Towards the Promise of Mobility as a Service (MaaS) in the U.S.

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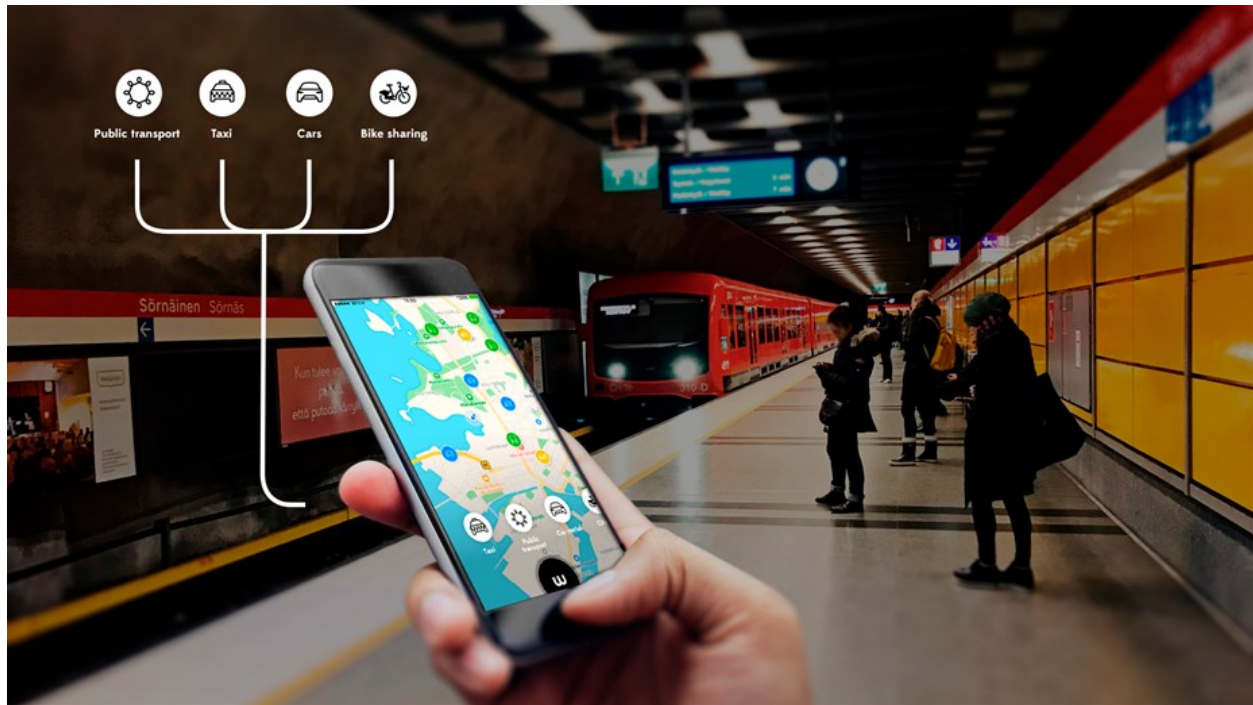
MaaS Supports an Ecosystem of Multi-Mobility

People use multiple modes of transportation: transit, carshare, micromobility including bikeshare and e-scooters, on-demand rides such as microtransit, and ride hailing. But we have just one purpose: to get where we need to go. Just as the availability of more modes makes it easier for people to get around without driving alone, better information about how to use these options together seamlessly can yield a transportation network greater than the sum of its parts.

In the physical environment, mode coordination is facilitated by way of integrated infrastructure, places where public transit and shared mobility operators place services near each other so that travelers can easily transfer between multiple modes safely and comfortably. Ideally, physical improvements are complemented with holistic policies to regulate land use, manage traffic, expand multimodal infrastructure, and regulate parking.

Mobility as a Service (MaaS) is a practice that integrates the travel options available to a user and offers them in a single interface, with a single payment mechanism. This allows users to "look, book, and pay" for their journeys in one place, even allowing a single charge for end-to-end trips or for monthly subscriptions to a suite of mobility services. MaaS introduces a technological advancement to harness the growing popularity and possibility of new mobility options and act as an antidote to driving alone and congestion.

The vision of the Shared-Use Mobility Center (SUMC) is the widespread availability of integrated modes of transportation, which can be easily accessed and planned together, in communities that are actively working towards environmental sustainability and social equity in their transportation and land use. SUMC sees MaaS as a meaningful component of a multimodal transportation network that works for all.

MaaS is most visible to users as an app. The trip planning function on Google maps demonstrates one level of integration towards MaaS. A further step would be the ability to see additional modes and on-demand transit, and pay for all of those services. Such a digital platform would ideally be supported by a call center for easier access by those without smartphones, and allow people to load a travel account using multiple payment methods.

The MaaS Alliance details the industry's perspective on guidelines and recommendations for developing a MaaS ecosystem including preconditions and building blocks, user experience and interoperability needs, recommendations for public administration, and suggested next steps.

MaaS helps travelers better understand their options and improves the user experience from planning, through travel, to the final destination. To the extent that it gets or keeps more people out of their cars, it can facilitate fewer trips driving alone. This helps to reduce CO2 emissions and improve the environment. Promising a seamless system and reliable user experience, MaaS can provide a reasonable, cost-effective option that can improve mobility and quality of life.

MaaS Advocates:

- The use of a single application with a single payment channel instead of multiple ticketing and payment operations

- The facilitation of a diverse menu of options—public transportation, ride-, car, or bike-sharing, taxi, car rental or lease, scooters, or a combination of these

- An alternative to the private use of cars that is convenient, economically sound, and affordable to all income levels

- Integrated ticketing and payment in addition to multi/inter-modal traveler's information and routing

- Digitalization as an aid to the effectiveness of the transport system; and
- Different pricing models for different services and products.

