GTFS/GBFS & NeTEx: how to interoperate?

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Tu-Tho Thai
MobilityData

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Before we start...

Tu-Tho Thai

Director, Partnerships Europe & Events

Paris, France

Industrial Engineer + M.Sc. in Project Management

Community inclusion with the support of technology

French, English, Vietnamese, and Spanish

Summary

1. GTFS history
2. GTFS today
3. GTFS governance
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The initial need

Traveler information

As a rider: How do I get from A to B?

- ➔ Public transit lines
- ➔ Public transit stops
- ➔ Passing times
- ➔ Fares

In 2005...

… GTFS was born

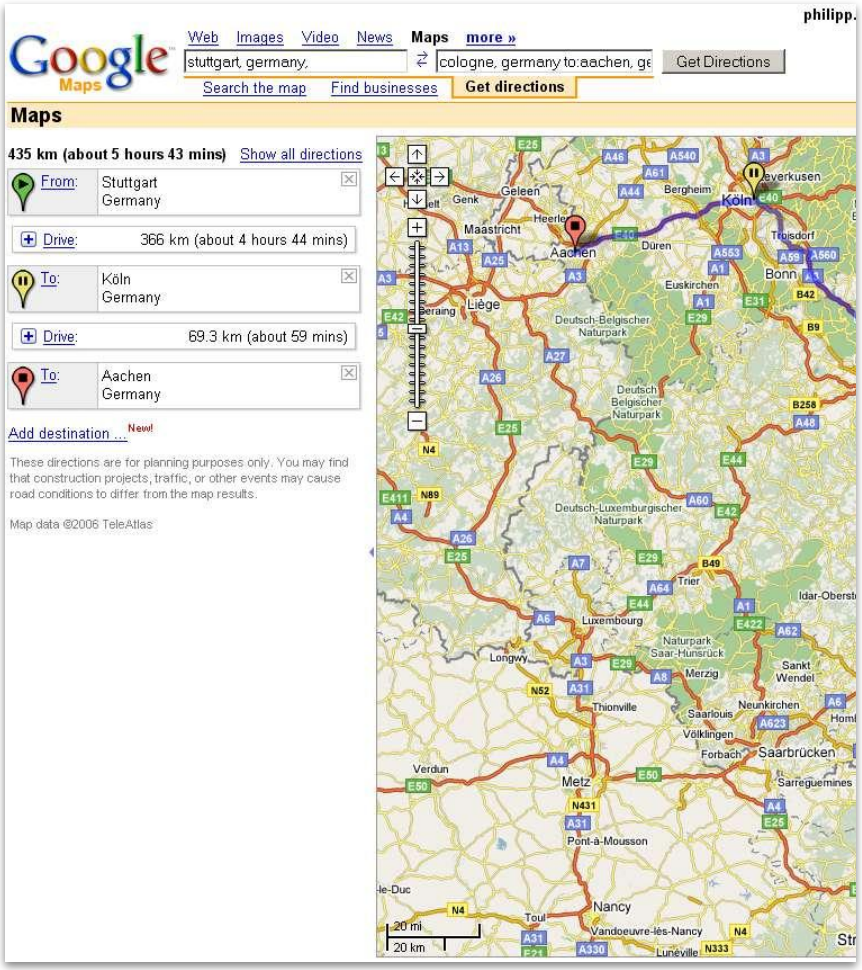
Designed to describe the **traveler-facing information** of a transit (i.e. public transportation) system.

Advantages

- ➔ Simple data format
- ➔ Open data (most of the time)
- ➔ Prevent vendor lock-in

Disadvantages

- ➔ Simple data format
- ➔ In 2005, no governance established



Since 2005

Designed for trip planning...

