

Spotlight Project for One-Call/One-Click Systems

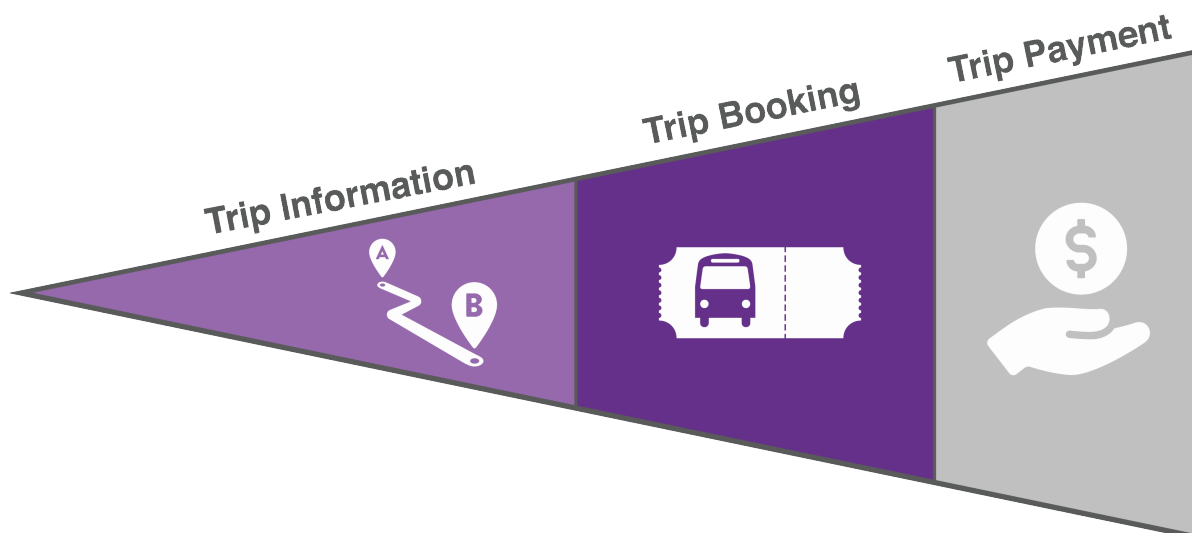
Project Location: Denver Metro Area, Colorado

Project Owners: Phase 1: Via Mobility Services; Phase 2: Denver Regional Council of Governments (DRCOG)/Denver Area Agency on Aging (AAA)

Project Partners: Phases 1 and 2: Via Mobility Services, City and County of Broomfield, Seniors' Resource Center, Denver Regional Transportation District (RTD); Phase 2 only: Denver Regional Mobility and Access Council (DRMAC), Douglas County

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Project Background



One-Call/One-Click System Diagram for the Denver Metro Area

The Denver metro area, like many places, has struggled over the years with the fact that there are multiple demand-response transportation (DRT) services operated for human services transportation (HST) and public transportation purposes in the same geographic area with little or no coordination among the services or the service providers. As explained in the Mobility Services for All Americans (MSAA) 2015 [grant project overview](#) about the Denver metro area,

There are a variety of service providers, some of which may have overlapping boundaries or serve clients who are eligible for services under multiple programs. For example, a rider could be a senior, a veteran, and have a disability that makes him or her eligible for ADA Complementary Paratransit, Veteran's Transportation services, and the local services provided by the Senior Center... The complexity of ride qualification and selection can be difficult for riders, family members, or human service agency staff to navigate as they try to figure out which agency to call to get needed transportation. Similarly, a transportation provider would

not know if there might be another provider who could carry a trip that is difficult to serve or that it does not have the resources to serve. A provider would also not know if there is another provider traveling in the same general corridor at the same time who could provide a trip more efficiently. It is a situation where existing technology can provide a means to quickly enable data about trip availability to be exchanged, allowing agencies to get the information needed to make decisions that provide the most trips and use resources effectively.