Source: the MaaS Alliance, a global interest group of practitioners

History and Topology

Though many aspects of MaaS rely on relatively recent advances in telecommunication technology (smartphone apps, real-time data feeds), the concept itself is much older and can be attributed to multiple sources. Among them:

- In 1996, when the world wide web was not yet five years old, Swiss researchers Nico Tschanz and Hans-Dieter Zimmermann presented the concept of an "Electronic Mall" at a tourism conference in Austria. It involved a single platform that could not only plan, book, and pay for multimodal trips, but also plan and pay for support services like hotels or insurance.

- In the late 1990s, North American leaders in transit and progressive transportation advocated for policy to enable common transit fare cards. In 2009, The Chicago Transit Authority (CTA) and IGO, a local carsharing service headed by SUMC Executive Director Sharon Feigon, launched a joint smart card program. Users were able to both unlock the IGO vehicles as well as ride CTA services, the first such integration in the United States.

- In 2014, the MaaS term was introduced by a man named Sampo Hietanen, now the founder and CEO of MaaS Global Ltd, at an Intelligent Transportation Systems (ITS) conference in Helsinki, Finland. He developed a for-profit model of MaaS with "packages," where a monthly subscription would pay for multiple services bundled into a single offering. Hietanen took the concept on the road and eventually worked with the Finnish Ministry to implement policy changes to support the concept. With a large IT industry and government finesse in promoting transit equity, Finland was a ripe place for MaaS to take off.

- Several other cities across Europe have developed MaaS models, including privately led and government owned services. The Shared-Use Mobility Center describes examples fromAustria, Belgium, France, Germany, and The Netherlands in its Global Benchmarking Report for the Federal Highway Administration, Shared Use Mobility: European Experience and Lessons Learned. The American Public Transit Administration also conducted a MaaS study tour of Vienna, Hamburg and Helsinki for its report Being Mobility as a Service (MaaS) Ready.

By 2017, MaaS gathered such momentum that researchers proposed a topology to describe differences between examples. The five levels (0 through 4) characterize systems based on their levels of service integration. The topology reflects benchmarks about where a MaaS system may be, and though it appears as a hierarchy, progress can take a number of variations.

The MaaS topology is one system that demonstrates MaaS in different levels.

Level 0 describes a scenario with multiple transportation options but no integration of trip-planning or payment. In some places, multiple options for transportation may be very limited.
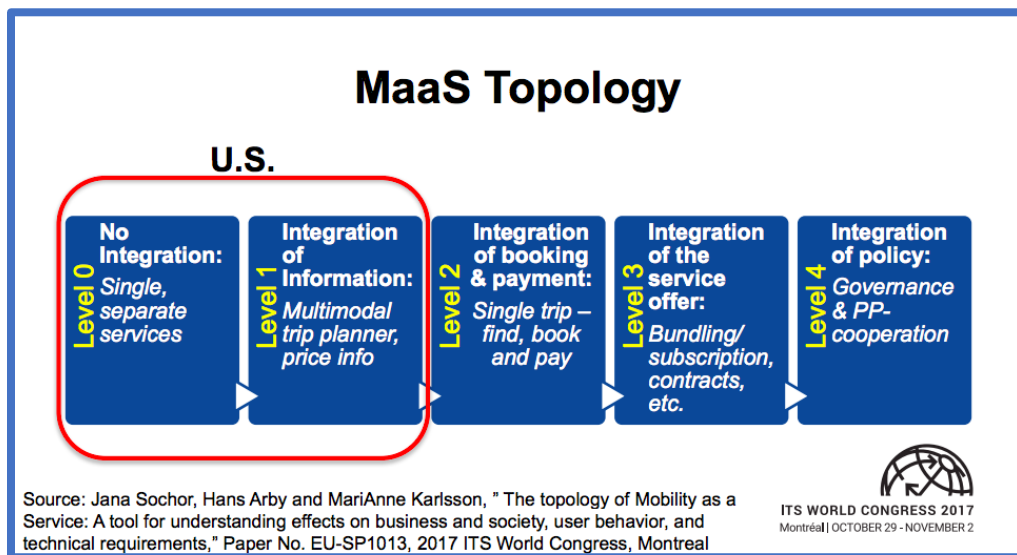
Level 1 describes the state when services integrate trip-planning information into a single platform. Some municipalities in Europe and America have created their own trip planners involving public and private

modes. Google Maps is an example of a private solution (using public data), where payment is handled outside the app but multimodal trip planning is possible.

Level 2 incorporates the integration of booking and payment. While still focused on individual trips, Level 2 involves multiple modes from public or private services being paid for using a single platform, a "one-stop shop."

Level 3 is the integration of the service contracts and responsibilities. At Level 3, multiple services from a variety of modes or operators are bundled together into a single service offer. At this point MaaS solutions can aid with more than a single trip, such as a monthly mobility subscription service.

Level 4 is the integration of societal goals. This conception considers a stage of MaaS in which a framework of transportation planning, booking, and payment is designed to help cities and operators address goals like reduced carbon emissions and lower household transportation costs.

MaaS Topology

U.S.