2005 TriMet & Google draft first spec as “Google Transit Feed Specification”

2008 Community governance

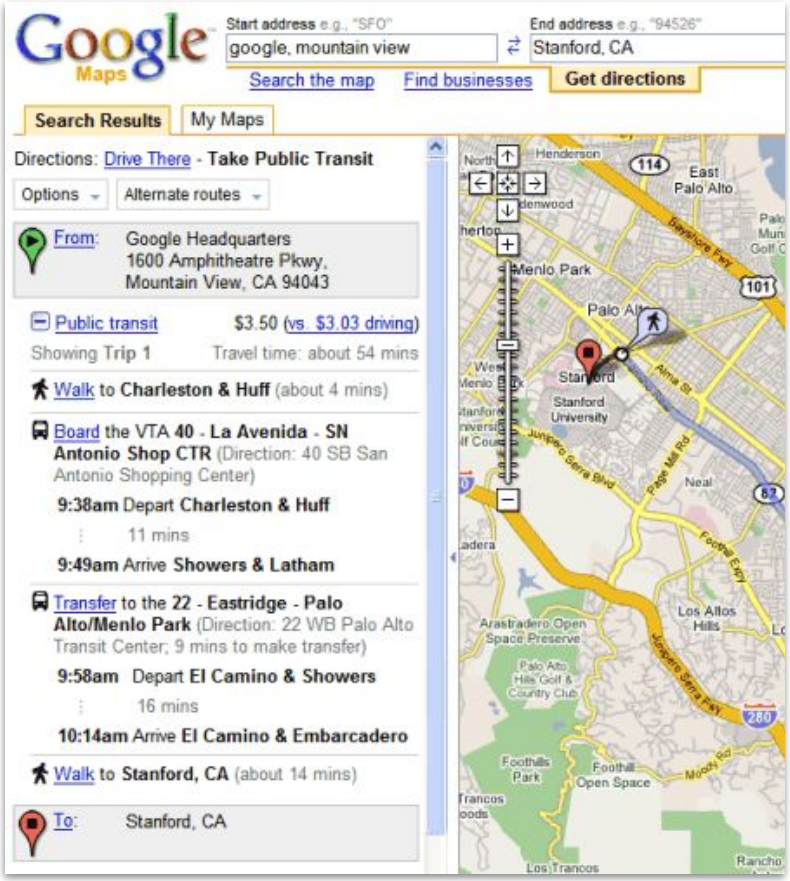
2010 Renamed: General Transit Feed Specification

2011 GTFS Realtime created

2013 Majority of people have a smartphone (US)

2015 RMI’s GTFS Best Practices

2019 MobilityData incorporated



googlesystem.blogspot.com/2007/10/public-transit-directions-in-google.html

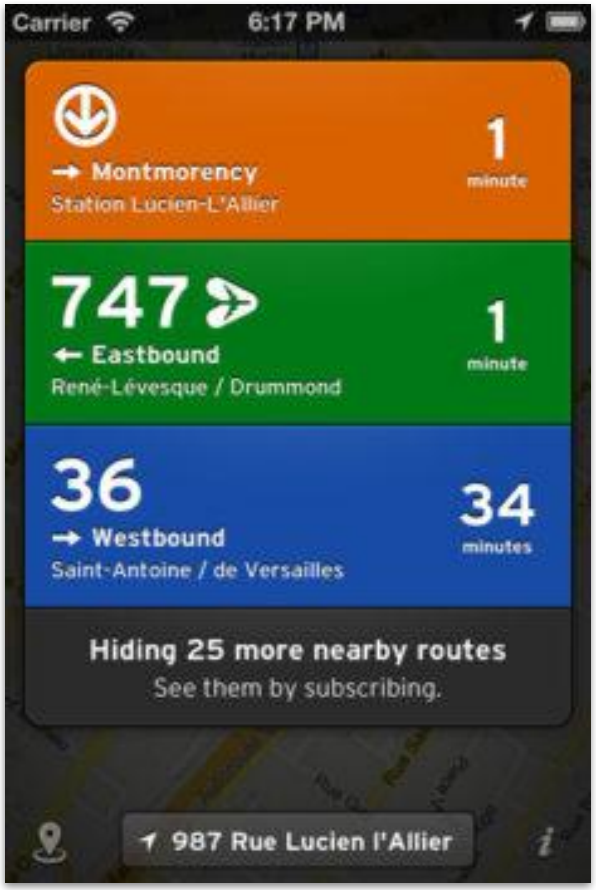
… And gave birth to an entire ecosystem

Mobile apps:

- ➔ 2011: Citymapper (London, UK)
- ➔ 2012: Transit* (Montréal, QC, CA)
- ➔ 2012: Moovit* (Ness Ziona, IL)

While label apps disappearing

- ➔ ~2013 : Salt Lake City
- ➔ ~2013 : Toronto
- ➔ ~2013 : Boston



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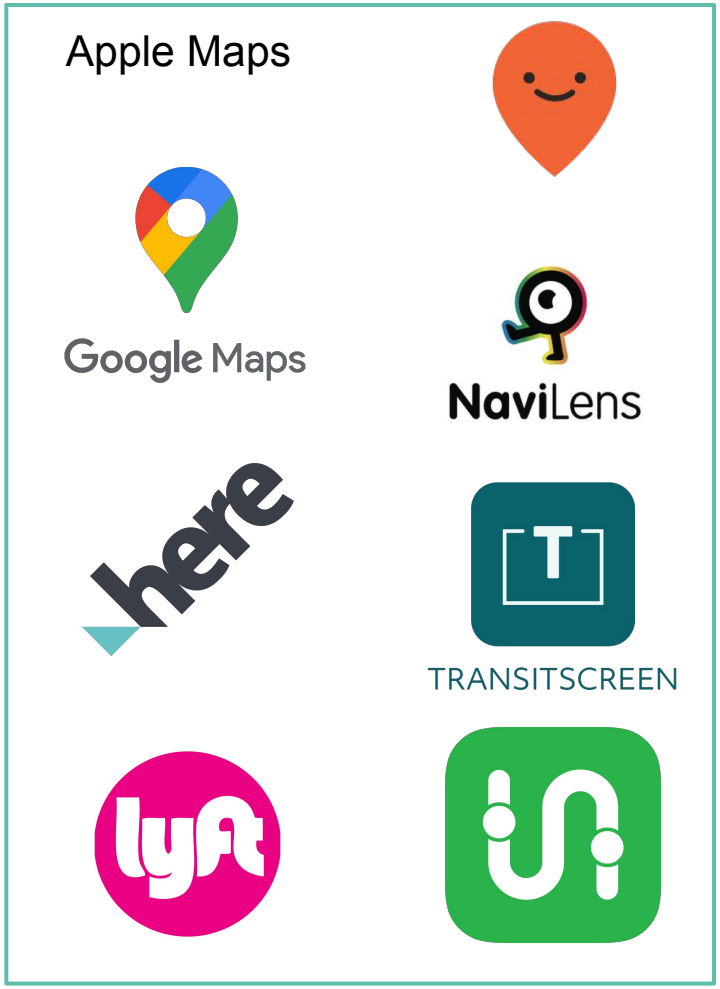
GTFS adoption map

677 cities or areas - 1,327 data producers - 2,832 datasets

(A few are not on the map: Abidjan, Accra…)

GTFS consumption

Trip planners & Mobile apps providing information to travelers



Bing maps

remix

Rome2rio

Intersection

Sugar

OpenTripPlanner
Multimodal Trip Planning

Walk Score®

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Community governance

Driven by the community

GTFS adapts and grows to **meet changing needs of producers and consumers**.

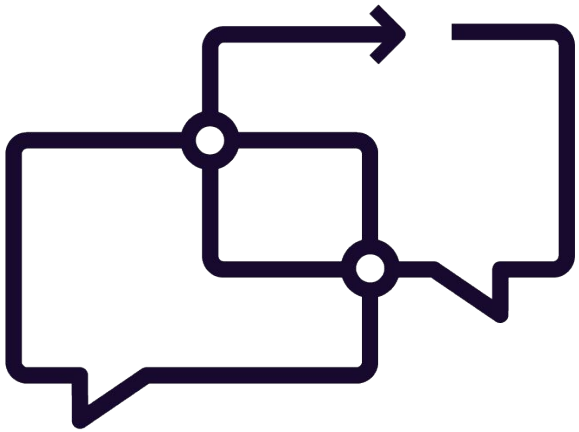
- ➔ Open License (Apache 2.0)
- ➔ Public Conversations
- ➔ Everybody can propose a change
- ➔ Everybody can vote
- ➔ Everybody has veto power

At the industry pace

No theoretical features allowed

To call for a vote on a proposal:

- ➔ It **must** be produced in production
- ➔ It **must** be consumed in production



No “future” features can be added to the official spec.

