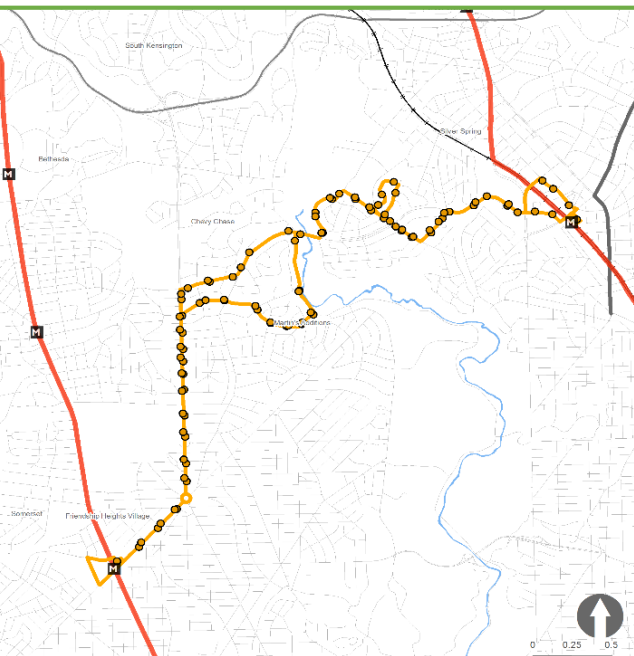




Got GTFS?

June 21, 2017, 10:00 AM



Let's compare.

Select a system and its routes below:

- 808 N Carrollton Ave, Baltimore, MD 21211, USA
- 28 N Wilton Ave, Baltimore, MD 21224, USA
- Wed, Jun 28, 2016 9:24 AM

CURRENT SYSTEM	BALTIMORELINK SYSTEM
CAREY & LAFAYETTE NB	CAREY & LAFAYETTE NB
CAREY & LAFAYETTE NB	CAREY & LAFAYETTE NB
CAREY & LAFAYETTE NB	CAREY & LAFAYETTE NB

PLAN NEW TRIP



FOURSQUARE INTEGRATED
TRANSPORTATION PLANNING



American Planning Association
Making Great Communities Happen



The Voice of Public Transportation in Virginia

Welcome

Introductions

- **Sandy Davis**
 - Experienced in regional transportation operations, research and policy development with a specific focus on geographic information systems (GIS), and qualitative and quantitative research design.
 - Led the development of the GTFS route and stop information for the new BaltimoreLink system.
 - Has used GTFS to create a comparative trip planner application, implement new customized stop signage, and in the development of various metrics to measure the impact of the new BaltimoreLink system.



Introductions

- Jessica Alvarez
 - Specializes in service analysis, forecasting ridership and working with partners and the public to develop service recommendations.
 - Has advanced knowledge of scheduling, Geographic Information Systems (GIS), GTFS, and Intelligent Transportation Systems.
 - Led the process to create GTFS feeds for multiple agencies with customized user input and utilized GTFS in myriad of analyses, including evaluation of metrics, level of services, and service gaps.



Goals and Objectives



- To understand General Transit Feed Specification (GTFS) data
- To learn how to process GTFS for service evaluation, extracting stop, route, schedule data from GTFS feeds in Microsoft Excel and/or Microsoft Access
- To display the GTFS data spatially in GIS software and generate maps
- To be able to use GTFS data to conduct region-wide analyses for summarizing levels of service by day, time period, route, stop or geographic area.

Today's Agenda



- What is GTFS? (5 min)
- GTFS Data Structure (10 min)
- Using GTFS to Determine Level of Service (40 min)
- Using GTFS to Visualize Transit Services (20 min)
- Questions (10 min)

What is GTFS?



- Static text data files that are consistent in format between agencies.
- Incorporating timetable and geographic data (route alignment, bus stop location) and general agency data into a tabulated “feed”.
- GTFS "feeds" let public transit agencies publish their transit data to Google Transit and other customized trip planner platforms. GTFS feeds provide a consistent data format for developers to write applications beneficial to passengers.



