



**N A B S A**

NORTH AMERICAN BIKESHARE ASSOCIATION

# **DATA GOOD PRACTICES FOR MUNICIPALITIES**

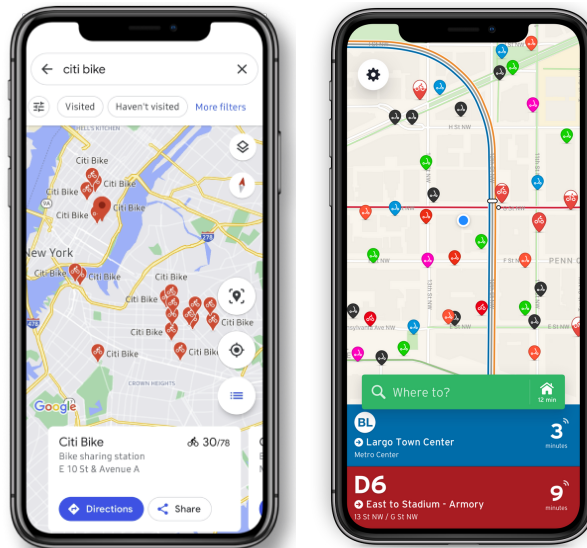
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## Understanding the General Bikeshare Feed Specification (GBFS)

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# INTRODUCTION

As the world of shared mobility has grown, municipal staff tasked with overseeing the public right-of-way and managing shared micromobility face an increasing number of data-related questions. What is GBFS and why should I use it? How do I use GBFS? What is the difference between MDS and GBFS? This document is intended to help answer these questions, along with their privacy, business, and regulatory implications, while maintaining open data, interoperable systems, and traveler privacy as foundational values.



GBFS in use on the Transit app and in Google Maps.

The [General Bikeshare Feed Specification](#) (GBFS), first introduced by NABSA in 2015, provides municipalities with a standardized way to ingest, analyze and compare data from micromobility service providers. Since its introduction, it has become the defacto standard for real-time micromobility data and is now in use in hundreds of systems across more than 45 countries.

Understanding GBFS and its use is an essential part of micromobility policy making. Municipalities are increasingly interested in advancing multimodal travel that integrates new mobility modes, like bikeshare and shared e-scooters, with public transit to encourage more sustainable travel. Open data standards like GBFS and GTFS have been critical in providing travelers with multimodal transportation information — such as the nearest bike or scooter, the wait time for the next bus, or the total travel time to work — across many popular apps and services. These open data standards form the foundation for trip planning and additional components of Mobility-as-a-Service (MaaS), such as integrated booking and payment capabilities.

This document, intended for a North American audience, explains what GBFS is, how to use it, and for what GBFS should be used.

**As of 2019, 56% of cities in North America required shared micromobility operators to release an open, public GBFS feed.<sup>1</sup>**

<sup>1</sup> Data reported by the [2019 State of the Industry Report](#)

# General Bikeshare Feed Specification

## (GBFS): Trip planning and real-time insights

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Modeled after the widely used General Transit Feed Specification (GTFS), GBFS defines a common format to share the real-time status of a shared mobility system<sup>2</sup>. The purpose of a data specification is to enable the exchange of information between multiple parties in a way that ensures that all parties agree on what the information represents. You can think of it like a dictionary, where each term has a definition and a set of rules for how it can be used. The GBFS format allows mobility data to be used by a range of software applications for trip planning, research, analysis, visualization and regulation. This publicly available data allows regulators, researchers and community members to gain insights that have helped municipalities meet their goals. GBFS data is also used by trip planning applications to present shared mobility services to travelers.

GBFS is a specification for real-time data. It describes the status of a mobility system at a current point in time. Examples of GBFS data are the locations of available vehicles and their attributes, the mobility provider's contact information, and policy information like speed limits and parking zones. GBFS does not contain the locations of vehicles that are in use, information about travelers, or records of trips taken.

GBFS consists of a number of files, each of which is made up of defined fields that describe various data. Compliance with the specification requires the publication of multiple files and some, but not all, of their associated fields. Optional files and fields provide additional data for specific purposes and use cases. To meet policy goals, it may be necessary for municipalities to require optional files and fields in their regulations.

**It is recommended that municipal policies require GBFS feeds that are available to the public and do not require authentication, as the first recommendation below states.**

GBFS is an open source specification that has been developed by mobility system owners and operators, municipalities, application developers, and technology vendors. The specification is not fixed; it is meant to be changeable. As the shared mobility industry evolves, it is expected that the GBFS community will extend the specification to include new features and capabilities over time. The project is housed in the [NABSA GitHub repository](#) where you can read the specification and supporting documentation as well as ask questions or propose changes and additions to the specification. GitHub is a collaborative tool that is commonly used to manage open source software projects. No prior technical knowledge is required to pose a question or contribute to the specification. To pose a question to the GBFS community, go to the repository, select the "Issues" tab, and then select "New Issue." Alternatively, you can pose a question via the [MobilityData GBFS Slack channel](#).

<sup>2</sup>

While GBFS started as a bikeshare-specific specification, it now represents many different types of vehicles (such as bikes, scooters, mopeds, and carshare), different types of propulsion (human-powered, electric-assist, fully electric, gas-powered), and more.