The “future” proposals are staying so until they are adopted.

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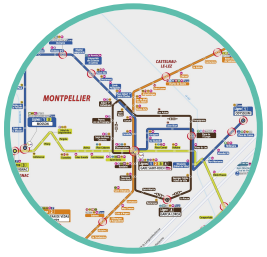
GTFS Schedule (to compare with NeTEx)

6 minimal functionalities

Stops



Routes

Agencies

Calendar

Trips

Stop times

GTFS Schedules: Extensions

10 Adopted Extensions (optional, additional information, refers to GTFS Schedule)


Shapes


Continuous Stops


Transfers


Pathways


Vehicles


Station entrance


Pathways Routing

Boarding Areas

Translations

Stop Text To Speech

GTFS Realtime (to compare with SIRI)

4 main use cases

ETA

Localisation of vehicles

Service disruptions

Service alerts

Current interoperability work

Mapping NeTEx <> GTFS

- ➔ Canonical
- ➔ With the support of NeTEx authors

- ➔ Leading to convertors
- ➔ Reducing the efforts for all

- ➔ In response to existing use cases
  - ◆ enRoute
  - ◆ Entur
  - ◆ Ile de France Mobilité

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The initial need

Traveler information

How do I get from A to B
using shared mobility solutions?

- ➔ Stations
- ➔ Vehicle types
- ➔ Availability
- ➔ Usage restrictions
- ➔ Fares

In 2014...

… GBFS was born

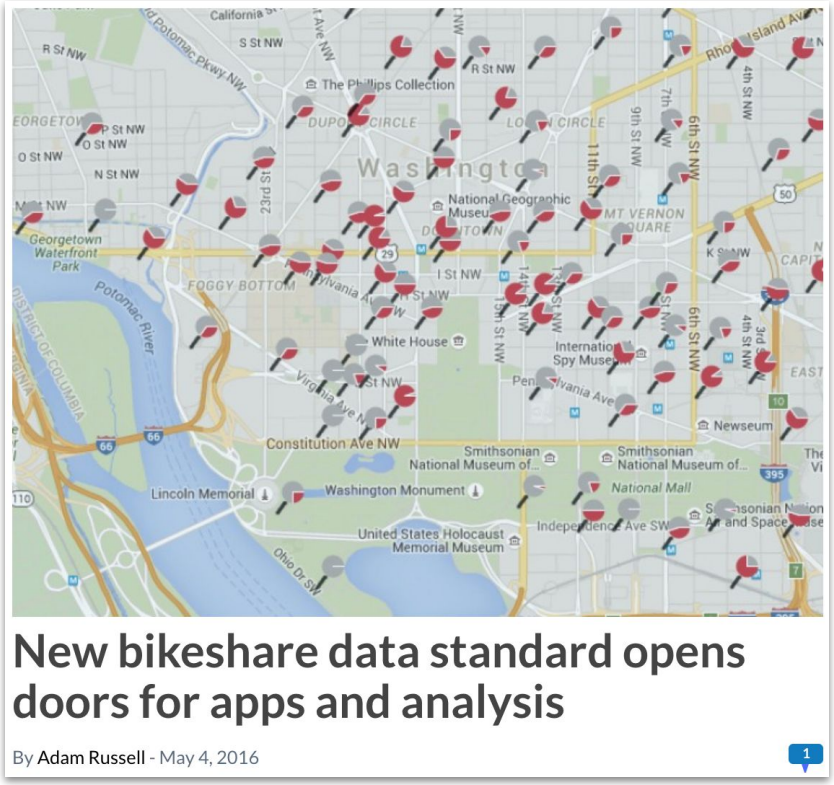
Designed to describe the **traveler-facing information** of a shared mobility system.

Advantages

- ➔ Simple data format
- ➔ Open data (most of the time)
- ➔ Prevent vendor lock-in

Disadvantages

- ➔ Simple data format



https://mobilitylab.org/2016/05/04/new-bikeshare-data-standard-gbfs/

Since 2014

Designed to support industry rapid evolution...