Level 0	Level 1	Level 2	Level 3	Level 4
No Integration: Single, separate services	**Integration of Information:** Multimodal trip planner, price info	**Integration of booking & payment:** Single trip – find, book and pay	**Integration of the service offer:** Bundling/ subscription, contracts, etc.	**Integration of policy:** Governance & PP-cooperation

Source: Jana Sochor, Hans Arby and MariAnne Karlsson, " The topology of Mobility as a Service: A tool for understanding effects on business and society, user behavior, and technical requirements," Paper No. EU-SP1013, 2017 ITS World Congress, Montreal

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The United States has not yet "passed" level 2 and most of the action globally falls within levels 0-2 as well. Similar to travel aggregators like Kayak.com for long-distance travel, a Level 2 operator doesn't necessarily operate a transportation service, only the platform for planning, booking, and payment. The Transit app is a private sector example in North America. Uber and Lyft also offer payment for multiple services in some markets. By 2025, industry experts forecast, we should expect to see multimodal trip planners that allow booking to become much more commonplace across the U.S.

Moving to level 3 necessitates having all modes or operators on board with a program, pricing structure, and reimbursement system that is perceived as fair—this requires transparent goals, cooperative private operators, and significant work to maintain political capital. It's a high bar to clear, as further detailed in the section, titled "What Does it Take?" Context is also important. The goals of American cities may not reflect multiple mobility options or even reliable, frequent public transit. Because transportation doesn't pay for itself and public transit is publicly subsidized, MaaS is inherently political. With this in mind, the societal goals and policy decisions described in the aspirational Level 4 are fundamental at every stage in developing MaaS.

MaaS Roles

The public and private sectors can come together in [different ways](#) to enable MaaS. In any configuration, much depends on a MaaS operator to bring services together. The operator packages and delivers services to the end user. Expedia is a parallel from the travel booking industry, though the value propositions differ. Travel booking services have grown in part because they cover large and costly trips for users who are unlikely to be able to navigate on their own, while MaaS does not have the established business models of these services.

Mobility Providers are those that provide a mobility service. Whether or not they serve as an operator of MaaS, public transit agencies are important providers and partners in any platform as they operate the backbone service of any MaaS system. Other providers may provide carshare, micromobility (bikeshare and e-scooter fleets), paratransit, microtransit, and dial-a-ride services.

Technology Providers provide the back-end technology behind operating a MaaS system. Some, like [Moovel](#), offer a platform for purchase by public agencies. MaaS Global offers the publicly available [Whim](#) app on a pay-as-you-go or subscription basis in Helsinki and Turku, Finland as well as Vienna, Austria; Tokyo, Japan; Antwerp, Belgium; Birmingham, U.K.; and Singapore.


Source: Whimapp.com

In a market-driven environment, the public sector doesn't play a role in the management of MaaS, although it does provide data. The market is open to private companies that can act as integrators of MaaS services and bring the information about the services together, and/or operators who package and deliver the services to the consumer and operate the MaaS platform. Google Maps is an example of a data integration where public transit provides freely available data and Google integrates it with other modes for trip planning purposes, operating on the Google Maps platform. In other examples, Uber and Lyft add this publicly-available transit data with information about those companies' own mobility services exclusively.

Government Agencies, especially public transportation agencies, often take a more active role in the implementation of MaaS. In a public environment, the public sector might act as an integrator and operator, while private operators deliver information to the agency. Public sector agencies don't always have a lot of experience operating like a business; they provide a public service that is usually supported through taxes and as such they are inherently political. The Dallas Area Rapid Transit [(DART)](#) agency, which developed and operates its own multimodal app, is an example of a public agency serving as an operator in the United States working towards a MaaS system. However, DART's efforts do not take

place in a policy environment requiring open data and interoperability, so integration efforts must happen individually with providers, which can be difficult to scale.
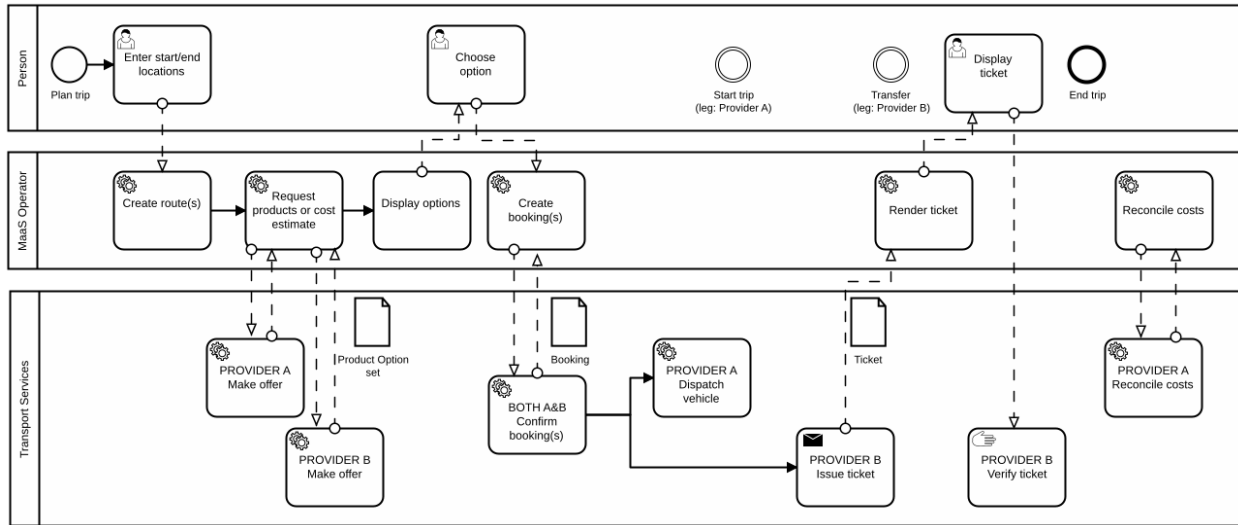
Swimlane Diagram demonstrating back-end steps to enable a MaaS trip by the MaaS Alliance.

