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# eFare Expansion in Oregon

*Final White Paper*

Oregon Public Transportation Plan

# Introduction

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The Oregon Public Transportation Plan (OPTP) establishes statewide policies and strategies to guide transportation investments and deliver useful, efficient, and accessible public transportation options for communities throughout the state. The OPTP provides a foundation for supporting and influencing the work of public transportation providers in addition to the work of Oregon Department of Transportation (ODOT) and other state, regional, and local agencies.

Increasing mobility for people of all ages, abilities, and income levels, while improving the transit experience is a key theme of the OPTP. During development of the plan, stakeholders identified eFare expansion as a potential tool for improving access to transit, increasing ease of using the system, and helping to increase ridership. “eFare expansion” means expanding the number of public transportation providers that employ eFare payment systems beyond the small number of providers that use eFare systems today. eFare expansion can mean regional or statewide expansion of efare to many providers, either on the one common statewide system or on multiple regional systems. Ideally, regional systems would be interoperable. Transit agencies in Oregon – TriMet, Rogue Valley Transportation District (RVTD), Cascade East Transit (CET), and Lane Transit District (LTD) – and others across the country have implemented successful eFare systems that have led to improved service and more seamless transit systems.

## What is eFare?

“eFare” is a form of payment systems for transit providers that has been around for decades. When riders board transit, they have traditionally presented a transit card to authenticate their account and pay their fare. The account can be thought of as a pre-paid debit card, or it can hold a pass product similar to a traditional paper transit pass.

Over time, technology has enabled account-based systems, which are more secure and reliable than card-based systems. Instead of the card carrying all of a rider’s money and data, a card, app, or other device communicates with a back-end account that holds all of the rider’s information. More recent eFare systems allow users to add value or products to their account online, at retail locations, and often at ticket vending machines. eFare systems also allow for equitable fare pricing policy, such as fare capping.<sup>i</sup>

eFare systems vary widely in their features and functions. Regardless of the specific system, eFare generally offers the following benefits to public transportation riders and providers:

### Fare Capping

Fare capping is when single fares paid by riders are “capped” when they reach the cost of an unlimited-ride pass. Advanced fare payment technology can count how many times a rider uses the daily system within specific time spans and stops charging a rider after they’ve hit the cost-equivalent of a daily, weekly, or monthly pass. Fare capping provides an equitable alternative to paying upfront for an unlimited pass.

- **Easy Payment:** by allowing multiple payment media (transit cards, smart phones, credit or debit cards), eFare systems make payment easier and more accessible for riders and streamline fare collection for providers.
- **Additional Sales Channels:** eFare systems provide additional sales channels through the use retail, web, and mobile phone applications.
- **Modern Fare Policy:** using a transit card or mobile app relieves the rider of having to figure out the 'right' fare. It can also facilitate equitable fare pricing for all riders through features like "fare capping," which allows riders to earn a monthly pass through incremental fare payments.
- **Seamless Transfers:** when adopted by multiple providers, eFare systems eliminate the need to navigate multiple fare systems, making transfers between systems seamless.
- **Quick Boarding:** eFare allows for faster boarding because riders do not have to insert cash or validate a paper ticket. Instead, riders tap their eFare media to quickly pay the required fare speeding up boarding times and improving on-time service.
- **Improved Data Collection:** eFare systems allow more robust data collection which can help in agency planning.

eFare presents significant opportunities to improve the transit experience for riders and provide a more equitable and cost-effective fare collection system. Given these opportunities, this paper explores, at a high level, the technical considerations, feasibility, and roles in eFare expansion across the state.

# State of the Practice

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Fare collection is typically an essential function of public transportation service delivery. In many systems, providers use non-electronic systems that accept cash and magnetic credit and debit cards for the purchase of paper fares. While simple to implement, these traditional fare systems come at a cost for both transit providers and transit riders. Transfers between vehicles and systems, as well as coordination between providers become difficult without an integrated fare system. Lengthy boarding times due to riders searching for exact change for fares, delays in arrival times due to slow boardings, and administrative burdens for drivers having to verify valid fares while having to drive, all lead to inconvenient and ineffective service.