2014 Created by Mitch Vars, inspired by GTFS

2015 Adopted by NABSA

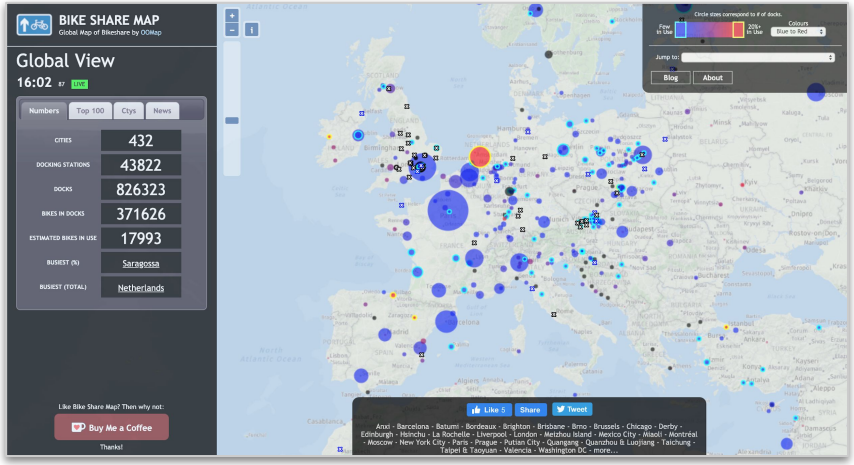
2015 Used by Motivate bikeshare

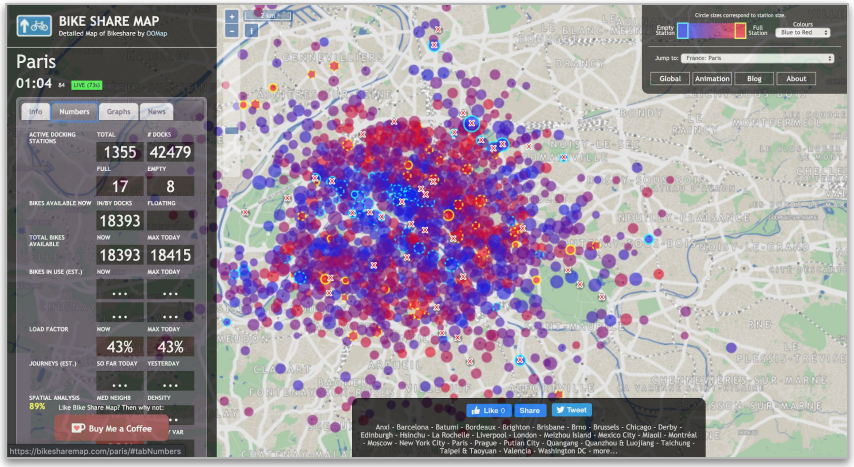
2016 Start spreading around the world

2019 Housed by MobilityData

2020 Improved governance (closer to GTFS)

2021 GBFS v2.2 to adapt to industry evolution





GBFS Schedule (to compare with NeTEx new modes)

10 characteristics represented

Stations

Station status

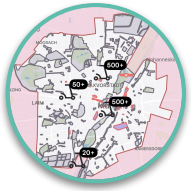
Vehicles status

Deep links

Contact email

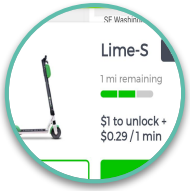
Versions

Vehicle types



Geofencing

Virtual stations
& valet services



Pricing

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A different approach

Top down vs. Bottom up

NeTEx: top down

- ➔ Main strength: complexity
- ➔ Main weakness: complexity

- ➔ Based on comprehensive data model
- ➔ Conceived by a normalization body
- ➔ Global approach
- ➔ Policy recommendation
- ➔ Vote on change, then adoption

GTFS/GBFS: bottom up

- ➔ Main strength: simplicity
- ➔ Main weakness: simplicity

- ➔ Organic growth
- ➔ Created by the industry
- ➔ Iterative approach
- ➔ Industry impulse
- ➔ Adoption of change, then vote

Data formats are means, not ends

Ultimate goal: high-quality, reliable passenger information in a standardized way