MaaS in Context

In best practice, MaaS functions as a system when there is a strong public transit network, safe walking and biking infrastructure, and additional modes like carshare that facilitate a range of travel that don't require car ownership. This scenario is furthest along in Europe, where policies supporting thriving cities, density, bikesharing, carsharing, ridesourcing, and other forms of shared mobility began decades ago. Europe's long-standing shared mobility history is documented in a 2019 report on MaaS by the International Association of Public Transport.

In the United States, automobile-based infrastructure and investment priorities alongside a lack of mobility options and supporting land use in the majority of communities pose challenges to achieving the goals of MaaS, especially changing how people get around. While many European cities have laws prescribing how different modal systems must interoperate on their back end (among a range of policies favoring multimodalism), there aren't parallel U.S. policies. In any location, MaaS relies on strong collaboration and partnerships among the public and private sectors to make it happen.

As explained in the Deloitte Review article "The rise of mobility as a service", MaaS would require widespread penetration of smartphones on 3G/4G/5G networks; high levels of connectivity; secure, dynamic, up-to-date information on travel options, schedules, and updates; and cashless payment systems, to function well. MaaS requires efforts from many parties, as the Swimlane diagram illustrates. Providers in the U.S. use data systems that don't necessarily operate together, and for the private industry, data is often considered too valuable to share. Industry expert Andrew Salzberg describes an analogy for the interoperability needed for MaaS data, comparing transportation to other tech spaces:

> *"...Email works magically well without us having to even think about it. I might have a Gmail account, and you might have a Hotmail account, or a Yahoo! account, or a university account. I*

can send you an email, and you won't think twice about the fact that it gets to you! Contrast that with services like Facebook Messenger — where if you don't have an account on that service, you can't interact with somebody else. I don't think that's a model we want to follow with mobility. It's something that worries me. That we're going to have one operator who is your interface for transportation, rather than an ecosystem that works more productively together."

While proprietary data concerns remain a challenge to achieving MaaS, among others detailed below, American cities and states are taking some steps towards integrating their systems. Efforts that drive towards MaaS are appearing in many different types of environments, including rural, to combine and streamline mobility services such as non-emergency medical transportation and paratransit in addition to the options found in larger cities. Each step expands the system, and each can be an opportunity to improve the equity of the mobility network.

MaaS can also operate between these approaches, and some examples don't fit tidily into a private or public category. Policymakers can enact legislation to facilitate MaaS. In Finland, private sector parties operate competing MaaS platforms. While the environment is market driven, it is bolstered by a key governmental role: Finland's Federal law has required all road transportation services to provide open data and interoperability since 2017 (with air, rail, and maritime services following soon after). This public act has enabled private sector MaaS platforms that are comprehensive: multiple private entities have platforms with aggregated options for the consumer. For more information, see SUMC's summary of Finland's National Mobility as a Service (MaaS) Policy.

What Does it Take?

There are sticking points to advancing MaaS. Central to achieving any technological advancement in MaaS is the establishment of common goals and aims among stakeholders in the public sector and private sector who come together. A common, shared vision will propel progress, especially with strong leadership from the public side. Private actors are driven by business models that may be incompatible with open APIs or collaboration. On the public side, beyond different approaches by public transit providers, there are 130+ Federal government programs to fund transportation services for people with disabilities, older adults, and lower-income individuals, most of which have different program rules. That's 130+ programs with different eligibility criteria, trip types allowed, and reporting obligations. Not to mention multiple state and local programs. While challenges remain, the benefits are so compelling that trials are underway and workable practices are beginning to emerge.

MaaS Requires Coordination Between Stakeholders

Transit agencies in neighboring jurisdictions don't always talk to each other, or talk to each other well. This is also true across modes. They must have a reason to come to the table. For some agencies, a mandate to serve the public good and improve the mobility of constituents may be enough. Private providers have a vested interest in making their service easier to use, although their motivations and

strategies may differ. Fortunately, there are many issues in which stakeholders share an interest. That may be expanding choices and options and growing transportation for all providers, providing alternatives to congestion, facilitating sustainability goals, gaining additional infrastructure, developing joint marketing, and more. Regional bodies such as MPOs or counties can serve as conveners on such cross-modal topics. In [Denver, Colorado](#); [Portland, Oregon](#); and [King County, Washington](#), each of which has made progress towards MaaS, that progress began with regional stakeholders convening around common support for mobility choices and options. Working together on physical projects such as the co-location of modes can likewise lay the groundwork for partnership on MaaS. Making it work requires a lead, usually a public agency, to build on this framework. Long-term collaboration around shared interests and goals is essential to advancing MaaS.

Providers Must Share Their Data

Data comes in different formats. For mobility providers, that data can be proprietary and important, offering valuable market information and a competitive advantage. For this reason, providers want to hold onto their data. It's important for partners to consider why people would share data and what would be beneficial for them to share—how they can help consumers without "giving away the store."

Mobility service providers and operators must **develop sound agreements for the sharing of data.** Best practices for transit agencies are outlined in SUMC's resource, [Objective-Driven Data Sharing for Transit Agencies in Mobility Partnerships.](#)

Data can both raise privacy concerns and be considered too valuable to give up (it has been described as the "new oil"). Private mobility companies often prefer for consumers to get information from their own platform. If they gave their data away to another, their competitor's information could be there too. As more services have consolidated under the leading U.S. ridehailing services Uber and Lyft or large rental companies, fewer service providers may be willing to come to the table without a compelling incentive.