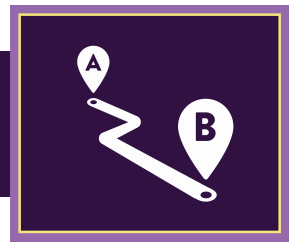
This project began with two agencies, [Via Mobility Services](#) (Via) and the [Regional Transportation District](#) (RTD), developing a means to coordinate trips in Longmont, Colorado where Via operated both the [FlexRide service](#) (i.e., general public on-demand transit) under contract to RTD as well as its own specialized transportation service funded by multiple human service programs. The two services featured multiple Via vehicles traveling between similar origins and destinations, a fact apparent to both Via and RTD. Recognizing that efficiency and cost-effectiveness gains could potentially be achieved by sharing vehicle capacity across the two services, Via and RTD embarked on an experiment to explore this idea. They agreed on ground rules (e.g., riders under each service could be transported on the same vehicle, format for data records, and others) and then worked together to set up systems that would make sharing trips as easy and automatic as possible. Over a several year period of coordinated operations, overall service productivity increased twenty-six percent. About one-third of this improvement (i.e., nine percent) is attributable to the coordination, as Via was able to provide more rides to more people—both for the FlexRide service and the Via HST services. However, this required a substantial amount of staff time to address scheduling needs.

In an effort to expand this coordination, Via and RTD were successful in obtaining a [Mobility Services for All Americans](#) (MSAA) grant in 2015 to replicate and automate this process. They were joined by two other HST programs and the two DRT software providers whose technology was used in the Longmont coordinated service. RTD uses DemandTrans Solutions software, MobilityDR, for its FlexRide service, while Via uses RouteMatch Software's core DRT product. The other two HST programs, those of Seniors' Resource Center and the City and County of Broomfield, also use RouteMatch's software, as does RTD's Access-a-Ride program (i.e., Americans with Disabilities Act complementary paratransit service) which became involved later in the MSAA funded effort.

The MSAA funded effort represents phase 1 of the Denver metro area's One-Call/One-Click (OC/OC) System. Phase 1 resulted in software used as a hub to exchange trips among agencies using different DRT scheduling systems. This software is referred to as the Trip Exchange and is explained in the "trip booking" section below. Phase 2, the current phase, is being led by the [Denver Regional Council of Governments](#) (DRCOG) and is funded in part through two [Veterans Transportation and Community Living Initiative](#) (VTCLI) grants. This funded effort, called the Ride Alliance, includes a means for those seeking rides and who may not have an organizational affiliation with any of the HST organizations to access a network of providers. This is described more fully in the "trip information" and "trip booking" sections below. Phase 2 also broadens the scope of the Trip Exchange to the entire Denver metro area.

Taken together, these efforts illustrate how technology projects can develop step-by-step, building and expanding over time.

Trip Information



Provider Options and Itinerary Planning

In order for users in the Denver metro area to find out about their DRT options, as well as additional transportation options (e.g., fixed-route, ride-sharing, and others), a provider directory is available through the Denver Regional Mobility and Access Council (DRMAC). DRMAC produces and distributes the [Getting There Guide](#), a robust provider directory available in Arabic, English, Russian, Somali, and Spanish that was first produced in 2005. Additionally, the Getting There Guide is available as a [mobile application](#). RTD has an [itinerary planner](#) for fixed-route services and provides information on the location of the more than twenty FlexRide service zones while explaining how to engage the [FlexRide service](#). In addition, DRCOG provides a [Network of Care service directory](#) in connection with the Area Agency on Aging (AAA) for the Denver metro area.

DRCOG and DRMAC both offer telephone information, as well as assistance and referrals, for transportation services. Such services are often referred to as [“information and assistance” \(I&A\) or “information and referral” \(I&R\)](#). For this project, DRCOG with the Denver metro area AAA and the Colorado Aging and Disability Resource Center (ADRC), as part of the funded Ride Alliance effort, will play a major role as an “intermediary” between the user and service providers (i.e., City and County of Broomfield, Douglas County, RTD, Seniors’ Resource Center, and Via) through their [I&A/I&R and options counseling services](#). In addition to providing such services, the organizations will also be able to post trips directly on the Trip Exchange for potential providers to pick up and serve once the Ride Alliance service is fully functioning. This means the organizations will be able to book trips on behalf of older adults and individuals with disabilities who previously had no direct connection with a service provider, moving from providing trip information only to also facilitating trip booking.