## eFare Systems and Features

eFare system options have grown over time. These new and modern options are convenient, secure, and cost effective for both providers and riders. Various eFare systems implemented in Oregon and features<sup>ii</sup> of eFare systems are highlighted below.

### Types of eFare Systems in Oregon

- Hop Fastpass: fare payment system implemented by TriMet, CTRAN and Portland Streetcar
- TouchPass: fare payment system implemented by several smaller sized agencies in Oregon that offers fare-payment-as-a-service. It includes a defined set of fare policies to choose from, purchase and install equipment, and transaction processing in the cloud.

### eFare Features

- Fare payment alternatives include smart-cards, mobile app and open payments, which include credit or debit cards as well as using mobile payment options like Apple Pay or Google Wallet.
- Account-based systems provide additional flexibility to a typical fare payment card. Instead of the card carrying all of a rider's money and data, a back-end account now holds all of this information, while the card communicates with the account.
- Some eFare systems now integrate arrival data with ridership data in real-time to understand measures like boardings at each stop and bus load factors along a route.
- Ability to integrate with other systems like paratransit providers and bike and scooter share programs.

## Oregon eFare Implementation

Oregon transit providers have increasingly adopted eFare systems. As noted in the Introduction, currently TriMet, RVTD, LTD, and CET are using eFare. Until recently, eFare systems were generally only implemented in large metropolitan regions, such as the Seattle and San Francisco metro areas due to their high price tags and complexity. However, new eFare technology that utilizes Cloud-based software has made these systems more feasible for smaller transit providers by not requiring them to host, operate, and maintain an entire system on their own.

Review of the features, benefits, and attributes of the two eFare systems currently being used in Oregon:

### Hop Fastpass

#### About Hop Fastpass®

TriMet initiated the Hop Fastpass program in the Portland metropolitan region to replace paper-based fare media and incorporate electronic payment technologies. The program's goal was to make travel on transit more convenient for customers, while also providing the region's transit agencies with a more efficient and secure fare collection system by reducing cash collection from fareboxes and ticket vending machines. Because the program is a universal fare payment instrument for TriMet, C-TRAN, and Portland Streetcar, transfers between these providers have become quicker and more seamless than before.

#### Benefits of Hop Fastpass

Hop Fastpass provides a convenient and functional eFare system across the Portland metropolitan area. Operating within Portland's three-county area and Washington State, Hop makes payment and transfers between service providers -TriMet, C-TRAN, and Portland Streetcar – easy for riders and bus operators. Payment options include a Hop smart-card or a mobile device using Apple Pay or Google Wallet. Hop also provides different pricing options or discounts for low income riders. Hop provides a portal specifically for employers, colleges, and other large institutions to bulk purchase Hop cards and manage accounts. While a paperless/cashless system has been a goal of Hop, the program still provides paper tickets at ticket vending machines at MAX light rail transit stations allowing riders without bank access the ability to ride with valid fare.

#### Key Attributes of Hop Fastpass<sup>iii</sup>

- Fare payment alternatives include smart-cards, mobile app and open payments, which include credit or debit cards as well as using mobile payment options like Apple Pay or Google Wallet
- The fare collection system is built on an open software platform that allows other agencies to utilize alternative interfaces, while still being required to integrate into Hop's back office
- Hop has the ability to integrate information like arrival data with ridership data in real-time to understand ridership trends as granular as boardings per stop and bus load factors along a route
- System functionality can be expanded to support various third-party paratransit and micro mobility service providers
- Expansive retail network with over 500 retailers in the Portland--Vancouver metropolitan area that utilizes a "giftcard" can be expanded to serve additional agencies

- Dedicated call center/customer service staffed by TriMet
- Fare media procurement mechanism and card” model, fee structure in place (through the retail network)

## TouchPass

### About Touchpass

TouchPass is an electronic fare payment system provided by Cubic/Delerrok, Inc. designed for small and medium-size transit agencies, providing the benefits of electronic fare collection at a lower price point. RVTD implemented the TouchPass fare system in spring 2017, CET in September 2018, and LTD started using it in August 2019.

