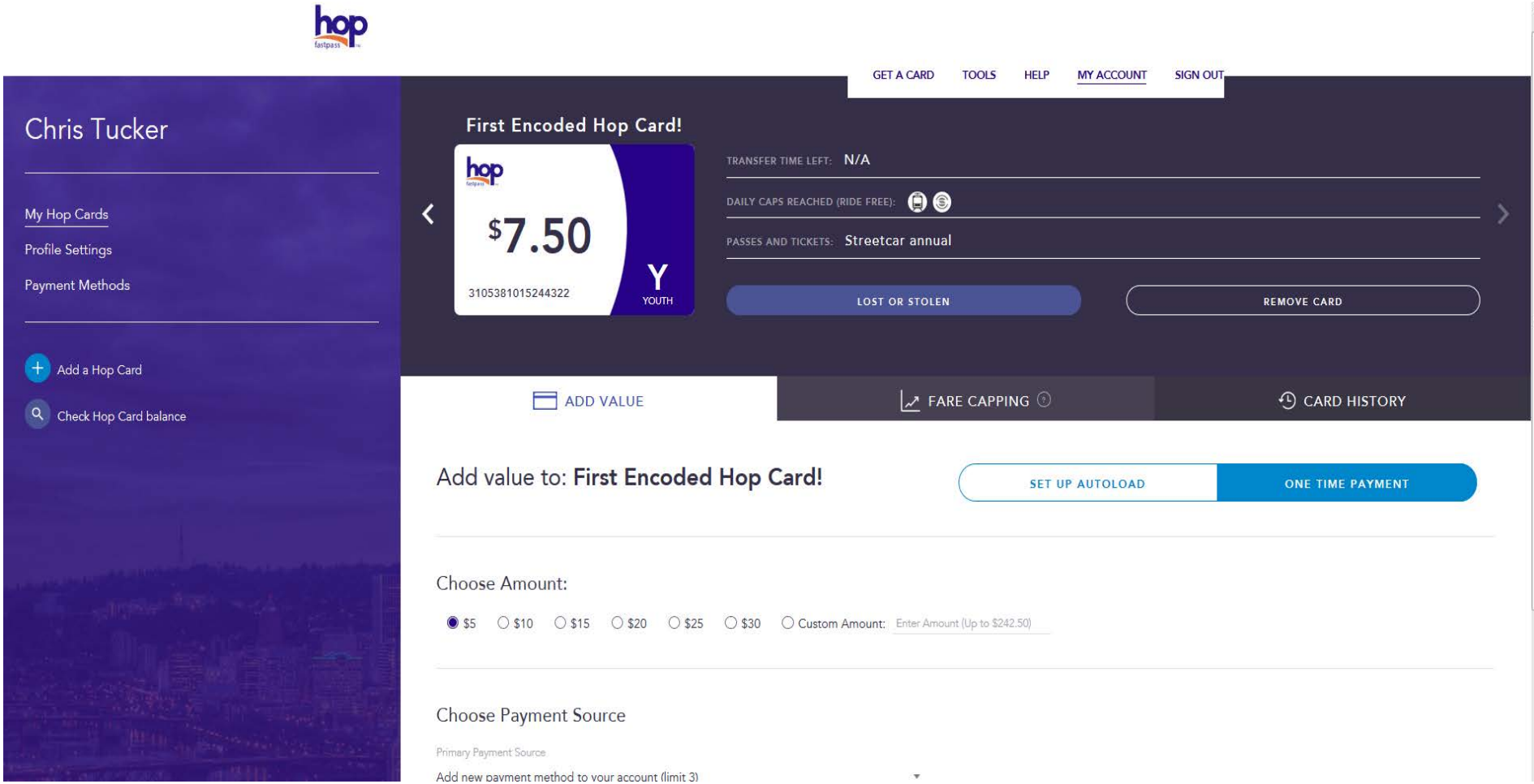
Customer Experience – Current Retail



Customer Experience – Future Retail



Customer Experience – Web-Based Account Management



Customer Experience – Education and Outreach

- **Because Hop Fastpass will require entirely new behavior for customers, a robust education and outreach plan has been developed**
- **Dedicated staff have been assigned to conduct outreach with community-based organizations and institutional partners throughout the region**
  - CBO outreach include demonstrations and interactive training for how to register
- **Collateral is being created to help with education and marketing**
  - Marketing print collateral (retail outlet booklet, fare chart, how-to and FAQ handbill)
  - On-street marketing (shelter ads, TVM signage, station takeovers)
  - Digital ads and videos
  - Event and community outreach collateral (Hop branded pop-up tents, t-shirts, pens, “Hopster mascot”)
  - Employer program collateral (Employer kits, posters)

Customer Experience – Education and Outreach

Operations – Training

Curriculum is prepared for all aspects of the eFare system

Training	Description	Type	Audience
Validator Overview and Operations	Focuses on the screen flows associated for the end user and agency operator	Train the Trainer	Maintenance, Bus Operations
Validator Repair and Maintenance	Reviews troubleshooting procedures, and those associated with removing a device from production and replacing it with a spare	Train the Trainer	Maintenance