Trip Booking

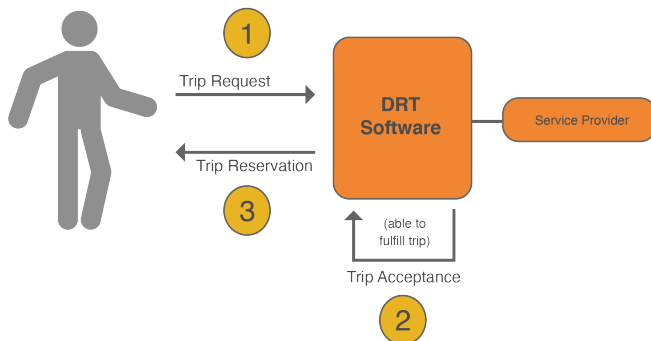


As mentioned above, a Mobility Services for All Americans (MSAA) grant was awarded in 2015 to help the Denver metro area address the challenge of trip coordination by developing the Trip Exchange. Inherent in the challenge is that people who use HST services often have additional trip requirements related to disability, age, income, or other factors (e.g., wheelchair access). Further, a person may be eligible across multiple different services (i.e., dual/triple eligibility) or may need a regional trip that crosses the service boundaries of multiple providers. This means there can be confusion on the user’s end with which service is the best fit for their needs for a particular trip.

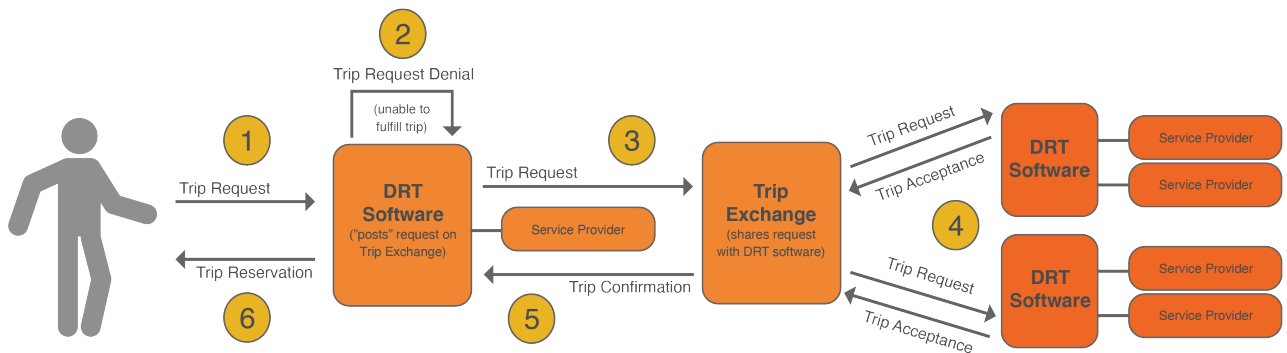
Trip Exchange Software Overview

The Trip Exchange is a software platform that enables data about trips to be communicated between multiple service providers, through their respective DRT software platforms (i.e., MobilityDR for some RTD services and Routematch for RTD’s Access-a-Ride, City and County of Broomfield, Seniors’

Resource Center, and Via). This is enabled through application programming interfaces (APIs) or adaptors that connect the “endpoint” systems to the central hub. When a user makes a trip request (e.g., to RTD through MobilityDR), the initial transportation provider can either accept the trip (i.e., scenario 1, see flow chart) or “post” the trip to the Trip Exchange (i.e., scenario 2, see flow chart).



Scenario 1: Trip request received by DRT software/service provider and accepted



Scenario 2: Trip request received by DRT software/service provider and “posted” on Trip Exchange

The initial provider may not accept the trip for various reasons such as a lack of space in vehicles on the requested day and time, the trip request taking place outside of service hours, or other reasons. By posting the trip on the Trip Exchange, other providers have an opportunity to see if they can provide the trip, ideally filling empty seats on a vehicle already traveling in the corridor. Two key elements of the Trip Exchange include:

- **Automating the trip acceptance process** - Each provider’s respective DRT scheduling platform can check, in an automated way, to see if “posted” trips can be accommodated within their schedule. This saves time for staff members who previously would have had to review the trip request details and decide on a case-by-case basis.
- **Service provider control** - The individual provider retains control of their vehicle and driver resources, deciding when to accept trips.