### Benefits of TouchPass

TouchPass has been a popular eFare system choice for several providers in Oregon. Because TouchPass is designed for smaller sized agencies, it has become a cost-effective eFare system for many providers. TouchPass reduces most cash fare payments by using a reloadable card that riders tap as they enter a bus. This card reduces boarding time which ultimately improves overall service performance. TouchPass also provides options for employers to purchase bulk passes.

### Key Attributes of Touchpass<sup>iv</sup>

- Fare payment alternatives include smart-cards and mobile apps
- Fare collection systems is an open software system that allows other agencies to utilize alternatives systems, while still being required to integrate into TouchPass’s back-end program
- TouchPass integrates systems like arrival data with ridership data in real-time to understand things like boardings at each stop and bus load factors along a route
- TouchPass offers a comprehensive, standard set of fare options for agencies – agencies set and manage customer fares via online portal
- Fare media can be procured through TouchPass or independently, including paper tokens
- Web interface, mobile applications, barcodes and QR-code readers are supported

## Case Studies

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The three select cases below provide different relevant examples of eFare system implementation and expansion with San Francisco Bay Area Clipper Card, Hop Fastpass Expansion in the Portland Area, and TouchPass implementation in Oregon. This section discusses key elements of each program, why they were developed, and consider their applicability to the Oregon statewide context.

### San Francisco Bay Clipper Card

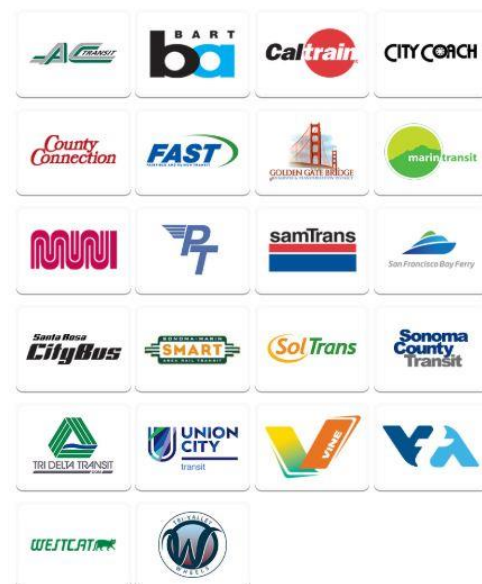
Public transportation in the Bay Area is provided by 27 different agencies. With so many different agencies and overlapping service boundaries, possessing and purchasing multiple fare media became expensive and inconvenient. Recognizing this as a problem, the Metropolitan Transportation Commission (MTC), the transportation planning, financing, and coordinating agency for the nine-county San Francisco Bay Area, introduced the Clipper card in 2010, after nearly twenty years of previous trial and error with an eFare system called TransLink.

Developed by Cubic Transportation Systems, the all-in-one Clipper Card is a reloadable contactless smart-card used for electronic fare payments. It lets passengers 'tag' their cards by touching them to the card reader as they board a bus or enter a transit station. The Clipper system automatically deducts the correct fare, according to the specific provider, and applies discounts and transfers for each trip. The card can be loaded manually or automatically with its Autoload feature.<sup>v</sup>

#### Management

The MTC is responsible for region-wide transit efforts in the Bay, because a regional transit authority does not exist. To manage the Clipper Card, MTC developed a memorandum of understanding (MOU) between all Bay Area transit agencies to create the Clipper

Executive Board.<sup>vi</sup> Two key aspects that the Executive Board worked through in the development of the Clipper program were capital costs and operation and maintenance costs. Capital funding for the Clipper Card program was provided through regional toll money, as well as federal and state grants. To pay for the operation and maintenance costs of the system, the MTC and participating providers divide the costs of operating and maintaining the Clipper system. The MTC pays all of the fixed monthly costs and operators pay the volume-based costs, which is based on their revenue collected and volume of transactions processed.