Institutional Programs	Reviews the processes for setting up institutional accounts, account management functionality and how to run reports	Direct Training	Institutional Programs, Sales
IVR System	Provides training on the day-to-day operation of the system and other system administrator training	Direct Training	IT, Customer Service
Customer Service	Training that focuses on the CRM system and customer website functionality, as well as a general overview of Hop Fastpass	Train the Trainer	Customer Service, Ticket Office Staff

Operations – Training

Curriculum is prepared for all aspects of the eFare system

Training	Description	Type	Audience
Reporting and Data Warehouse	How to create, edit and manage reports in the UI	Direct Training	IT, Planning, Finance
Finance and Accounting Reporting	Finance and Clearing Settlement system training	Direct Training	Finance
System Administration and Operations	Back Office and Architecture, Central System Configuration Management, and Central System Monitoring and Maintenance	Direct Training	IT
Fare Inspection Training	Training for how to use the fare inspection app	Direct Training	Fare Inspectors, Police
ePOS Training	Training for how to sell media via the point of sale system	Direct Training	Ticket Office Staff

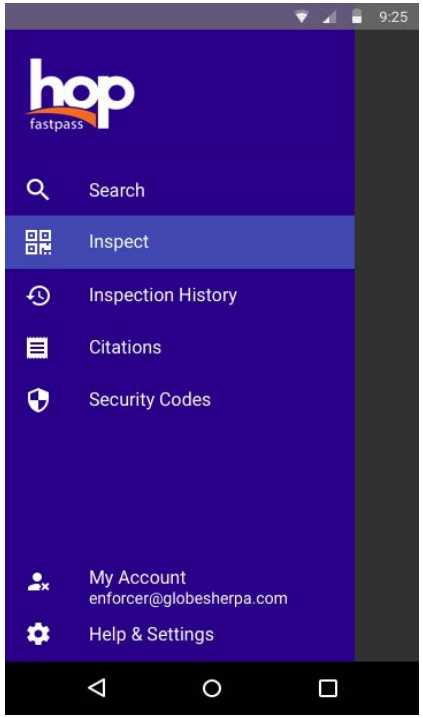
Operations - Card Distribution

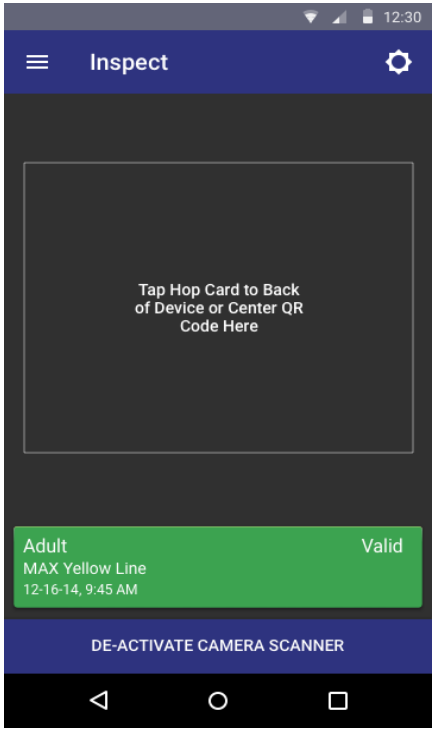
Hop cards will be distributed through the following channels:

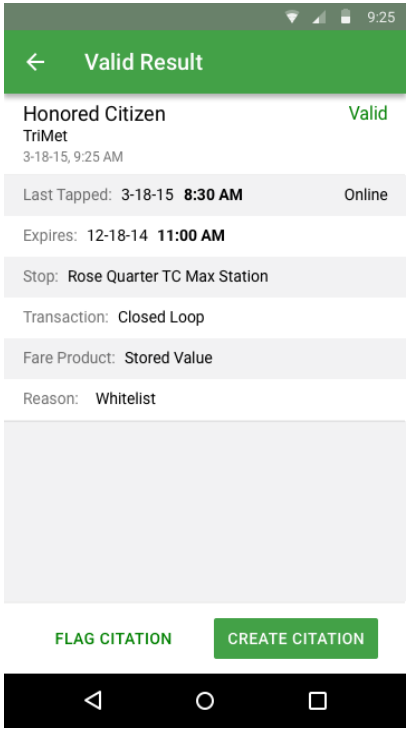
- Giveaways – Hop truck, special events, CBOs
- Retail Stores – Integrating with Blackhawk, Green Dot, Western Union – almost anywhere you can buy a gift card – 500 + stores
- Ticket Vending Machines – Integrating 250 TVMs to issue limited-use account based tickets (2.5 hour tickets/day passes)
- TriMet Ticket Office – Point of sale system
- Institutional Website – Cards are ordered on the website and fulfilled in the TriMet Ticket Office

Operations – Fare Enforcement

- **Moovel is in the process of developing a fare inspection app**
  - Android and iPhone
  - Ingenico devices are being procured for open payment fare inspection
  - Fare Inspection supports offline mode





