



Improving Rider Access through the General Transit Feed Specification (GTFS)

July 9, 2025



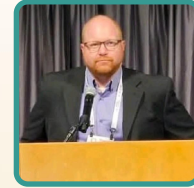
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Agenda

1. What is GTFS?
2. The Data Standard
3. Creating and Maintaining a Feed
4. Beyond the Basics
5. Statewide Transit Map
6. Resources

Kickoff Poll

Join at [menti.com](https://www.menti.com)

Use vote code 5175 8351

-or-

<https://www.menti.com/al1548k7xbsv>



What is GTFS

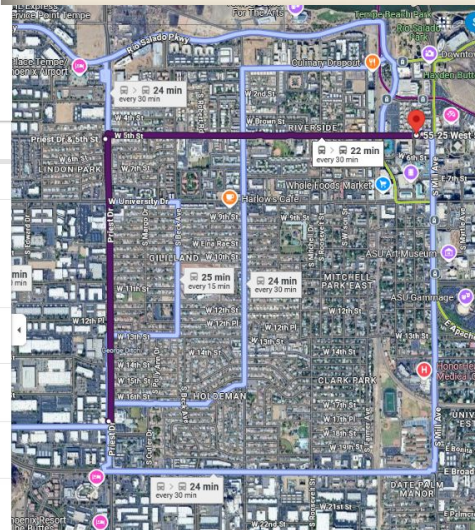
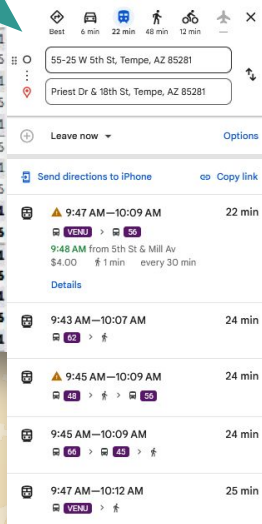
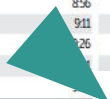
Standardized format for communicating transit service information.

Used by riders find services and plan trips.

Used by other stakeholders for planning and analysis.

Monday-Friday Clockwise Lunes a Viernes, en el sentido de las agujas del reloj

TEMPE TRANSPORTATION CENTER	BROADWAY RD & ROOSEVELT ST	PRIEST DR & UNIVERSITY DR	5TH ST & FARMER AVE	TEMPE TRANSPORTATION CENTER
7:05	7:17	7:26	7:35	7:38
7:20	7:32	7:41	7:50	7:53
7:35	7:47	7:56	8:05	8:08
7:50	8:02	8:11	8:20	8:23
8:05	8:17	8:26	8:35	8:38
8:20	8:32	8:41	8:50	8:53
8:35	8:47	8:56	9:05	9:08
8:50	9:02	9:11	9:20	9:23
9:05	9:17	9:26	9:35	9:38
9:20	9:32	9:41	9:50	9:53
9:35	9:47			
9:50	10:02	10:11		
10:05	10:17	10:26		
10:20	10:32	10:41		
10:35	10:47	10:56		
10:50	11:02	11:11		
11:05	11:17	11:26		
11:20	11:32	11:41		
11:35	11:47	11:56		
11:50	12:02	12:11		
12:05	12:17	12:26		
12:20	12:32	12:41		
12:35	12:47	12:56		
12:50	1:02	1:11		
1:05	1:17	1:26		
1:20	1:32	1:41		



How Riders Interact with Transit Information

Accurate and reliable transit information establishes trust with transit riders

74% of adults use their cell phones for navigation (Smith, 2015).

Real time transit data reduces perceived and real wait times and can increase ridership (Brakewood et al., 2015)

Providing additional integrated information, such as fares, can increase ridership by an additional 3 – 7% (RMI, 2016)



What does high quality data look like?