*Transit agencies using Clipper Card*

MTC played a critical role in convening agencies early on to discuss a universal eFare payment system. The Bay Area's largest transit agencies – Muni, BART, AC Transit, VTA, Caltrain, SamTrans, Golden Gate – were among the first to implement the Clipper Card, demonstrating support for MTC's efforts. The success of the Clipper Card not only confirmed their goal of creating a more seamless and convenient transit payment experience was worthwhile, but it provided leverage for the MTC to encourage smaller regional agencies to get on-board.<sup>vii</sup>

## Challenges

A lead regional transit authority does not exist in the Bay Area. While it is clear that coordination among the many transit providers was successful with the creation of the Clipper Card, seamless transit across the region continues to be a major challenge.<sup>viii</sup> The one-card system that Clipper provides has made fare payment easier, but route schedules and fare policy are not coordinated. In this system, Bay Area providers set their own fare policy and individual schedules, making cross-city trips and transfers a serious problem for riders. After much public pressure and not seeing ridership grow as expected, the MTC approved funds to conduct a fare coordination and business study scope of work to begin exploring integrating fare policy among all Bay Area providers.<sup>ix</sup>

Early on, the transition from paper fares was also a challenge for transit agencies. BART, for example, surveyed more than 400 riders about paperless fares and found that while most riders were fine with the transition, around 20% of riders opposed it due to lack of smartphones. To ease the transition, BART allowed paper fares for a period of time, provided discounts for the new card, and distributed free Clipper cards through non-profits, local organizations, and in low-income neighborhoods.<sup>x</sup>

## Application to Oregon

The Bay Area provides a unique example of regional transit fare expansion using the Metropolitan Planning Organization (MPO) as the central agency rather than a single lead transit provider. Utilizing MPOs or Councils of Government (COGs) across the state, Oregon could spearhead similar fare programs at a regional level. Critical to the Bay Area's program was the leadership and convening and coordinating ability of the MTC, their MPO. Some Oregon MPOs have few staff and limited resources. While not an MPO, the Northwest Oregon Transit Alliance (NWOTA) coordinates inter-community transit service – the NW Connector – among five transit providers along the northwest Oregon coast and into the Willamette Valley. The NW Connector demonstrates that inter-jurisdictional regional service is a viable model for programmatic transit improvements.



## Hop Fastpass Expansion

In 2010, TriMet was faced with a decision to either spend \$50 million to \$60 million refurbishing the existing fare collection infrastructure or spend a much smaller amount upgrading it and focusing on a new next generation fare collection system. TriMet chose to upgrade their system to provide a more convenient transit experience for customers and a more efficient and secure fare collection system. Shifting to a software-based system and reducing cash management within the system were key goals in the development of the Hop Fastpass eFare system.<sup>xi</sup>

ODOT subsequently conducted an eFare expansion analysis – *Hop Program Gap Analysis – Hop Fastpass Feasibility Study* – that considered the implications of expanding eFare to eleven suburban and rural transit agencies in ODOT Regions 1 and 2, potentially extending the system down the Willamette Valley and to the North Coast. The focus of the project was to assess the feasibility of expanding the Hop Fastpass fare payment system launched with TriMet, CTRAN, and Portland Streetcar in 2017. The Feasibility Study assessed the capital costs needed to implement Hop Fastpass or Touchpass with each agency, ranging in size from Columbia County Rider, with 87,000 annual trips, to LTD, with over 10 million trips. The Study reviewed the capital costs for each agency, operating costs, agency staff needed to administer the program, and a proposed cost allocation among the agencies based on annual ridership.