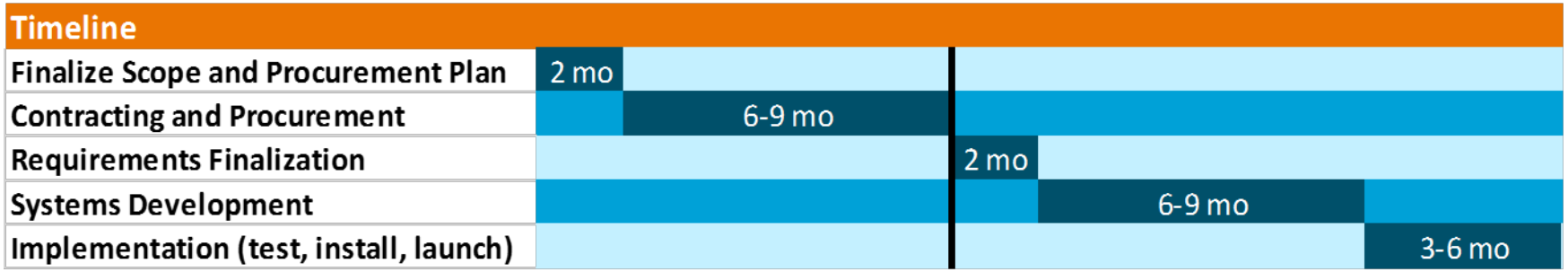


Launch Preparation

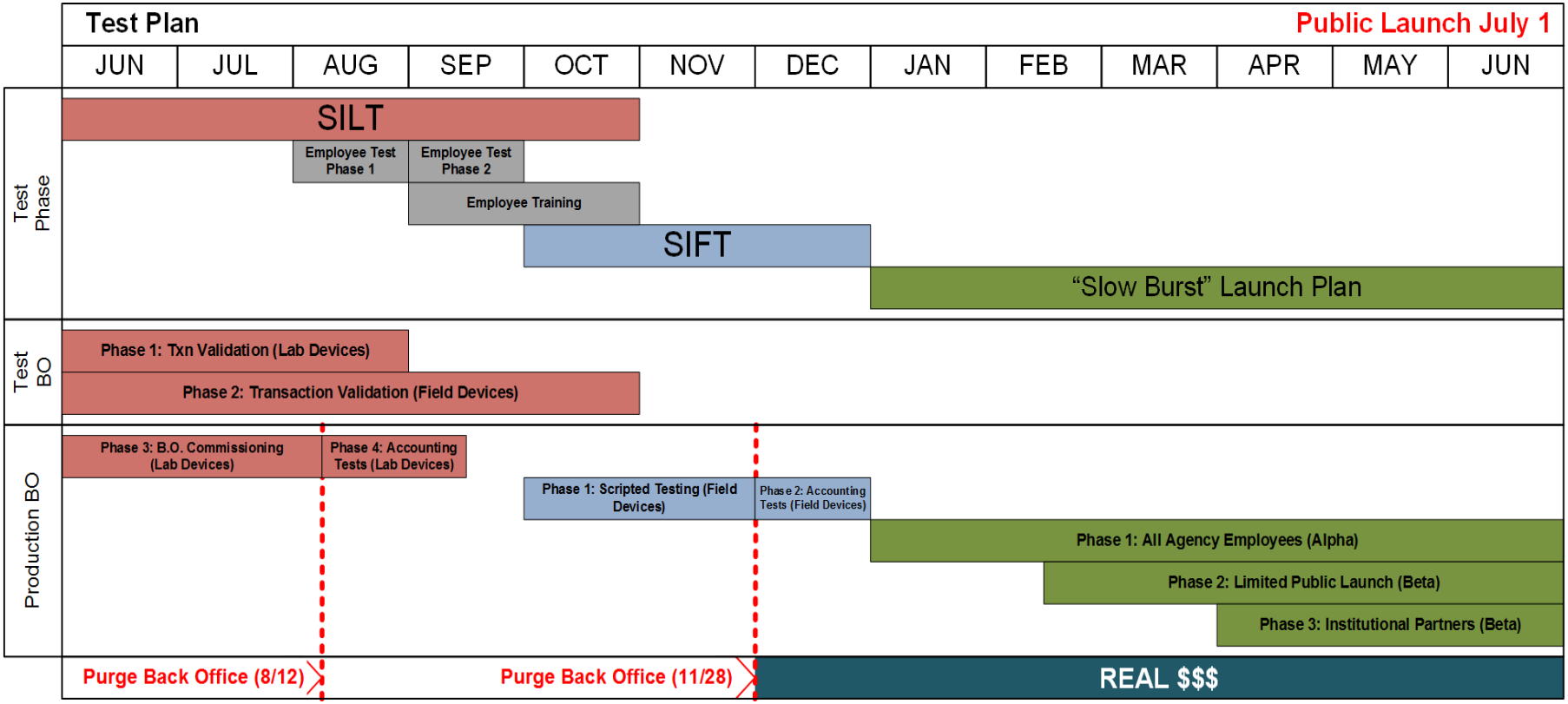
Pre-launch Activities:

- **Education/Outreach** – depending on implementation scope and schedule, 1-6 months in advance of public launch
- **System Testing** (Tariff verification, hardware, accounting, etc.) **–** lab testing – prior to installation of equipment; field testing – prior to limited public launch
- **Training** – ~1 month from launch
- **Limited Public Launch** – prior to media, full public launch

Timing: in the last six months prior to launch



Example: Hop Test/Launch Schedule



Takeaways

- **Customer Service Implications of Regional Call Center (TriMet)**
- **Identifying Media Distribution Channels**
  - Desired Retail Network
    - **Participation of Existing Retailers**
    - **Retail Network Expansion**
  - Continuation of Institutional Programs, if any
    - **Requires separate website**
- **Customer Education and Outreach Strategy**
  - Essential – A new way to pay; requires new behavior for customers
- **Fare Enforcement Strategy**
- **Implementation Steps**
  - Testing
  - Training
  - Limited Public Launch
  - Full Public Launch