

Private data islands or public data oasis?

Why cities need mandatory
open mobility APIs.



Executive summary

Public, real-time Application Programming Interfaces (APIs) are critical pieces of data infrastructure that facilitate multimodal, multi-operator trips, promote a fair and competitive mobility marketplace, and enable the public to help determine whether a public mobility program's goals are being met.

Non-governmental organizations have drafted initial principles that promote public APIs for services that operate on public streets, and cities are increasingly seeking public APIs from permitted operators. But there is still a lack of specific guidance about how to require these important open real-time feeds. In this policy paper, we point to specific examples as best practices for public, real-time API policies.

We also look to the future, envisioning what mobility APIs can achieve beyond simply conveying real-time availability information, with a focus on the evolution of payment APIs across multiple modes of transport.

Our enlightened self-interest

It's true: our app exists because of public APIs from transit agencies and mobility operators. While Transit benefits from open APIs, so do other companies — and the general public. Open transport data has led to an entire generation of consumer apps that turn data streams into useful tools for riders. Requiring public APIs from services that operate on public streets extends a mobility tradition that's open and fair, while promoting innovation and competition.

What are public, real-time APIs?

A public, real-time Application Programming Interface (API) allows a mobility operator to provide universal access to real-time information about their service, using a standard data format.

Translation: a transit, scooter, bikeshare, moped, carshare, microtransit, or ridehail operator can use a public, real-time API to provide information about where it has vehicles available for use, or when its service is going to arrive, opening up information so potential riders can find and use the service.



Why is this important?

There are three key policy reasons to require public, real-time APIs from transportation operators:

01 Multimodal connections to reduce private auto trips

With public, real-time APIs, information about separate modes and operators can be integrated together for multimodal trips, a necessary step for “Mobility as a Service” and complete first-mile, last-mile connections. With open APIs, the public can easily mix-and-match transportation services — whether that’s an Uber car, a Lyft bike, a Bird scooter or a city-operated bus. Thanks to public APIs, leading transport apps like Google Maps, Citymapper and Transit support different types of multimodal trip planning, maximizing the utility of options that reduce car ownership.

02 Ensure a competitive marketplace

Public, real-time API requirements help harness the power of the market, providing consumers with information about competing options and helping them make better transportation decisions. Mobility operators have little incentive to show information about a competitor — you probably won’t see a Lyft-owned service appear in the Uber app, for example. Public APIs help level the playing field, fostering competition and helping new, innovative entrants improve service for the public.

03 Public accountability for new mobility

Public, real-time APIs are available not only to transport apps, but also to the general public. These APIs indicate when a transportation service is available, and do not reveal personal information. These data streams can be used by civic technologists, academics, journalists, and policy advocates to verify that operators are living up to their promises, to ensure a mobility program is adequately serving communities of need, and to help the city achieve its policy goals.

What's the current state of public APIs in mobility?

Public APIs are a standard offering from North American transit agencies, thanks to the development of the General Transit Feed Specification ([GTFS](#)) beginning in 2005. Most dock-based bikeshare systems have also traditionally offered public, real-time data feeds, thanks to the General Bikeshare Feed Specification ([GBFS](#)), which was [adopted by the North American Bikeshare Association \(NABSA\)](#) in 2015.

GBFS? MDS? What's the difference?

The [Mobility Data Specification](#), initially developed by the Los Angeles Department of Transportation and now governed by the [Open Mobility Foundation](#), is designed for mobility operators and regulating agencies to manage operations and planning. As a real-time, two-way communication channel between operators and government, MDS is not intended to be available to the general public. To ensure that there is a public API available, MDS requires that operators [also provide a public GBFS feed](#) in order to be MDS compliant.



In contrast with public transit, voluntary adoption of public APIs by new mobility services is lacking. Few mobility companies offer APIs, and most that previously offered public APIs have shut them down:

**Dockless
bikeshare
and scooters**

GBFS can be used to show vehicle locations in free-floating systems such as dockless bikeshare and scooter operations. Unless they are compelled to offer them by permitting authorities, most operators do not provide public, real-time APIs in the cities they serve.