### Application to Oregon

The Feasibility Study provides a helpful starting point for understanding the effort required to expand eFare across the state. Expansion of an existing system is much less costly than developing one from scratch and both Hop and TouchPass provide options that are already on the ground in Oregon. The Study addresses costs and needs for expansion to a variety of providers, from small county to large urban agencies. This provides a good start for understanding costs and needs for agencies in all corners of the state.

### Goals of eFare Expansion Study

- Promote universal travel throughout a large area
- Manage the cost of fare collection
- Improve customer convenience through multiple payment options
- Increase access to discounts for low-income and frequent full-fare customers
- Improve travel pattern data collection
- Reduce boarding time to improve performance
- Provide self-serve opportunities for institutional program partners
- Leverage marketing and public information opportunities of a multi-agency program

### Revenue Sharing

Revenue sharing involves the allocation of revenues received from trips that involve a transfer between two or more agencies within an integrated or universal transit system.

Tables 1 and 2 provide a general snapshot of the high and low-cost estimates for expanding eFare systems to the eleven providers cited in the Study.<sup>xii</sup> These providers combined represent over 15 million annual trips and together have over 300 vehicles.

Table 1: Capital Expansion Cost Estimates		
Systems	Low Estimate	High Estimate
Hop Fastpass	\$5,500,000	\$8,500,000
TouchPass	\$2,970,000	\$9,991,000

Table 2: Operations Estimates	
Systems	Low Estimate
Hop Fastpass	\$667,900
TouchPass	\$489,000

Hop Fastpass cost estimates are based on actual program costs and estimated equipment and labor necessary for expansion. The TouchPass estimate is based on information provided by Delerrok Inc.<sup>xiii</sup>

Besides the costs, several key principles were identified in the Feasibility Study that would apply to a broader statewide effort. They include:

- Fare Policy: Multiple providers working together under one system will have to determine a fare policy that they all agree upon. A simple fare policy that meets the needs of each provider and its riders will be critical.
- Revenue sharing: Operators need to agree on a revenue sharing model but developing a fair policy can be a challenge. Providers under the Hop Fastpass program determined their model would be based on ridership and pass sales, but other models exist that are based on passenger-miles traveled or time spent on a specific system.
- Consider incorporating pass accumulators into fare systems that also use pre-paid passes and ridebooks: pass accumulators would provide stored value and fare capping using a card or an app, reducing system costs and improving customer experience.
- Assess paratransit feasibility: Paratransit/dial-a-ride service providers are likely to benefit from eFare system integration and therefore should be assessed for integration after initial fixed-route is considered.

## Rogue Valley Transportation District – TouchPass Implementation

Beginning as a pilot project in 2016, RVTB successfully launched Delerrok Inc's TouchPass eFare system in spring 2017 in Oregon's Rogue Valley – including the cities of Medford, Ashland, Central Point, Talent, Phoenix, White City, and Jacksonville.

Similarly to TriMet, RVTB decided to implement TouchPass to replace an old and costly fare system and provide a more convenient and easier transit experience for its customers. With their switch, RVTB has been able to use the data provided from the program to continue to improve service through better on-time performance to meet the needs of their customers.

### Management

TouchPass, while implemented by RVTB, is owned, operated, and managed by Delorrok Inc. Using a cloud-based design, RVTB was able to deploy TouchPass at a much-reduced cost and much faster than other eFare systems. The lower cost of TouchPass is due to Delorrok's subscription service model that allows for various configurations to meet the needs of a variety of agencies. Cloud servers process fare purchases and payments in real-time, making data available to agencies and passengers instantly. Under this system, agencies are charged a fee based on passenger usage of the system.<sup>xiv</sup>

### Application to Oregon

TouchPass provides an off-the-shelf eFare system that utilizes the Cloud. Its Cloud-based system makes upfront costs lower than other eFare systems that are hosted locally by the Agency. Day to day operations costs are subscription-based, meaning that pricing is based on ridership volume.