Bringing all services together would require **governmental requirements for open data or the development of data standards**. This would level the playing field for private providers and aid the coordination of public providers using a range of formats, some of which are contracted over many years with software that isn't open. Shared and open standards can also ensure that privacy and anonymity are preserved. Planners can also use mobility data from MaaS to identify infrastructure investments that can have a high impact. The achievement of full partnership across major modes is unlikely absent government intervention, but that is not to say that transit can't be integrated with a local cab company, or dial-a-ride service, or a bikeshare or carshare provider. For example, in Montreal, while there is not a one-stop "look, book, and pay" option, subscribers to the [OPUS](#) transit card can rent from the local Bixi bikeshare at a reduced cost, and the card can be used to receive a discount on rental cars as well as with a variety of retailers and service providers.

Data Must Cross Physical and Program Boundaries

Separate data formats are a hurdle, and all the more so when considering different jurisdictions. One common effort in rural communities to make residents aware of all of their options is "one-call or one-

click" services. These enable customers to make one phone call or search one website to receive information about all transportation services available in the community.

A large hurdle for bringing together these services is that it's impossible to share trips across agency borders, e.g., a county paratransit service would have to manually share data with a transit agency. In this instance, it is up to all of the providers to standardize data for mobility management. This is easier said than done when there aren't national standards and some providers still operate off of spreadsheets. SUMC has partnered with the National Center for Mobility Management (NCMM), which provides technical assistance for mobility grantees of the Federal government, to organize convenings and share information on this topic.

As an example of the challenges of standardizing data between public and private entities, the City of Los Angeles Department of Transportation (LADOT) established its own **data standard** for exchanging anonymized information with e-scooter companies—the Mobility Data Specification (MDS). Public agencies use MDS to obtain information about a micromobility network in real time, such as whether scooters on the street are operational and where they're supposed to be. As the second largest market in the US and a new mobility leader, LADOT had leverage to scale MDS and draw other cities to the framework, and it did. In theory, this would save mobility providers administrative time by allowing them to publish their data to public agencies in one single format (rather than comply with a patchwork of standards across multiple markets). However, it is not without challenges and pushback from private providers, such as an Uber-lobbied state-level bill in California that would preempt local governments from requiring MDS. Further confounding the city's goals, Uber sued the city of Los Angeles in early 2020 claiming that the city would abuse trip data to triangulate users' identities. The ACLU has brought similar litigation. Many cities across the country now use MDS and can find themselves at odds with private operators who would prefer not to share information about their operations, even exclusively with a government agency. Data sharing challenges indicate the importance of the public and private sectors reaching common ground on unified standards.

Payment Platforms Must Be Compatible, Simple, and Modern

Fare payment systems at most transit agencies are planned, procured and implemented over the course of perhaps 6-7 years, and shared mobility as we conceive it had hardly emerged that long ago. Some vendors offer their services on notoriously longer time frames, up to 20 years, and charge dearly for any integration. However, **incremental changes** can often be made without a system overhaul. Agencies like TriMet in Portland have succeeded with emphasizing an app with an open format. The industry has also moved towards **account-based** fare payment systems that allow agencies to keep track of individual rider data, which is valuable for interoperability. Another useful standard applicable is **"transactional data standards,"** which allow for the passing of payment information from provider to provider. No single universal standard has yet emerged, which makes coordination more challenging. The FTA offers a comprehensive review with recommendations, Mobility Payment Integration: State-of-the-Practice Scan and a Transportation Research Board report recommends a transactional data standard for demand-responsive transportation. SUMC will also be releasing a paper about fare payment integration in the near future.

Financial Incentives Must Align

While so many agencies are cash-strapped, there's a need for financial **incentives or motivation** for providers to pursue transportation coordination initiatives. Motivation could include common goals for multimodal communities, agencies using private modes for agency programs (e.g., Uber or Lyft for late night rides), localities providing parking, or developing mobility hub infrastructure. Cooperating on physical infrastructure can pave the way for partnership on digital infrastructure.

Direct funding also enables public agency leadership. Federal grants like the [Integrated Mobility Innovation Program](#) have allowed for staffing and organizing many projects, among them the DART and Vermont examples described here. The lead on a MaaS project takes on accounting obligations, logistical responsibilities, implementation work, and other administrative tasks that consume time and resources. There are large and often unanswered questions of developing cost sharing and payment across participating stakeholders in a way that is equitable and proportionate to the services received. If services are to be bundled and provided together, this is all the more true.

The Government Must Provide Leadership

For any MaaS project, someone must lead. In the United States that is typically a public transportation entity or one of a few private services. Local and regional governments have important roles as well as conveners and participants. But the U.S. is absent the strong **Federal leadership** required to guide and support communities in coordinating transportation, and there is insufficient funding for transit and other modes. Done right, democratic institutions place their funding where their values are, and it is a priority of SUMC to see stronger national leadership and policy. Research leadership may also facilitate improved information for decision-making, such as data that can increase the transparency of transportation spending, demonstrate the utility of transportation coordination, and equitably allocate the costs of coordinated transportation.

With private sector providers taking an interest in becoming mobility integrators, and some resistant to public sector efforts, it's important that **public agencies take an active role** in ensuring that eligible services can participate and that as many travelers as possible can access services. It is likely that contractual or legislative requirements with private mobility services can facilitate an even playing field for making available comprehensive mobility information and payment options. Governmental leadership can also help remove barriers to mobility coordination among a fractured public landscape.