Carshare

Most carshare services have never provided a public API showing real-time vehicle availability. When they are offered, public APIs are not guaranteed. Daimler-owned car2go [provided its own public API](#) to show cars available for use, before revoking API access for transport apps in January 2018. (Under merger conditions for a Daimler-BMW joint venture [approved by the European Commission](#) in November 2018, Daimler will partially reinstate this API in six European cities, and is allowing private API access on a case-by-case basis in North America.)

Ridehail

Ridehail services were relatively early adopters of APIs, starting with [Uber](#) in 2015 and [Lyft](#) in 2016. While these APIs enabled real-time ETAs, pricing information, and even the ability to book a ride, Uber and Lyft have been known to discourage apps that use their APIs from also [including other ridehail services](#). After Uber and Lyft went public in early 2019, both companies restricted access to a limited number of approved apps and [revoked their public APIs](#).

Best practices for requiring public, real-time mobility APIs

A growing number of cities are recognizing the importance of public APIs, and can serve as models for other policymakers.

In January 2018, the North American Bikeshare Association issued [guidance to cities for the regulation of dockless mobility](#), saying that “real-time bike location data should be provided via a publicly accessible API in General Bikeshare Feed Specification (GBFS) format.”

In December 2018, the Chief Data Officers of 13 major U.S. cities — including Denver, CO, Kansas City, MO, Louisville, KY, Pittsburgh, PA, and San Diego, CA — signed a [Dockless Mobility Open Letter](#) from Harvard University’s Civic Analytics Network. The letter echoes NABSA’s guidance and recommends that cities require a real-time API “published directly to the public” in GBFS format.

Public, real-time APIs can be required for many types of on-street transportation options, not just bikeshare and e-scooters. Washington, DC, for example, requires public GBFS feeds from operators in its [moped program](#). APIs can also be used for carshare, microtransit, ridehail, and other services.

Making APIs available to the public

Simply requiring an operator to host a GBFS feed on its website is not a guarantee that it will be accessible to the public.

In addition to posting links on government websites and open data portals, where they can be found by local audiences, industry best practice is to also list feeds on NABSA's GitHub repository, which contains a comprehensive list of public GBFS feeds for those accessing data across multiple cities.



Government agency website

To make it possible for the public to find required GBFS feeds, cities including [Washington, DC](#), [Arlington County, VA](#), [Kansas City, MO](#), and [Providence, RI](#), link to the feed URLs from their government websites.



Open data portal

Cities such as [Calgary, AB](#), and [Louisville, KY](#), have posted public GBFS feeds to municipal open data portals, while [Portland, OR](#), posts GBFS feeds in its own GitHub repository.



Published to NABSA GitHub

Chicago, IL, not only posted GBFS feeds [on its website](#), it also engaged in the best practice of updating [NABSA's GitHub repository](#), which provides a comprehensive listing of public GBFS feeds around the world.

Protecting privacy

Public APIs that show the real-time availability of vehicles do not contain personally identifiable information such as user names, addresses, or IDs. They do, however, show the precise locations of vehicles available for use, along with a vehicle ID. As an additional precaution, operators can rotate or randomize vehicle IDs each time a vehicle becomes available. This prevents inferring the precise start and endpoints of trips by seeing when and where a specific vehicle ID "disappears" and then "reappears" in the data.

A wide range of cities have begun requiring public APIs as part of their mobility programs. Four cities with strong, clear, and well-enforced language about public APIs are Los Angeles, CA, Washington, DC, Arlington, VA , and Providence, RI.

**Los Angeles,
CA**

“All permitted Operators shall provide a publicly accessible API that meets the requirements of the General Bikeshare Feed Specification. The Operator may not change the API URL without notifying the City with at least 30 days’ notice. Operators are required to make the API endpoint available for public consumption.” As part of LADOT’s Mobility Data Specification requirements, the city notes: “Any MDS compatible API... must must also provide a link to your open GBFS.”