# Considerations for Advancing eFare Across the State

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## Regional Approach First

Expanding eFare statewide would provide a completely seamless public transit network across Oregon. A statewide system would make payment and transfers smooth and efficient, saving people time and money and potentially increasing ridership throughout the state. In practice however, eFare systems at their largest scale have only been implemented at regional levels due to the greater likelihood of interoperability.

Unlike more urban and regional areas, most rural communities do not have frequent fixed-route transit service. Many rural transit providers in Oregon provide demand response only systems, some requiring no fare at all. An eFare system for rural providers could lower operating costs by allowing riders to pay for fares remotely or online, decreasing the use of cash in the system. The question for rural transit providers is whether the benefits of an eFare system outweigh the costs of implementing it – the answer is unclear.

Building upon Portland’s regional approach with Hop Fastpass, NW Connector’s coordinated transit effort along the coast, and other coordinated transit efforts across the state, a regional approach to eFare expansion could be the first step in better, more seamless transit across the state.

While TriMet has succeeded in coordinating transit among the three county area in the Portland Region and Vancouver, WA, an eFare expansion could occur with neighboring, smaller fixed route systems, like Canby Area Transit or Wilsonville SMART, or by including ODOT-run transit services that connect to TriMet like the Columbia Gorge Express. Bringing these kinds of providers into a larger eFare agreement would provide clear benefits for riders in outlying communities, through

### Agency Spotlight

#### ORCA Program Management

The ORCA card (one regional card for all) is a contactless, stored-value smart card system for the many public transit providers in the Puget Sound Region in Washington State. ORCA is managed by the Central Puget Sound Regional Fare Coordination System, a joint board of directors made up of member transit agencies. Day-to-day operations, however, is provided by staff of Sound Transit and King County Metro<sup>xvi</sup>.

#### ORCA Coordinated PugetPass

The PugetPass is ORCA’s monthly or yearly pass program. PugetPass provides a pass to a customer at a fixed price, regardless of the number of times it is used. Once the pass exceeds 36 rides, its “break even point,” the remaining rides are free. With several agencies working together, the PugetPass eliminates the inconvenience for customers having to track rides, carry exact change, or to pay for multiple tickets during a single transit trip. Revenue from PugetPass is divided among providers depending on where passes were purchased and used. Under this program, ORCA has developed a coordinated seamless fare system that benefits both customer and agency<sup>xvii</sup>.

seamless transfers, various fare payment methods, a coordinated fare policy, better access and mobility, and improved customer experience.

## State Support

The costs and coordination required to expand a current eFare system or create a new one can be a challenge, especially for smaller providers. ODOT could support these efforts in several ways, described in the following section.

## Funding and Capacity

ODOT currently administers several transit funding programs and could support efare expansion across the state through funding. The agency would need to consider the following:

- Determine which ODOT division would lead funding and assistance efforts.
- Identify funding sources. Capital cost and funding allocation would also need to be determined. How much would providers contribute financially? How much would the state?
- Work with regional organizations and local providers to ensure local staff capacity to manage or participate in an eFare system.
- Considerations of benefit/cost analysis may be important to any funding program. As discussed previously, it is possible that costs outweigh benefits of efare expansion in some situations.

## Coordination and Facilitation

One of the important roles ODOT could play in eFare expansion is coordinating, convening, and facilitating conversations among public transportation stakeholders. There are various ways in which ODOT could start the conversation around eFare expansion:

- Use the Public Transportation Advisory Committee (PTAC) as a forum to discuss what eFare expansion is, why it would be beneficial, and how it could be accomplished. PTAC has a broad cross-section of providers from across the state.
- Use Oregon's annual Public Transportation Conference (OPTC) to discuss best practices, share information, and facilitate connections among providers.
- Point to local/regional examples of eFare use and expansion efforts for lessons learned – ODOT could provide information on the Technical Resource website.