# General Bikeshare Feed Specification (GBFS): Trip planning and real-time insights

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In 2019, NABSA selected [MobilityData](#) to become the technical steward for the GBFS community, which involved improving the specification and its governance to meet evolving industry needs. NABSA and MobilityData continue to partner on the effort. GBFS [Version 2.0](#) was released in March 2020. [Version 2.1-RC2](#), which supports dockless and hybrid systems and more extensive pricing representation, was released in October 2020.

Since the introduction of the [Mobility Data Specification](#) in 2018, questions have arisen about the difference between the two specifications. MDS and GBFS are distinct specifications that are intended for different purposes. GBFS is primarily intended to be publicly available in the service of aiding traveler trip-planning, while the primary function of MDS is for non-public use in regulation by cities and other agencies. Unlike GBFS real-time feeds, which represent the system's current state, MDS also includes historical trip and vehicle status information, which contains sensitive location data and is only available through specific authorized channels. **To be considered fully compliant with MDS, operators are required, per the specification, to also publish a public GBFS feed.**

Micromobility data policies should always seek to safeguard traveler privacy. While GBFS does not contain personally identifiable information, any data about vehicle location has potential implications for traveler privacy. GBFS version 2.0, which became effective in March 2020, requires the rotation of bike\_id after every trip. This change reduces the possibility that GBFS data could be used to determine trip origins and destinations, ensuring that public GBFS data is not disclosing traveler's trip information.

## Using GBFS: Recommendations for Municipalities

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To ensure the most effective use of GBFS, we recommend that cities engage in the following good practices:

- Policies should be specific in their requirements and avoid generalization. Ensure that the requirements of your data policy support your specific policy goals and use cases, requiring optional fields and files as necessary.
- Require public GBFS feeds that do not require authentication.
- Post the URL for each operator's gbfs.json file on the municipality's website or open data portal.

- Require that operators license GBFS data using a permissive license that places minimal restrictions on usage to ensure that more apps, developers, researchers, and advocates can use GBFS data without onerous restrictions. Encourage the use of standard open source data licenses, such as the options found [here](#).
- Require that operators include their GBFS feed information in the GBFS systems.csv file in the NABSA Github repository.<sup>3</sup>
- Require rotation of bike\_id after every trip in publicly published GBFS datasets.<sup>4</sup>
- Participate in GBFS governance and enhancement directly or through relationships with other municipalities, industry groups, or organizations that participate in governance and align with your municipality's interests.
- Do not request or require data outside the scope of the GBFS specification unless a prior arrangement has been made with the operator.
- Care should be taken when developing policies that rely on location data. Location data from GPS, cellular and Wi-Fi signals are subject to interference resulting in accuracy levels in the tens of meters or greater. GBFS location data can provide valuable information for users, as well as planning and analysis purposes. However, accuracy levels may make it unsuitable for certain activities, such as enforcing vehicle parking violations.
- Be specific and explicit in policy and communications about which version is required, and work with your providers on the timeline to implement version changes.

## Additional Resources

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With this document, NABSA has aimed to help clarify the purpose and benefits of GBFS, while also providing recommendations to ensure that such benefits are realized.

To dive deeper into the topics addressed in this document, **we encourage you and your organization to participate in [GBFS governance and enhancement directly](#)**, and to check out additional resources about mobility data sharing, user privacy, managing mobility data, and further education about GBFS. Here are some helpful links to get you started:

- [GBFS Repository on GitHub](#)
- [GBFS and Open Data](#), NABSA
- [GBFS Resource Center](#), MobilityData IO
- [GBFS Public Slack Channel](#), MobilityData IO
- [Understanding the Relationship Between GBFS and MDS](#), MobilityData and Open Mobility Foundation
- [Mobility Data Methodology and Analysis](#), City of Minneapolis
- [Guidelines For Mobility Data Sharing Governance and Contracting](#), Mobility Data Collaborative

<sup>3</sup> The location and format of this record may change in the future. There is currently an open issue ([#249](#)) considering this.

<sup>4</sup> Version 2.0 of GBFS, which became effective in March 2020, requires the rotation of bike\_id after each trip to ensure user privacy is protected. As this is a recent change, we encourage cities to verify that operators are adhering to this requirement.

- [Personal data in transport: exploring a framework for the future \(report\)](#) by The Open Data Institute
- [How to write a good open data policy](#), The Open Data Institute
- [Responsible data principles](#), Responsible Data
- [Managing Mobility Data](#), NACTO
- [Inventory of the State of Practice](#), Open Mobility Foundation

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**NABSA**

NORTH AMERICAN BIKESHARE ASSOCIATION

NABSA CONNECTS THE BIGGEST MINDS IN BIKESHARE AND SHARED MICROMOBILITY TO SUPPORT, PROMOTE AND ENHANCE SHARED ALTERNATIVES TO TRADITIONAL TRANSPORTATION ACROSS NORTH AMERICA. NABSA IS THE INDUSTRY'S MEMBERSHIP ORGANIZATION WITH REPRESENTATION FROM SYSTEM OWNERS, OPERATORS, HOST CITIES, EQUIPMENT MANUFACTURERS AND TECHNOLOGY PROVIDERS.

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