If, after comparison with its own capacity (e.g., vehicles and schedules/manifests), another service provider decides to accept the trip, the Trip Exchange registers that acceptance and sends all of the relevant trip data to the service provider. The latter is responsible for scheduling the trip in its system. The Trip Exchange removes the trip from visibility in the hub mechanism, where trips can be viewed by participants and accepted via automated processes or manually, and then sends a data message to the original owner of the trip with a trip confirmation. That organization is responsible for notifying

the trip maker that they have a trip reservation and will be picked up and delivered by a different organization—that which accepted the trip.

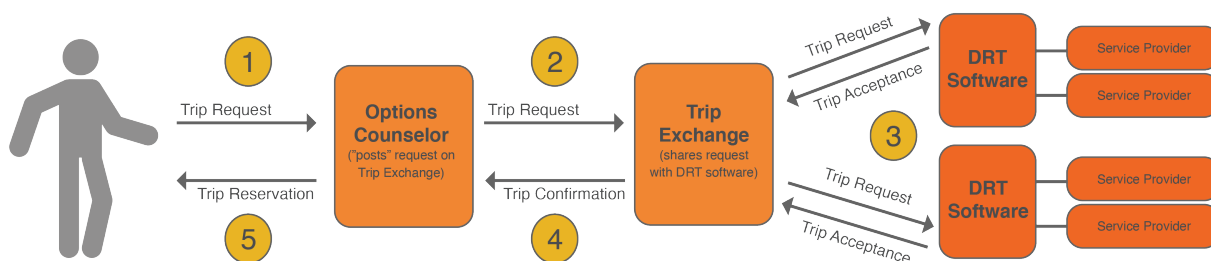
Data reporting is a critical function as well. After the trip is completed, the Trip Exchange receives “trip execution data” which include details of the actual trip such as when it was picked up, delivered, and its length. These details are sent via a data message to the service provider that initially received the trip request. The service provider can use the data for its own reporting, data analysis, and financial purposes, and the Trip Exchange also keeps a record of each trip that has occurred.

Designing the Software

The Trip Exchange software, created during 2016 and 2017, was initially placed in a “testing” environment, which is an environment for experimenting with and refining software. The testing environment demonstrated that trips could be coordinated through the Trip Exchange. Although the MSAA funding authorized the software to be used in a testing environment, it did not authorize the software to be used in a “production” environment. A production environment is an environment that enables software to become operational and connected directly with end users. At this point in the project, the Ride Alliance effort and its associated funding through two Veterans Transportation and Community Living Initiative (VTCLI) grants supported the continuation of the Trip Exchange into a production environment. In addition, the Ride Alliance effort enabled the expansion of the providers and geographic areas and provided needed resources to improve the software’s usability.

From 2018 through 2019, the service providers involved worked to develop business rules and data standards, further developing the project. The business rules established customer service expectations including who is responsible for communicating with riders, cancellation and no-show policies, operational protocols, and reporting standards. A subcommittee of service providers developed a list of desired enhancements to increase the Trip Exchange functionality, and these enhancements are in development as of the first quarter of 2020. Currently, the software is in a production environment and is ready to be piloted.

As mentioned at the end of the “trip information” section, DRCOG with the Denver metro area AAA and the Colorado Aging and Disability Resource Center (ADRC) will play a major role as an “intermediary” between the user and service providers through their I&A/I&R and options counseling services. After the Trip Exchange is successfully piloted, the organizations will be able to book trips on behalf of older adults and individuals with disabilities who previously had no direct connection with a service provider, moving from providing trip information only to also facilitating trip booking. DRCOG will be able to book trips by posting them on the Trip Exchange (i.e., scenario 3, see flow chart) as a part of its transportation “options counseling” services.