- ➔ GTFS built an ecosystem on top of which NeTEx is building
- ➔ Possible success paths in 10 years:
  - ◆ NeTEx has replaced GTFS and everybody has more precise information
  - ◆ NeTEx & GTFS still live together with different use cases
- ➔ Current bleeding edge industry practice (e.g. Entur):
  - ◆ NeTEx internally
  - ◆ NeTEx *and* GTFS exported
- ➔ Most challenges for open public transit are identical regardless of the data format:
  - ◆ Alleviate fears
  - ◆ Create processes
  - ◆ Create an ecosystem

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Open Source Ecosystem

OpenTripPlanner

➔ Trip planner built for GTFS

➔ Extended to support NeTEx

OneBusAway

➔ Mobility app

The Transit Clock

➔ Prediction engine

➔ Turns real-time vehicle position into ETAs

And so many others

➔ github.com/CUTR-at-USF/awesome-transit

MobilityData vision of data ecosystem fostering

2017: GTFS, 2018: GBFS, 2021: CurbLR (planned)

Adoption:

MobilityData Academy

- ➔ Training
  - French, Spanish, English
  - German, Italian, Portuguese, Arabic, Japanese
- ➔ Resources centers
  - gtfs.mobilitydata.org
  - gbfs.mobilitydata.org

Quality: Tools

- ➔ Best practices
  - gtfs.org/best-practices
- ➔ Canonical validators
  - github.com/MobilityData/gtfs-validator
  - “Code” support from Google & Cal-IPT
  - github.com/MobilityData/gbfs-json-schema
- ➔ Grading scheme
  - github.com/MobilityData/gtfs-grading-scheme
  - Support from Washington State DoT, Cal-ITP

Discoverability: Services

- ➔ OpenMobilityData
  - openmobilitydata.org
  - Window on mobility data
  - Multiple formats
- ➔ The Mobility Database
  - mobilitydatabase.org
  - Index with metadata of all GTFS Schedule dataset
  - “World” Access Point
- ➔ GBFS Datasets catalogue
  - github.com/NABSA/gbfs/blob/master/systems.csv
- ➔ The Mobility Archives
  - mobilityarchives.org
  - Records of the past
  - Multiple formats

Community based approach for public transit data

PTA, PTO, mobility apps, governments...

Software vendors:

- Cityway
- enRoute*
- Kisio*
- Mécatran
- Padam*

Authorities: PTA / AOM

- Aléop (Pays-de-la-Loire)*
- IDFM (Ile-de-France)
- STIB (Bruxelles)*
- SMMAG (Grenoble)*
- STM (Montréal)*
- TPG (Genève)

Mobility apps

- Apple Maps*
- Citymapper
- Google Maps*
- HERE*
- Moovit*
- Transit*

Operators

- Kéolis
- SNCB
- SNCF
- RATP
- Transdev

Public entities (policy makers)

- DG MOVE
- transport.data.gouv*

Non-profit organizations

- AGIR*
- FabMob*
- Le GART
- Nouvelle-Aquitaine Mobilités*
- Polis

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What lies ahead

MobilityData mission is **traveler information**. The traveler information ecosystem requires:

- ➔ A culture of data as a source of travel information
- ➔ A culture of open data and data freshness
- ➔ Uniform modeling between producers
- ➔ A culture of community including both data producers & data consumers
- ➔ A culture of incremental improvement.

15 years ago, GTFS created the world of open data for travelers' information.

It gave birth to a whole ecosystem of service, of companies: an entire industry.

NeTEx can be the next generation for this industry, building on top this flourishing ecosystem.

How we see it

The NeTEx and GTFS ecosystem **share a large number of stakeholders, needs and challenges**.
Regarding passengers information :

- ➔ The challenges of openness and standardization are identical
- ➔ The challenges of collecting (& updating) the data are very close
- ➔ The errors in the datasets are often the same

Due to the large overlap of stakeholders, GTFS and NeTEx bound to share one ecosystem.

To avoid duplication of work, synergy should be pursued between the two projects.

Thank you for your attention

MobilityData

mobilitydata.org

www.linkedin.com/company/mobilitydata/

twitter.com/MobilityDataIO

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