MaaS Should Be Equitable and Serve Everyone

By most definitions MaaS is about a digital platform, generally a smartphone app. Communities deserve parity in reaping the benefits of integrated modes, and Federal programs that fund many services don't work together. Ideally, a service would be complemented by **call-centers** for those without smartphones and the unbanked. Outreach and the availability of **cash-based payment** transfers are essential for extending any MaaS benefits to all residents. In Dallas, local 7/11s offer cash payment on account-based cards. Still, many unbanked individuals prefer the convenience of disposable tickets and thereby don't reap the benefits of monthly [fare capping](#) that are provided to those with accounts. Leaders in [Tompkins](#)

[County, New York](#) aim to provide a one-stop call center for every mode of transportation, and eventually a mobility subscription service. Though efforts are early, they are bringing many stakeholders together to consider how it could work for everyone. SUMC is facilitating national efforts to promote best practices towards **universal accessibility** of MaaS efforts in human services transportation. Among these, vehicle and service types need to meet the needs of individuals with disabilities.

Examples of MaaS Efforts in the United States

The following examples demonstrate a range of efforts towards MaaS in the United States, from private sector leaders in the space to a leading public agency, DART, as well as rural and mid-sized city approaches. These examples highlight the importance of public sector leadership as well as private industry partners and their roles as both operators and payment platforms. In all of these examples, integrating multiple modes through a singular information platform and sometimes a payment option remains the underlying model.

The Transit App and Private Sector Approaches

Several travel planning apps have been developed recently. An early leader in the space, [Moovit](#), was acquired in May of 2020 by Intel for $900 Million. Citymapper is another. Since launching in 2012, the [Transit app](#), developed by the company of the same name, has grown to be a leading example of MaaS efforts at scale in North America. The company began its journey by partnering with transit agencies to aggregate schedules from multiple agencies, publishing frequency and service information so that a user could navigate the transit system in any participating city. Eventually, they also added the public API feeds from micromobility companies, showing real-time locations of scooters and bikeshare bikes. In 2016, the company introduced payment for many bikeshare systems in partnership with one of the biggest operators, Motivate, clearing a major hurdle towards payment integration. Beginning in 2018, Transit also launched transit fare payments in their app, steadily adding more payment options across North America in partnership with agencies. In multiple cities, they became the "official" transit-planning app, a sometimes informal arrangement in which the agency promotes the app and the app provides a local fare payment option. This has pushed the brand ahead as it has grown to be the transit app for dozens of U.S. cities. By integrating multimodal planning, booking, and payment for single trips, the Transit app stands out as one of the few examples of Level 2 MaaS in North America. The Transit app is primarily backed by venture capital, but it receives some funding from the local transit agencies that it partners with directly to integrate ticketing.
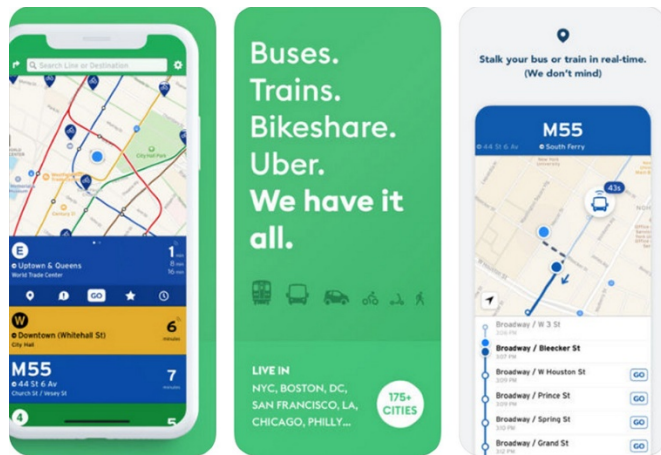
Source: Transitapp.com

Much of the data the Transit app uses is widely available, thanks to public efforts. Part of this integration is due to standardized information feeds. The General Bikeshare Feed Specification (GBFS) used for bikeshare grew from the similar General Transit Feed Specification (GTFS), which was developed through a partnership between Google and Portland's TriMet to develop a consolidated stream of information from transit agencies to tech companies. In both cases, a standard data reporting format allows third-party apps like the Transit app to display real time information like headways, bike location, or service disruptions. The Transloc blog describes the history of GTFS and the North American Bikeshare Association outlines some history of GBFS and differences between it and MDS.

Because of the public nature of this data, operators like Uber and Lyft have begun offering transit frequency and service information within their own apps. Unlike MaaS principles and platforms that are built on comprehensiveness, these multimodal companies intend to keep riders using their private app exclusively. Critics have referred to this approach as a walled-garden, where many options are available on a single app but only those provided by the app's parent company. The threat of walled gardens has grown with industry consolidations including major scooter company acquisitions by both Uber and Lyft, and it became apparent when Lyft procured the bikeshare company Motivate and took their data off the publicly available stream. Now, users must use the Lyft app to access bikeshare information for those systems. While the Transit app's business model is based on the aggregation of services, most mobility companies are focused on volume and exclusivity. The visibility of transit on Uber and Lyft is likely a net gain, but critics question the prospect of a monopoly on multimodalism.