Scenario 3: Trip request received by options counselor and “posted” on Trip Exchange

By providing multiple access points, through service providers directly as well as through agencies with options counseling services as part of the Ride Alliance, the Trip Exchange should help the DRT service provider network distribute the trip request load more efficiently. This, in turn, could help deliver more trips with the same/similar resources. The user experience, which now involves navigating a complex system of several service providers with varying availability, should also improve substantially as a result of the Trip Exchange—one service provider or Ride Alliance contact should result in the ability to request a trip and in most cases actually obtain the trip.

Piloting the Software and Business Rules

The organizations involved in the Ride Alliance will pilot the enhanced Trip Exchange for six months beginning in May 2020. The pilot will focus on testing the functionality of the software and the business rules. Key aspects will be tested, such as the following:

- Users contacting a transportation service provider (e.g., RTD), with the service provider posting the trip request on the Trip Exchange to see if it can be served by another provider (i.e., scenario 2, see flow chart)
- Transportation options counselor (e.g., DRCOG) posting a trip request to the Trip Exchange on behalf of a user who sought general trip information not specific to any particular service provider (i.e., scenario 3, see flow chart)
- Potential for filling service gaps (e.g., long distance trips, key destinations such as Rocky Mountain Regional Veterans Administration Medical Center) involving incentives and data collection on trip usage and demand

There are multiple ways to interact with the Trip Exchange, depending on the actor's role and step in the process. These interactions will be thoroughly tested during the pilot.

“Posting” a trip request on the Trip Exchange:

- **Transportation options counselors (e.g., DRCOG)** - They can “post” a trip request on the Trip Exchange on behalf of a user as shown in Scenario 3 by using a web portal, which was designed as part of the Ride Alliance funded effort. The web portal, which facilitates a connection between a secondary location and the Trip Exchange, has a custom user interface designed to accept trip request details and transfer those details to the Trip Exchange in order to post a trip request from a secondary location.
- **Transportation service providers (e.g., RTD)** - To “post” a trip request as shown in Scenario 2, they can use a Trip Exchange-adapted DRT software such as MobilityDR or Routematch, which most of the transportation service providers currently involved in the project use. If they do not have the software, they can also post a trip request on the web portal (i.e., as a transportation options counselor would).
- **Members of the public** - The project has a goal of eventually facilitating a connection between members of the public and the Trip Exchange without requiring an intermediary (e.g., transportation options counselor). This could include older adults, individuals with disabilities, and others. This is a longer-term goal and is not included in the pilot.

“Accepting” a trip request posted on the Trip Exchange:

- **Transportation service providers (e.g., RTD)** - They can “accept” a trip request as shown in Scenario 2 and Scenario 3 either through Trip Exchange-adapted DRT software (e.g., MobilityDR) or through the web portal that facilitates a connection between a secondary location and the Trip Exchange. A feature currently in development is the option to download detailed data on accepted trips from the Trip Exchange, which is a more direct way to gain the data than using the web portal.

It is anticipated that the pilot will address many considerations for the project. The results from the pilot will inform refinements for the Trip Exchange software and business rules. Example considerations include:

- **General tracking** - How many local and regional trips are exchanged? What is the average time, start to finish, to facilitate a complete exchange?
- **Usability** - Do transportation service providers find the software intuitive to use? Can changes be made to make it more intuitive, or should training be provided? When a user/client attempts to book a trip with one provider and ends up having the trip handled by another provider, do they easily understand what happened and why?
- **Operational needs** - Does the system support day-to-day operational needs well? Does it work well with the work flows of staff members? Were cancellation, no-shows, and unusual events resolved sufficiently by the service providers?
- **Processing speed** - Are response times reasonable? What is the average delay time?
- **Financial** - Is the cost and payment method clearly communicated to the user/client? Is cost allocation across two or more funding sources accurate on the back end?