- [LADOT Dockless On-Demand Personal Mobility Conditional Permit](#)



**Washington,
DC**

“(1) Permit holder shall provide a publicly accessible application program interface, clearly posted on the company’s website that shows, at minimum, the current location of any dockless vehicles available for rental at all times.

(2) A smart phone-based application used to rent dockless vehicles does not qualify as a publicly accessible application program interface.

(3) Data must be provided in compliance with the Generalized Bikeshare Feed Specification (GBFS) v1.0. To account for the dockless nature of the vehicles covered by this permit, the following clarifications and modifications are accepted to the GBFS:

(a) There are no “stations” in the parlance of GBFS. As such, station_status.json should return an empty list and station_information.json should return an empty list;

(b) free_bike_status.json is required;

(c) the field “vehicle_type” shall be added to the public API to describe the vehicle type. This may be either “bicycle,” “e-bike,” “scooter,” or another type of permitted vehicle that must be specified.

(4) The public API need not be available without authentication; however, any member of the public, including commercial entities, must be able to gain access to the data provided by the API by requesting access through a web interface. Moreover, the provider should provide access on average of at least 50 requests an hour...

(6) If the operator operates more than one type of vehicle, they must provide a separate GBFS version 1.0 API [per vehicle type].”

- [DDOT Public Right-of-Way Occupancy Permit](#)



**Arlington
County, VA**

“(c) [Company] shall provide a publicly-accessible application program interface, clearly posted on the company’s website that shows, at minimum, the current location of any dockless vehicles available for rental at all times.

(d) A smart phone-based application used to rent dockless vehicles does not qualify as a publicly accessible application program interface.

(e) [Company] shall use the General Bikeshare Feed Specification (GBFS) as documented at <https://github.com/NABSA/gbfs/> for its devices. [Company] shall inform Arlington County of the location of the gbfs.json file on the Internet. The gbfs.json file contains the necessary information to find other files related to the GBFS data. If a token or authentication is required to view that file, the location to apply for the token must also be submitted to Arlington County.

(f) Arlington County requires that [Company] publish in a location accessible by Arlington County staff six of the GBFS v1.1 draft files. Below are the required files that must be published...”

- [Arlington County Memorandum of Agreement](#)

**Providence,
RI**

“Permittee shall provide a publicly accessible API that meets the requirements of the General Bikeshare Feed Specification (GBFS) as published online at <http://github.com/NABSA/gbfs>. Permittee shall not change the API URL without notifying the City at least 30 days in advance of change. Permittee is required to make the API endpoint available for public consumption without the need for an access key... The City shall be permitted to publicly utilize Permittee’s API and display real-time data.”

- [Regulations Governing the Placement and Operation of Personal Transportation Devices in the City of Providence](#)

Ensuring data standards are inclusive of new modes

Transportation data standards like GBFS and MDS are open, allowing data producers, consumers, and regulators to collaborate so they include relevant information in usable formats.

The Mobility Data Specification (MDS), for example, is designed to be inclusive of any floating mobility service, such as bikes, scooters, and carshare. It is not, however, intended as a publicly-available data feed. Instead, MDS requires that a GBFS feed, the existing specification for public, real-time data, be made available for public use.

While GBFS was originally designed for dock-based bikeshare, it has already been adapted for use by free-floating mobility operators, as required by cities including [Los Angeles](#), Washington, DC, and Arlington, VA. Additional improvements are coming: NABSA has selected the non-profit MobilityData, which leads GTFS governance and development, to work with stakeholders on updates to GBFS. [Work is already underway](#) to identify needs and modernize the open data standard.

Open APIs support public accountability

In addition to providing the data streams that enable multimodal trips and fostering a fair, competitive marketplace, open APIs also provide a vital source of information to the public about services permitted to operate on city streets.

Bikeshare in New York, NY

Advocates and journalists at Streetsblog used Citi Bike's public GBFS feed to [verify a sudden drop in the number of available bikes](#) in September 2018. By comparing the drop to bikeshare systems in other cities, they identified a bike maintenance problem in New York and pressed the operator for service improvements.