Required Files

- Agency
- Stops
- Routes
- Trips
- Stop Times
- Calendar

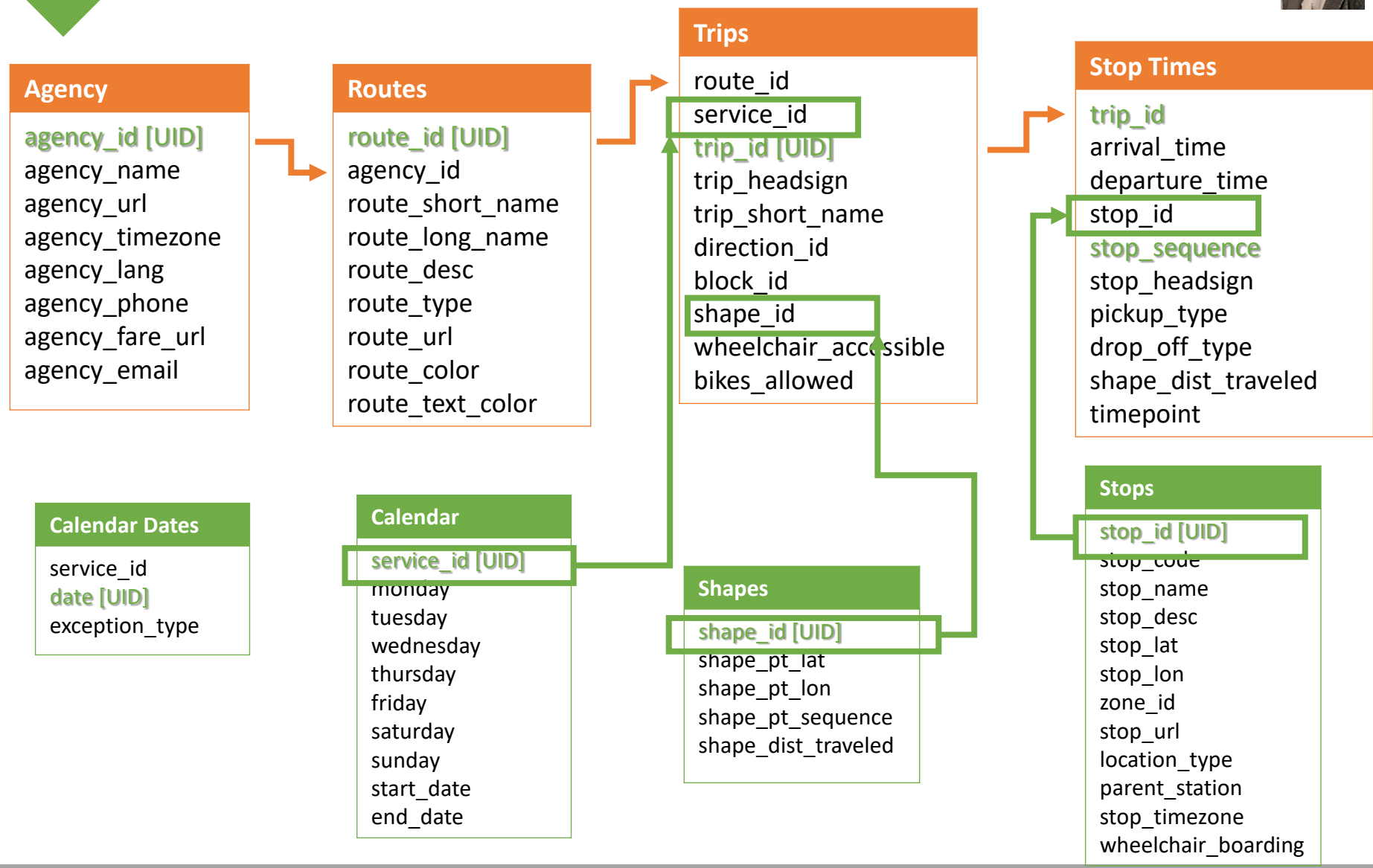
Optional Files

- Calendar Dates
- Shapes
- Fare Attributes
- Fare Rules
- Frequencies
- Transfers
- Feed Info