A Transportation Wallet in Portland

As one of the original partners in developing GTFS, the global standard for public transit data, Portland's TriMet transit agency has long been a forward-thinking mobility leader. Following a series of pilot projects focused on affordable housing residents, the Portland Bureau of Transportation (PBOT) launched their Transportation Wallet in January of 2018. The program is available to users who live or work within one of two districts of the city, and the program's pilot focused on affordable housing residents. Users can pay $99 for a suite of services including an annual bikeshare membership, an annual

Streetcar pass, and a transit card with $100 of credit. The car2go carshare service was also included as part of the Transportation Wallet before it left the market.

This program is also notable for their success through first focusing on communities which have typically been kept out of the urban mobility conversation. This equitable approach bucks the trend of app-based mobility providers serving only affluent, white neighborhoods in cities where transportation options are already plentiful. While this does not integrate trip-level information from multiple modes, Portland's innovative program is a valuable example of services bundled into a single contract for a set price. Through strong partnerships to bundle services, PBOT achieved some parts of the MaaS Level 3 topology.

Statewide Trip Planners for On-Demand, Paratransit, and Medical Needs

In partnership with Trillium and Cambridge Systematics, the Vermont Agency of Transportation (VTrans) has developed an **open-source trip planning application**. The application uses a type of data (GTFS-flex) that is an extension of fixed-route transit data (GTFS), but applies to demand-responsive transportation like dial-a-ride. Bringing these together represents Level 1 MaaS in which trip planning functions are integrated. Because these services don't generally fall on a fixed schedule, and because they are offered by a patchwork of providers, they are particularly challenging for planning trips.

The Go! Vermont Trip Planner was established to serve areas across the state, and is also designed for people who have mobility challenges. With the platform, users—particularly, non-traditional rural transit system users—gain a more complete picture of all their mobility options when planning a trip. The online platform was developed as a pilot project within the FTA Mobility on Demand Sandbox program. It is based on open-source planning tools, and several other transit agencies have already taken steps to replicate the initiative's resulting technologies.

The program offers an example of a statewide transportation planning tool that takes into consideration services for persons with a disability while crossing local political boundaries, particularly important in Vermont given many rural and small-town areas and the need to travel from one jurisdictional boundary to another. The Shared-Use Mobility Center offers a full case study on this service, the Vermont Flexible Trip Planner: Bringing Fixed and Flexible Transit Together on a Single Platform.

In a similar program, the Michigan Department of Transportation (MDOT) developed **a statewide brokerage system for non-emergency medical transportation (NEMT)**. MDOT and several partners were awarded over $1 million from the FTA as part of the federal Rides to Wellness Demonstration and Innovation Coordinated Access and Mobility grants for a NEMT brokerage system available in part of the state to be available statewide. The Michigan Access to Wellness (MATW) Project aimed to develop software and incorporate non-profit and private transportation providers' offerings to route calls and requests for transportation-related services. Following the grant, program supervision and support was shifted to the Michigan Public Transit Association, which is continuing the pilot. The Shared Use Mobility Center details this among several Examples of Mobility on Demand Policies and Public-Private Partnerships to Increase Accessibility.

Dallas' Transit Agency Leads the Way

The 2011 Super Bowl in Dallas ignited the imagination of regional leaders for how to put the city's best face forward. This included leadership at the Dallas Area Rapid Transit agency (DART), a rapidly growing 13-city transit system covering 700 square miles with bus, light rail, commuter rail and paratransit services. In 2013, DART introduced a new mobile app, GoPass. When it was launched, GoPass was the first multimodal, multi-agency transit fare payment app in the US. GoPass combines a mobile ticketing app with a trip planning function and it is also accepted by neighboring Trinity Railway Express, Trinity Metro and Denton County Transportation, as explained by ITS International.

In 2014, DART introduced links to external mobility providers such as Lyft, Uber, and Zipcar, from within the trip planner. The agency improved the system so that users had their own account - which makes it easier to add modes. 2018 saw a relaunch with a fare increase but also the introduction of daily and monthly fare capping, which limits the amount paid for transit in a day or a month. In addition to purchasing and activating tickets, users can track their progress toward the monthly fare cap. DART also expanded retail partnerships to allow travelers to load cash to their account at locations other than ticket vending machines or transit stations/stops.

Currently GoPass covers trains, buses, street cars, paratransit and carpooling and it has recently been updated and joined by GoLink, an app-based, demand-responsive transport solution that helps bridge the first/last mile 'gaps' in select areas that are hard to serve with traditional fixed-route transit. In 2019, DART partnered with Uber to have UberPool trips be discoverable in GoPass within these zones. Travelers can book and pay for a trip to a designated transit station in the zone through DART's microtransit service, GoLink, directly in GoPass, or for a shared Uber ride through a link from GoPass to the Uber app. Trips to or from transit stations are subsidized.