Complete




Accurate





Accessible


 Walk
▼ About 9 min, 0.4 mi

6:45 AM  **Downtown Connection Center**




2 Route 2 to Mall
▼ 4 min (2 stops) · Stop ID: 24
▲ Detour
▲ Detour
▲ Detour
▲ Detour
▲ Holiday


6:49 AM  **San Francisco / Elm**

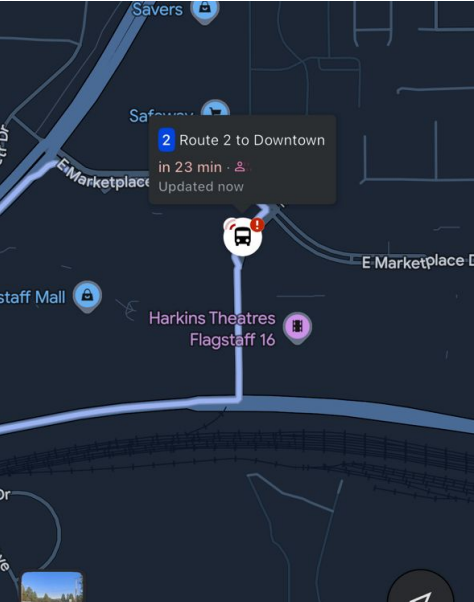
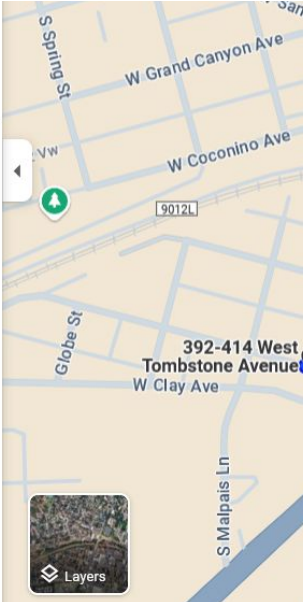
 Walk
▼ About 4 min, 0.2 mi

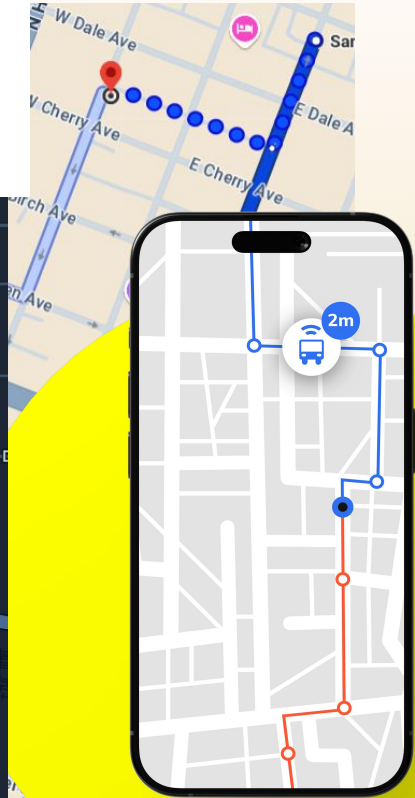
6:53 AM  **35.2009962, -111.6487111**

Tickets and information
[Mountain Line](#) - [Ticket information](#) - 1 (928) 779-6624

 >  **Pirtleville/BayAcres** > 

11:40 AM from 20th St. at A Ave.
\$1.00  **20 min** **every 60 min**





Where Transit Agencies Can Improve

- Regularly update feed information
- Providing fare information
- Provide complete stop arrival and departure times
- Provide shapes.txt
- Incorporate demand responsive services (GTFS-Flex)
- Provide real time information (vehicle locations, arrival times, detours or announcements, etc.)

Of 21 Arizona Transit Agencies with GTFS feeds:

20

With all Required
Files

3

Expired Feeds

2

Missing Feed Version
Information

0

Including NTD IDs in
Feed

16

Providing shapes.txt
Files

5

Missing Fare
Information

7

Missing Arrival and
Departure Times

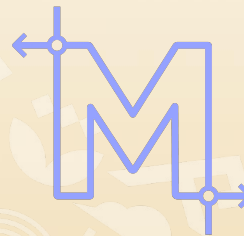
3

Publish Realtime
Vehicle Location

GTFS: The Data Standard



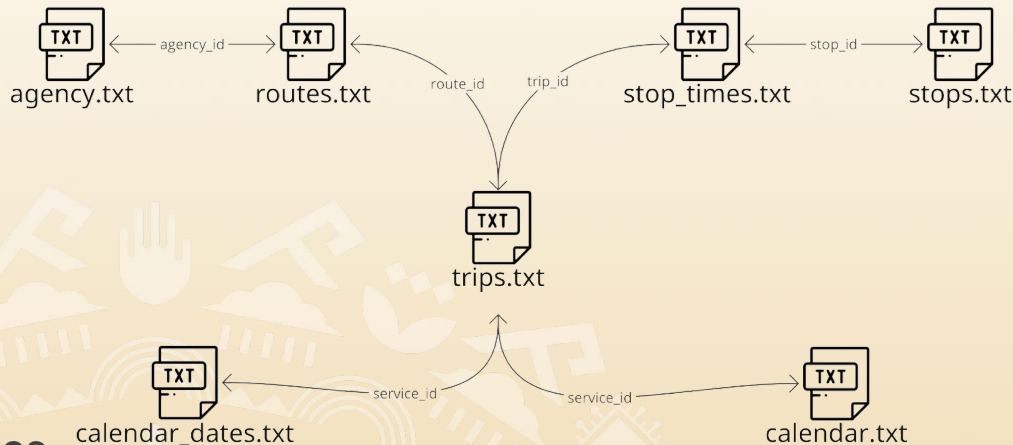
Federal Transit
Administration



GTFS Requirements

- Located in a zip file at a permanent web link
- Consistent ID fields
- NTD Required files
 - Agency
 - Stops
 - Routes
 - **Trips**
 - Stop Times
 - Calendar or Calendar Dates

[Consistent URL Location]/**Consistent_File_Name.zip**



GTFS Optional but Encouraged Files

- Shapes
- Feed Info
- Fare Rules and Fare Attributes
- Demand Response Service Areas and Booking Information (GTFS Flex)
- Beyond the Schedule: Realtime Information



Creating and Maintaining Your Feed



Ways to Create and Update Your Feed

- Manual entry in Excel with Google Maps and Google Earth (RTAP's method)
- Scheduling Software from Vendors
- Self-hosted Scheduling Software

The screenshot shows the GTFS Editor web application interface. On the left is a sidebar with a list of stops, including '10 Gower St - Gower P...', '1 Overland Dr - Better Living - Th...', '1 and 3 Concorde Pl North Side (...', '10 Deauville Lane (15674)', '10 Disco Rd (11699)', '10 Gower St - Gower Park Place ...', '100 Bridgeland Ave (604)', '100 Carrier Dr (11085)', '100 Conallium Pl (11367)', '100 Lesmill Rd (9664)', '100 Norfinch Dr (5850)', '100 Steeles Ave West (8300)', '100 Wynford Dr (Bell Canada) (4...', '101 Duncan Mill Rd (2109)', '1020 Mcnicoll Ave (2874)', '103 Orfus Rd (1425)', '1030 Martin Grove Rd (5591)', '105 Clement Rd - Richview Resid...', '105 Ironside Cres (10847)', '105 Nugget Ave (9565)', '1050 Don Mills Rd - Shops On D...', '1050 Mcnicoll Ave (2875)', '1051 Martin Grove Rd @ Highwa...', '1055 Mcnicoll Ave (2899)', '106 Lansdowne Ave (5205)', and '1081 Kingston Rd - Hensley Gard...'. A red box highlights the location pin icon in the sidebar. The main area displays a map of a residential neighborhood with a red pin indicating the location of '10 Gower St - Gower Park Place'. To the right of the map is a form for editing the stop. The form includes fields for 'stop_id' (23966), 'stop_code' (15608), 'stop_name' (10 Gower St - Gower Park Place), 'stop_desc', 'stop_lat' (43.702167), 'stop_lon' (-79.297834), 'zone_id' (Select zone ID...), 'stop_uri', 'location_type' (optional), 'platform_code', 'parent_station' (Select stop...), and 'stop_timezone'. A message at the top of the form states 'No validation issues' and '* denotes required field'.