Scooters in Chicago, IL

Academics at DePaul University's Chaddick Institute for Metropolitan Development issued a report in August 2019 that used GBFS feeds to analyze how scooters were distributed across different neighbourhoods. The researchers found that while operators were deploying fewer vehicles than permitted by the city, they were [meeting the city's goal of equitably distributing available scooters](#) in priority areas.

Carshare in Montreal, QC

Journalists at CBC/Radio-Canada were able to corroborate local complaints about on-street parking in 2016 by using car2go's API. (The API has since been closed to the public.) The reporters analyzed which neighbourhoods had the most car2go vehicles, and established that carshare vehicles had more curbside turnover than privately-owned cars.

Ridehail in Washington, DC

Journalist academics at the University of Maryland, writing for the Washington Post in 2016, found which neighbourhoods were best served by Uber after analyzing wait times from the service's API. They discovered that people in higher-income, whiter, denser, and more centrally located areas were most likely to find an Uber driver quickly, while lower-income, non-white, and less central locations received lower levels of service. (Uber has since closed its API to the general public.)



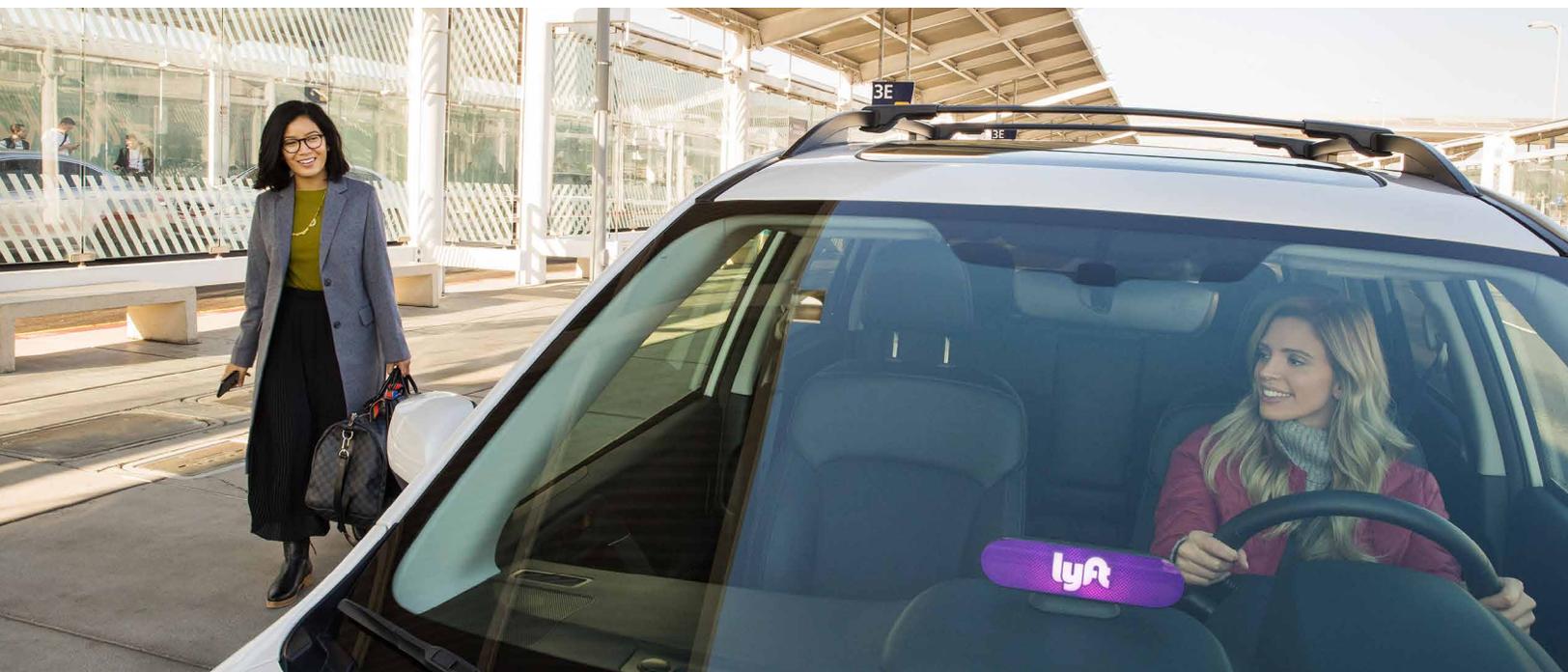
Moving forward: Using APIs to enable multimodal payments