The Evolution of DART's GoPass, as showcased for the Transportation Research Board by DART Assistant Vice President for Innovation Tina Mörche-Pierre, is shown below.
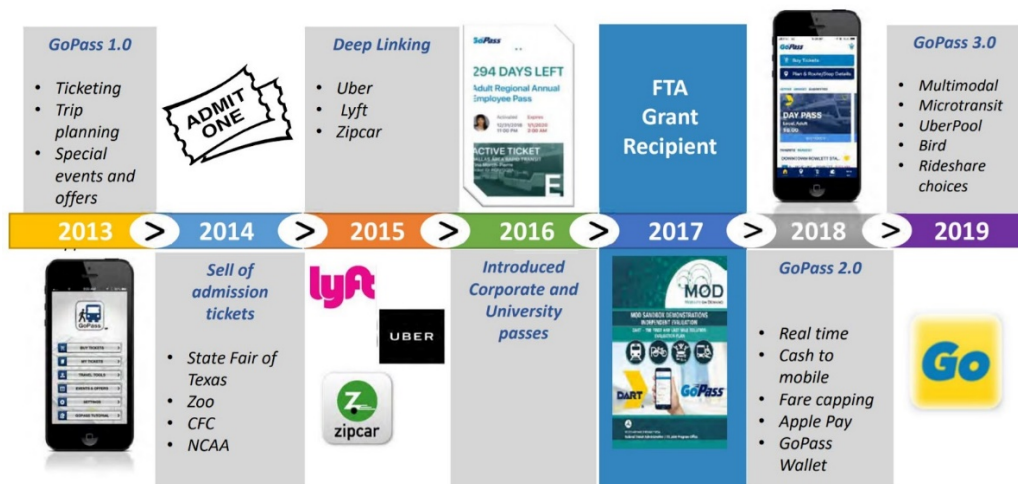
As DART remains in the MaaS stage of trip planning while making progress on payment integration, placing it nearly at Level 2, its role in the national network is pivotal. DART is publicly leading the way as an agency developing MaaS for itself, on its own terms, and working to set the terms for the providers

that it partners with. DART is actively pursuing licensing the GoPass to other transit agencies, and did so in early 2020 with neighboring Trinity Metro. Revenue from this licensing supports long-term funding for improving GoPass features and building Mobility as a Service capabilities by combining transportation services from public and private providers, and gives DART customers a wider variety of choices and services through the platform.

Agency-Led Incremental Public-Private Collaboration

Dayton Ohio is a smaller, lower-density, and slow-growing metropolitan area, not a prime expansion candidate for venture-capital backed private mobility providers. The local transit agency took a need for bikeshare into its own hands, partnering with a local nonprofit, Bike Miami Valley, to bring Link Dayton Bikeshare to the region. This arrangement is unique in that the transit agency is the owner and operator of the service. When dockless scooters swept the country in 2019, the Regional Transit Agency (RTA) applied the same agency-operated and -maintained model to a partnership with the scooter provider Spin — a model that's unique among transit agencies in the U.S. This gave the agency facility over managing multiple modes, partnering with providers, and understanding major data issues at play. APTA describes the experience in a feature on Transit as a Micromobility Manager.

When the City of Dayton was working on authorizing legislation for scooters, the RTA worked closely with them to require that any provider permitted to operate in the city must provide a public API and integrate with the City's chosen mobility app provider. Now, Dayton is working with the Transit app on trip planning integration, and RTA and Bike Miami Valley have included similar language in their transportation and bikeshare contracts, requiring all private transportation providers (ridehailing, scooters, micromobility, and whatever comes next) to aggregate their service information alongside RTA's schedule in a single trip planner as a condition of operating in the city. Working with a private provider provides the city and transit agency with a system that's agnostic both to the services and the platform providers and lets the public agencies maintain continuity even if they choose to change vendors in future.

In 2019 Uber began offering transit trip planning on its app, and by May it launched a partnership with Denver's Regional Transportation District (RTD) and its mobile ticketing partner Masabi. Now, Uber riders in Denver can both see real-time transit information in the app, and have the ability to purchase tickets and use their phones to access ridehail and bus services. Denver was the first city globally to have such an option through the Uber app. Uber is not the only option for mobile ticketing, and by working with a flexible vendor, Denver has multiple channels available for users to purchase and use tickets online. In Las Vegas, where an entrepreneur had previously tried and failed to develop a subscription-based MaaS platform with Tesla vehicles, a similar partnership enables ticketing on the Uber app. Each of these examples demonstrates advancement towards Level 2 MaaS.

Source: [Shared-Use Mobility Center](#)

Conclusion

MaaS has the potential to change and improve how people get around. In a post-COVID world, the availability of information for multiple modes—anywhere and anytime—is vital as service patterns and transportation preferences evolve. For MaaS to have the greatest benefit, it should be complemented by fast, frequent, and reliable public transit. In places with several modes available, MaaS can reduce congestion, expand options, and make it easier for people to get around without having to drive a car. It can also augment the on-demand, human services transportation experience.

There are many success stories on the road to MaaS, but there is much to do to advance systems that truly facilitate comprehensive and efficient mobility for all. Business models are not yet mature and it may seem difficult to incentivize work among cash-strapped public agencies or venture capital-funded mobility providers. We know some of the solutions. Fare payment platforms are evolving, but funding them and aligning payment among providers remains challenging. Data sharing is essential, but this can be difficult for large and small cities alike. There are efforts toward common standards or agreements, but there is not yet a single, unified approach to scale them. The public and private sectors must find common solutions.

Achieving MaaS necessitates better investment, leadership, and cooperation. While funding lags and there are only a few small grant programs for MaaS-related efforts, participants are still compelling progress and innovating in the field due to the underlying importance of accessible mobility. It is more important than ever that local public and private stakeholders work even harder to convene, collaborate, understand best practices, and share knowledge about what works.

COVID has provided an important window for realizing a fully functional Maas system. Agencies and private companies alike are meeting together to plan the restart of local economies and find common ground. Transportation challenges are being addressed more quickly than ever before, be it setting up temporary bike lanes, redoing transit routes, or repurposing microtransit for delivery services. Communities are engaged and looking for solutions to reduce inequities. Transportation that provides access to jobs and services can be pivotal in creating more economic opportunity. This is a moment to inspire MaaS to reach its fullest potential. The components are clear and the technology is ready. By focusing on community needs and ideas, public leadership, inspirational examples of what has and can be done, collaboration across sectors, common goals, and clear metrics and data, we can move closer to a multimodal transportation system that works for all.