## Implementation

ODOT could provide technical assistance and serve as a clearinghouse for information on eFare expansion. There are a number of different arenas where information and guidance would benefit providers:

- **eFare program goals**

One of the first things to discuss are goals of implementing eFare. Perhaps the goals are to reduce operating and maintenance costs that providers are responsible for, improve customer experience, or interoperability.

- **Fare collection system alternatives**

Key considerations are scalability and interoperability: existing systems can be “scaled” to serve additional areas. Multiple efare systems across regions present interoperability issues. The eFare Expansion Feasibility Study is an example of an ODOT-led product that could inform agency decision-making.

- **Information sharing**

Lessons learned from those providers who’ve implemented eFare, performance data, and challenges could be collected and summarized on the Technical Resource website. The ongoing experience of providers would be helpful for others considering eFare expansion.

While these are not all of the potential considerations for advancing eFare across the state, they provide a starting point for further discussion.

## Definition of Terms

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This short list provides a description of specific terms used in this paper.

**Smart-Card:** A smart-card for transit use, is a card that contains a small chip that functions like a computer with a transit fare system. The chip in the card keeps track of ticket value that is on the card. Many of these cards have contactless functionality, which allows a user to make a wireless connection with a card reader.

**Ridebook:** A ridebook is book of individual transit passes.

**Pass accumulator:** A pass accumulator keeps track of transit fare purchases for a rider. It will only deduct a cash value total to the cost of a day pass.

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<sup>i</sup> Fare Capping: A Formula for Fairer Fares. TransitCenter, <https://transitcenter.org/fare-capping-formula-fairer-fares/>

<sup>ii</sup> eFare-Hop Program, ODOT Regions 1 and 2 Gap Analysis Report. ODOT <https://www.oregon.gov/ODOT/RPTD/RPTD%20Document%20Library/eFare-Expansion-Gap-Analysis.pdf>

<sup>iii</sup> Ibid

<sup>iv</sup> Ibid

<sup>v</sup> Clipper Card Upgrade Could Bring Seamless Regional Travel, Or Not. StreetsBlogSF, <https://sf.streetsblog.org/2014/05/13/clipper-card-upgrade-could-miss-big-regional-transit-improvements/>

<sup>vi</sup> Clipper Executive Board. Metropolitan Transportation Commission, <https://mtc.ca.gov/about-mtc/what-mtc/mtc-organization/interagency-committees/clipper-executive-board>

<sup>vii</sup> Clipper Expansion – Universal Fare Media Stretches Its Reach to Include Additional East Bay Transit Systems. Transit California, <https://caltransit.org/news-publications/publications/transit-california/transit-california-archives/2015-editions/november/clipper-expansion/>

<sup>viii</sup> Breakthrough On Fare Integration. StreetsBlogSF, <https://sf.streetsblog.org/2019/09/17/breakthrough-on-fare-integration/>

<sup>ix</sup> Ibid

<sup>x</sup> BART Paperless Ticket Goal Negatively Affects Some Riders. NBC Bay Area, <https://www.nbcbayarea.com/news/local/bart-paperless-ticket-goal-negatively-affects-some-riders-report/2220307/>

<sup>xi</sup> TriMet Hop Interview. Trillium Transit, <https://trilliumtransit.com/2018/08/16/trimet-hop-interview/>

<sup>xii</sup> eFare-Hop Program, ODOT Regions 1 and 2 Gap Analysis Report, ODOT <https://www.oregon.gov/ODOT/RPTD/RPTD%20Document%20Library/eFare-Expansion-Gap-Analysis.pdf>

<sup>xiii</sup> Ibid

<sup>xiv</sup> <https://www.masstransitmag.com/technology/fare-collection/press-release/12325623/rogue-valley-transportation-district-rvtd-rvtd-launches-touchpass-electronic-fare-collection-service>