APIs can offer more than just real-time information about how long a rider must wait for a bus or where the nearest scooter, bikeshare, moped, carshare, microtransit, or ridehail vehicle is located. APIs can also enable users to sign up, book, and pay for services in whichever app is convenient for them.

The discussion around payment APIs is still ongoing, but there are already a number of payment APIs in use or under development, both public and private:

Ridehail

Ridehail services were the first to offer APIs that included not just ETAs and estimated price but also booking, starting with [Uber](#) in 2015 and [Lyft](#) in 2016. Both services can be booked within Transit as part of a trip that combines public transport and ridehail to solve the “first mile, last mile” problem. However, since 2019 these APIs are [no longer available to the general public](#), and are instead restricted to a limited number of approved apps.





Shared services

Payment APIs allow Transit users to pay for and unlock bikeshare trips from 10 operators including BIXI, Bike Share Toronto, and Divvy, as well as carshare vehicles from Communauto and Pogo.

Transit agencies

As public transit operators provide mobile ticketing options and upgrade their fare collection systems, innovative agencies are increasingly looking to payment APIs as a way to make their services easier to use. Mobile payment APIs through vendors such as Masabi and Token Transit, for example, allow riders to pay for transit trips using third-party apps including Transit. Larger fare collection systems like the MBTA's upcoming [AFC 2.0](#) make open APIs a [requirement](#), so riders have flexibility in how they can pay for trips.

Payments are the next frontier for API development across all modes. Making it easy to pay across modes and operators will help riders compare options and take multimodal trips that are difficult to execute today.

Indeed, some governments have recognized the potential of public payment APIs to make shared mobility more attractive and reduce trips by personal automobile. As part of its transportation industry deregulation in 2016, [Finland began requiring public and private mobility operators to provide](#) “open information and payment interfaces” as a way to “promote the introduction of interoperable digital ticket and payment systems” and “pave the way for the Mobility as a Service concept.”

North American policymakers could, as Finland does, begin considering payment APIs as a necessary and required component of their transportation data infrastructure, building upon APIs that show real-time availability.

Using APIs to enable seamless mobility

- APIs include real-time locations of available vehicles, prices and, if applicable, ETAs. Individuals can see all their options in one place, but must still open each separate mobility operator’s app to use the service.
- Payment APIs allow existing users of each mobility service to securely sign in to their account and book a trip or unlock a vehicle without needing to switch apps.
- Account creation APIs allow people to sign up for and use a service from within any app.

APPENDIX

What's missing from existing guidance to policymakers?

An array of governments and NGOs have offered general principles in support of public APIs or guidance on other types of mobility data, but they currently lack enough specificity about how to require public, real-time APIs.

Oct 2017

A consortium of transportation NGOs launched the [Shared Mobility Principles for Livable Cities](#). The project, now under the auspices of the [New Urban Mobility Alliance](#), promotes “public benefits via open data” including “integration and seamless connectivity.” According to the principles, “the data infrastructure underpinning shared transport services must enable interoperability, competition and innovation, while ensuring privacy, security, and accountability... Seamless trips should be facilitated via physical connections, interoperable payments, and combined information.”

Unfortunately, public APIs are not consistently required or available, with policy falling short of the principles agreed to by dozens of governments, NGOs, service providers and companies, including Transit, Uber, Lyft, Zipcar and Lime.