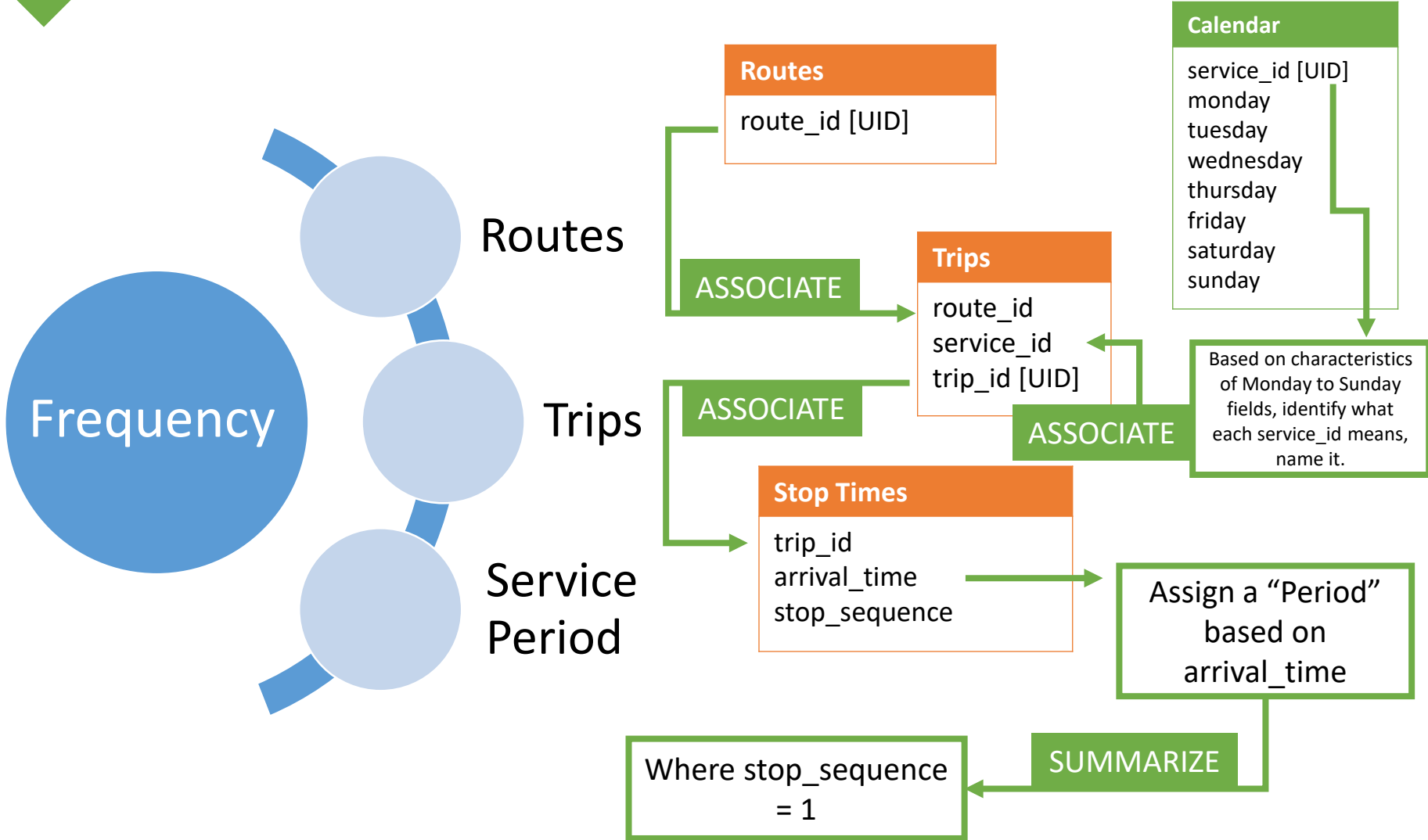


→ Recommended

GTFS Data Structure



Using GTFS to Determine Level of Service



Using GTFS to Determine Level of Service



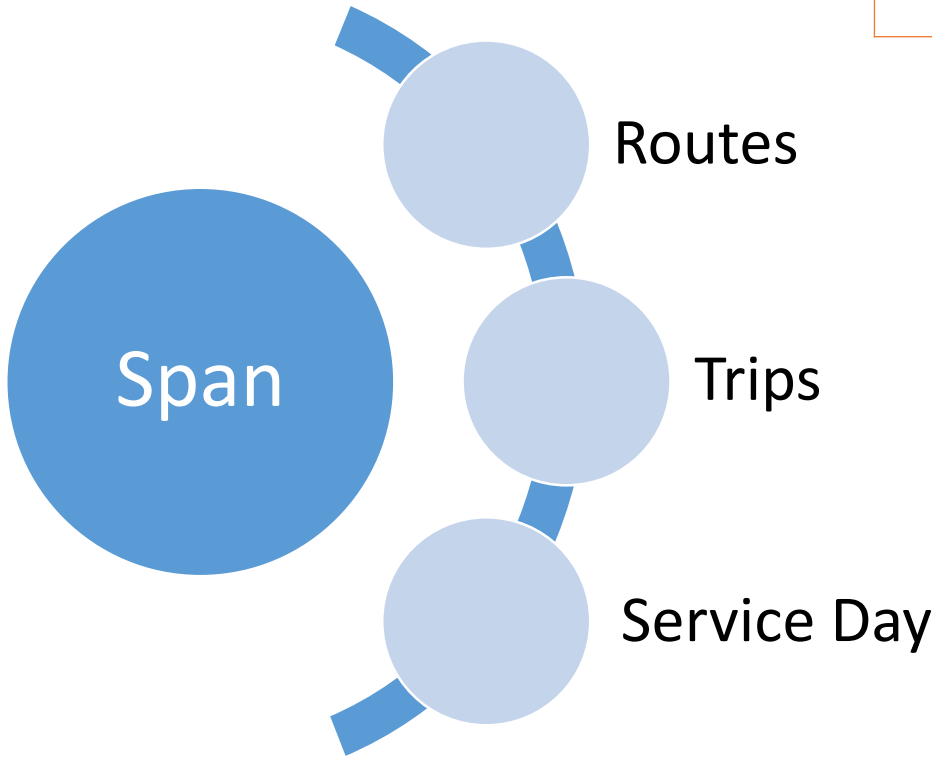
Steps to find frequency by route, day and period:

1. In calendar table, based on characteristics of Monday to Sunday fields, identify what each service_id means and name it.
2. In stop_times table, where stop_sequence = 1 in stop_times table, add a “period” based on “arrival_time.”
3. Add desired descriptive data from routes table and from calendar table to the trips table.
4. Add desired descriptive data from new trips table (created in Step 3) to stop_times table modified in Step 2.
5. Count and sum trip_id in stop_times based on route, service id, and/or time period. Be sure to exclude all records in stop_times table where sequence <> 1.



Excel Example

Using GTFS to Determine Level of Service

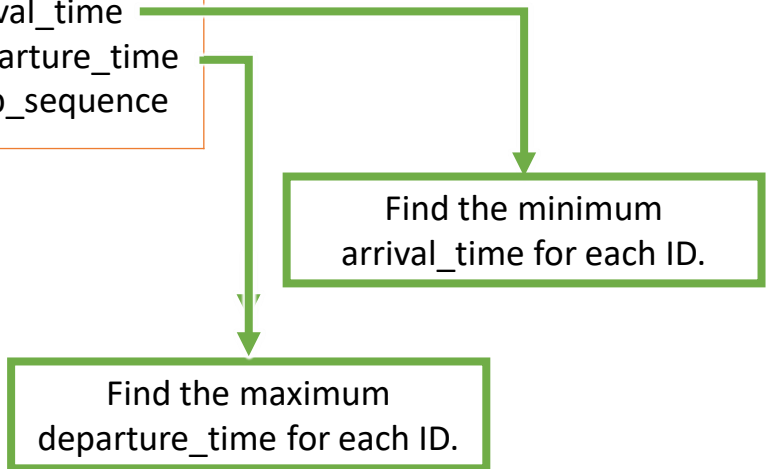


Routes
route_id [UID]

Trips
route_id
service_id
trip_id [UID]

Stop Times
trip_id
arrival_time
departure_time
stop_sequence

Calendar
service_id [UID]
monday
tuesday
wednesday
thursday
friday
saturday
sunday



Using GTFS to Determine Level of Service



Steps to find span by route, day and period:

1. Add desired data from other tables (route_id, route_short_name, service_id, etc) to stop_times table.
2. Find the minimum arrival_time for each [route_id] / [service_id].
3. Find the maximum departure_time for each [route_id] / [service_id].
4. Summarize results.



Excel Example



- What can be visualized using GTFS data and outputs?
 - Route Alignments (Patterns) using the shapes table
 - Bus Stops, both System-wide and by Route or by Shape (pattern)
- Other Applications
 - Displaying Level of Service, By Route and Bus Stop
 - Conducting region-wide analyses by summarizing levels of service by day, time period, route, stop or geographic area.

Using GTFS to Visualize Transit Services



- Data Tables to be used
 - Stops
 - Stop Times
 - Routes
 - Shapes
- Additional Data
 - Geographic Layer
- GIS Tools
 - Convert X-Y data to Point
 - Convert Point to Line
 - Joins

Using GTFS to Visualize Transit Services



Today's Exercises:

1. Display stops locations.
2. Display stops by route and by shape (pattern).
3. Display route lines by shape (pattern).
 - Using [ET Geo Wizard's](#) Line tool Point to Polyline tool.



Visualization Example

Questions & Discussion

Contact Information

Sandy Davis, SDavis@FoursquareITP.com

Jessica Alvarez, JAlvarez@FoursquareITP.com

www.foursquareitp.com/training

Resources & Further Reading

- General Feed Spec Info: developers.google.com/transit/gtfs
- Validation Tools: github.com/google/transitfeed/wiki/FeedValidator
- Transit Feeds Repositories:
 - www.transitfeeds.com
 - www.gtfs-data-exchange.com
 - Check the “Developers” page of your local transit agencies website.
- Open Trip Planner: www.opentripplanner.org

More training available at: www.foursquareitp.com/training

Upcoming GTFS Workshop,
Washington, DC's *GIS in Transit Conference*:
www.urisa.org/transitgis