Planning for Trip Payment

Trip booking often connects to payment, and the project partners plan to build payment components into the Trip Exchange software as part of the 2020 enhancements financed by the VTCLI grants. As explained in the [“Development of Transactional Data Specification for Demand-Responsive Transportation”](#) report, which profiled the Trip Exchange work, “Enhancements are planned...to address billing and financial requirements and to provide more options for multi-lateral business relationships among participants. For example, when trips are claimed the provider’s price to perform the trip will be calculated and presented to the agency that posted the trip, and the latter can decide whether to accept or decline the claim.”

Support

This effort has benefitted from two major support areas, funding and partnership. A Mobility Services for All Americans (MSAA) grant was awarded in 2015 for approximately \$800,000. These funds were used to plan and design the Trip Exchange software, and local match was provided by the partners. Further, provider agencies contributed staff support, while for-profit entities provided cash match. In addition, two [Veterans Transportation and Community Living Initiative](#) (VTCLI) grants (first \$613,580 [awarded in 2011](#), second \$50,000 [awarded in 2012](#)) and additional state funding (approximately \$65,000) supported the projects. A portion of these funds (less than 50%) have been devoted to further development of the Trip Exchange software as well as acquiring other software for HST in the region that can also be used to interface with the Trip Exchange. These grants provided the financial base that made possible the development, enhancements, and regional level implementation of the Trip Exchange.

The project also involves a number of partners for its success. At present, there are eight active provider and agency partners who will participate in the pilot and a broader group of agencies who are interested in future participation. Further, each partner has agreed to change how they handle their day-to-day work to accommodate the changes the Trip Exchange will bring. The level of commitment is a driving factor for the project’s progress.

Challenges, Maintenance, and Future Plans

Maintenance planning

There will be ongoing hosting and maintenance fees for the project, estimated to be approximately \$50,000 annually. Since these costs are generally eligible to be grant funded, it is anticipated they will be paid for with one or more of the following: Federal Transit Administration (FTA) Section 5310 funds, Older Americans Act (OAA) funds, and/or Transportation Improvement Program (TIP) funds through DRCOG.

Private sector software involvement

The Trip Exchange software involves sharing information across a number of DRT software platforms providing route planning, manifest creation, and other functions. Interacting with a trip exchange often involves building connections between the DRT software and the exchange software, which may add time and cost for the software companies. It can be difficult, especially without clear incentives or contractual requirements, to gain buy-in from software companies. Addressing issues and concerns early in the project through budgeting, incentives, and contract details is a good practice.

Piloting software with AAA in “intermediary” role

The Denver Area Agency on Aging (AAA), which supports the day-to-day activities for the Aging and Disability Resource Center (ADRC) of Colorado and is housed within DRCOG, will provide transportation “options counseling” over the phone to connect users with DRT services they may be eligible for that meet their trip request needs. More details are provided in the “trip information” and “trip booking” sections. Having plans for intermediaries, and piloting the project incorporating their work flows, raises the project from working across specific DRT service providers to another level that engages transportation options counselors. After the pilot is completed and the Ride Alliance program that supports trip booking is put in place, the AAA plans to launch a small marketing campaign to increase awareness that it can provide trip booking in addition to trip information. Over time, the marketing could reach various target audiences, especially veterans who require long-distance trips, those who have recently moved to the Denver metro area, or those who have recently discovered they need DRT service due to age or disability.

Related Materials & Contacts

The [MSAA grant project materials](#) for the Trip Exchange software, including a Project Management Plan, Concept of Operations, System Requirements, and Final Report and Phased Implementation Plan, provide greater detail into how the software was designed and implemented. In addition, the Trip Exchange software is featured in Transit Cooperative Research Program (TCRP) Report 210 titled "[Development of Transactional Data Specification for Demand-Responsive Transportation.](#)" This resource goes into details about the types of data included in the software, the data transfer/communication protocols between the Trip Exchange software and other software, and other aspects.

For additional information, contacts are provided regarding various aspects mentioned above:

- **Phase 1** - Jeff Becker of RTD at Jeff.Becker@rtd-denver.com
- **Phase 2** - Heather Kamper of DRCOG at hkamper@drcog.org
- **Access to the Trip Exchange software and/or TCRP Report 210** - Roger Teal of DemandTrans Solutions at roger.teal@demandtrans.com