Jul 2018

The National Association of City Transportation Officials (NACTO) released [Guidelines for the Regulation and Management of Shared Active Transportation](#). While it said that “at a minimum, data should be provided to the city in GBFS format,” it did not specify that GBFS feeds should be available to the public. Instead, it says, “cities shall require that companies make anonymized trip data available to the public for use in creating apps that are not affiliated with the companies or city.” Unlike real-time GBFS information, after-the-fact trip information is not useful to most app developers and users.



Nov 2018

The International Municipal Lawyers Association (IMLA) released [Guidance for Regulation of Dockless Micromobility](#). "Consider what format shared data should be compiled," IMLA said. "GBFS is useful for real-time data." IMLA did not say that GBFS should be made available to the public, or offer language to help cities require public, real-time APIs.

Jan 2019

Transportation for America released the [Shared Micromobility Playbook](#). It said that "cities should require public application program interfaces" for micromobility fleets and "strive to require and utilize an authenticated, standardized API." It also says that "real-time data on vehicle availability and operations should also be available via API for use by the city or third-party analysis platforms." The playbook focused on the needs of municipal operations managers and approved research partners, but did not specify the value in having real-time APIs available to the public.

Mar 2019

The UK Department for Transport (DfT) published its [Future of Mobility: Urban Strategy](#) policy paper. It lays out a strong set of principles in support of open APIs. “The marketplace for mobility must be open, to stimulate innovation and give the best deal to consumers,” it says. “New mobility services must be designed to operate as part of an integrated transport system combining public, private and multiple modes for transport users. Data from new mobility services must be shared where appropriate to improve choice and the operation of the transport system.” DfT lays out a clear and comprehensive vision of how open APIs can be used to develop an integrated multimodal network that includes competing operators. But it only provides a roadmap for future decisions by the government, and not specific guidance on how to achieve its goals.

Apr 2019

The National League of Cities released [Micromobility in Cities: A History and Policy Overview](#). The report encourages cities to “develop a plan and agreement for trip data,” but does not speak to the importance of public, real-time APIs. (It does, however, briefly mention Washington, DC’s public GBFS requirement in the report’s appendix.)

Aug 2019

The UC Davis Policy Institute for Energy, Environment, and the Economy released [Mobility Data Sharing: Challenges and Policy Recommendations](#). The report includes GTFS and GBFS in its history of data standards, but its recommendations are primarily concerned with trip and operational data for planners, policymakers, and researchers. The report does not make a strong distinction between data provided to regulators, and the benefits of real-time APIs available to the public.

These documents promote good principles and advance the policy discussion. But without clear, specific guidance to policymakers about what should be included in public APIs and how to secure them from operators, many regulators are not requiring them as part of their permitting or licensing programs. As a result, policymakers are missing opportunities to create the more deeply integrated transportation systems, more competitive marketplaces, and more transparent, accountable mobility programs that are enabled by public APIs.

Additional reading about public APIs

[Chicago's scooters are mostly being used during rush hour, and 3 other things to know about the devices](#)

MARY WISNIEWSKI, CHICAGO TRIBUNE · AUGUST 19, 2019

[The right way to do scooter share: Build the physical and tech infrastructure to manage it — and other new transportation innovations.](#)

NEW YORK DAILY NEWS OP-ED · JANUARY 22, 2019

[Transit Series B: we've raised \\$17.5M to build the Switzerland of mobility: From subways to scooters, our app Transit is the open, neutral alternative to "walled garden" transport apps.](#)

BLOG POST BY TRANSIT · NOVEMBER 5, 2018

[Why Uber and Lyft want to create walled gardens — and why it's bad for urban mobility](#)

DAVID ZIPPER, FAST COMPANY · NOVEMBER 3, 2018

[Our car-free future will be blocked by Comcast tactics: Monopoly-seeking behaviour and closed data policies will impede the shift away from cars... can our cities help prevent it?](#)

BLOG POST BY TRANSIT · NOVEMBER 1, 2018