RTAP: GTFS Builder

	A	B	C	D	E	F	G	H	I
	route_short			route_route					
1	route_id	agency_id	_name	route_long_name	desc	_type	route_url	route_color	route_text_color
2	CART	Coolidge		Central Arizona Regional Transit		3	https://www.coolidgeaz.com/transitroumap	267300	FFFFFF
3	CXBLUE	Coolidge		Cotton Express - Blue Route		3	https://www.coolidgeaz.com/transitroumap	366092	FFFFFF
4	CXRED	Coolidge		Cotton Express - Red Route		3	https://www.coolidgeaz.com/transitroumap	C00000	FFFFFF
5									
6									
7									
<div><div>< ></div><div>Notes</div><div>agency</div><div>calendar</div><div>calendar_dates</div><div>routes</div><div>stops</div><div>trips</div><div>feed_info</div><div>shapes</div><div>fare_attributes</div><div>fare_rules</div><div>tra</div></div>									

Marcy Jaffe

Sharing and Publishing Your Feed

Trip Planners



Feed Aggregators



It's as easy as sending an email!



Beyond the Basics

GTFS Flex & Realtime

GTFS Flex

It does so by:

- Recommended for all Arizona transit agencies.



Get Started with GTFS Flex for Demand Response

1. Create or Download your service area “locations.geojson” file:
2. Create a new “booking_rules.txt” file for the service.
3. Create a new “route” connected to the booking rule, and a new “stop_time” connected to the zone.
4. Add a new trip connected to the stop time and route.

GTFS Realtime



Builds trust by providing live vehicle arrival and location information



Reduces real and perceived wait times



Increases ridership



Gives agencies more information.

How to Get Started with GTFS Realtime

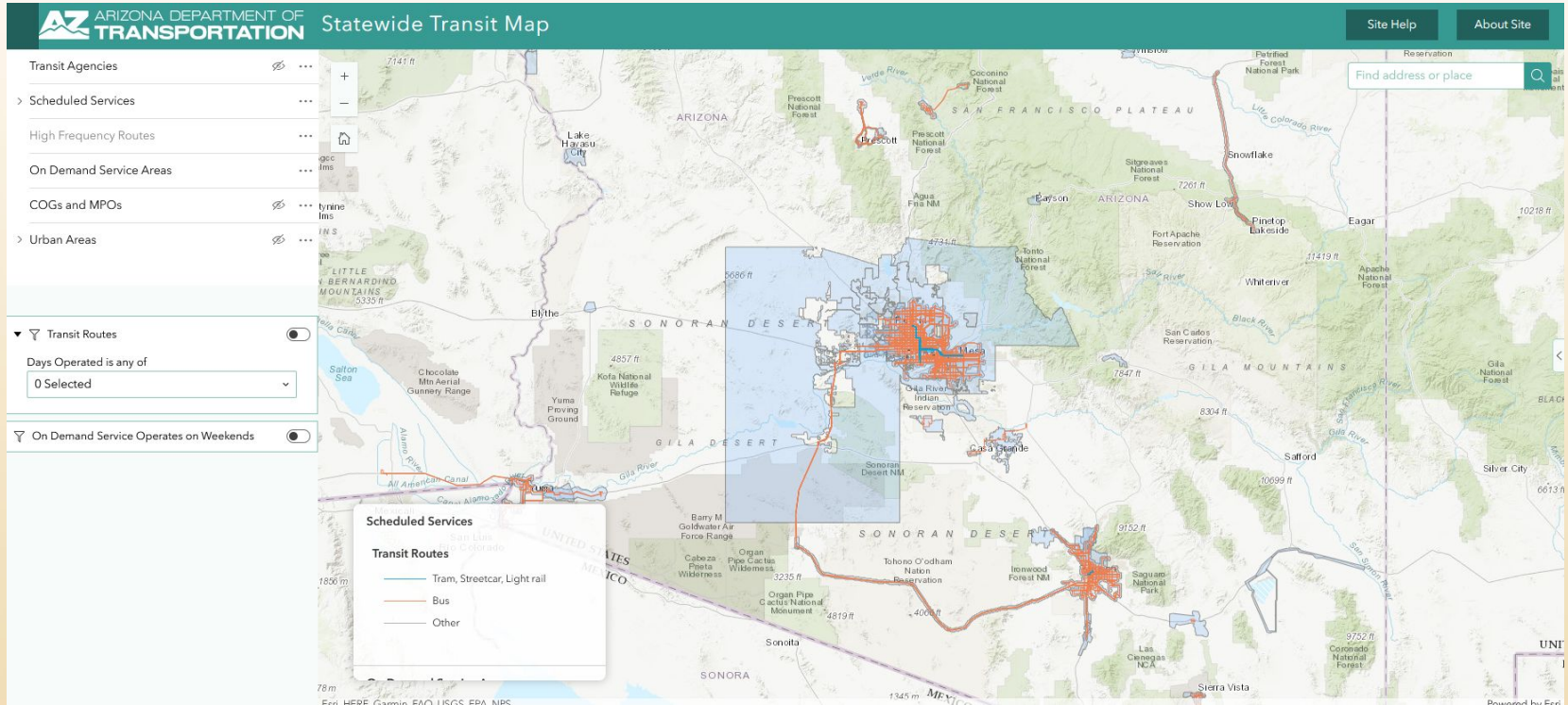
1. Set-up or confirm use of automatic vehicle location (AVL) hardware
2. Reach out to your AVL vendor about if they offer GTFS Realtime feed publishing
3. Publish GTFS Realtime feeds to trip planners and feed aggregators
4. Work with your vendor(s) to monitor and maintain accuracy of GTFS Realtime



Statewide Transit Map



Statewide Transit Map



Resources: Documentation and Best Practices

- General Transit Feed Specification Documentation:
 - Schedule Documentation:
<https://gtfs.org/documentation/schedule/reference/>
 - Best Practices:
<https://gtfs.org/documentation/schedule/schedule-best-practices>
- Creating a Feed
 - Resources List:
<https://gtfs.org/resources/producing-data/#gtfs-data-collection-and-maintenance-tools>
 - RTAP GTFS Builder:
<https://www.nationalrtap.org/Technology-Tools/GTFS-Builder>
 - Feed validator: <https://gtfs-validator.mobilitydata.org/>

Resources: RTAP Resources

- GTFS Builder Support:
 - <https://www.nationalrtap.org/Technology-Tools/GTFS-Builder/Support>
- Uploading GTFS:
 - <https://www.nationalrtap.org/Technology-Tools/GTFS-Builder#UploadGTFS>

Resources: GTFS Flex and Realtime

- GTFS Flex
 - GTFS Flex Documentation: <https://gtfs.org/community/extensions/flex/>
 - Prepared Service Area Files and Example:
<https://highstreetconsulting.sharepoint.com/:u:/s/A0903ADOTTransitGIS/EZsngDjPeQVPhlc3YzAnHAIBz64kGJzMtjn0py3KgCSDxg?e=BIpOD1>
- GTFS Realtime
 - Best Practices:
<https://gtfs.org/documentation/realtime/realtime-best-practices/>
 - Reference: <https://gtfs.org/documentation/realtime/reference/>

Resources: Publishing Feeds

- Registering with Trip Planners
 - Google Maps:
https://support.google.com/transitpartners/contact/agency_participate?sjid=17977417685719896671-NC
 - Transit App: email data@transitapp.com
 - Apple Maps: email maps_data_validation@apple.com
 - Moovit: email usa@moovit.com
- Feed Aggregators
 - Mobility Database: <https://mobilitydatabase.org/contribute>
 - Transit Land: Ask us for help if you'd like to register!

Next Steps

- Check that your feed is up to date
- Add fare information (if missing)
- Add Shapes.txt (if missing)
- Incorporate GTFS-Flex
- Go Real Time (for Fixed Route services)
- Review the data published to the Statewide Transit Map (coming soon!)

We're here to help

- Need help updating your GTFS feed, creating shapes.txt files, or developing GTFS Flex? Contact your ADOT Office

transitgroup@azdot.gov



Thank You!