The Schedule-Based transit model of the Chicago Metropolitan Area

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Why Google Transit Feed?

- More than 445 cities covered worldwide
- More than 150 cities in US
- Google provides some open source tools which help reading and analyzing the GTF data
How to get the Data?

- The data in GTF format is owned by the corresponding transit authority, not by Google and in many cases *openly available* on the web or by a request from the authority.
- In the Chicago region data available for CTA and Metra.
Essential Tables 1/2

- **Stops** (id, name, x, y, zone, type, parent)
- **Routes** (id, name, type). Types:
  - **0** - Tram, Streetcar, Light rail. Any light rail or street level system within a metropolitan area.
  - **1** - Subway, Metro. Any underground rail system within a metropolitan area.
  - **2** - Rail. Used for intercity or long-distance travel.
  - **3** - Bus. Used for short- and long-distance bus routes.
  - **4** - Ferry. Used for short- and long-distance boat service.
  - **5** - Cable car. Used for street-level cable cars where the cable runs beneath the car.
Essential Tables 2/2

- **Trips** (trip_id, route_id, service_id)
- **Stop_Times** (trip_id, arrival_time, departure_time, top_id)
- **Calendar** (service_id, monday, tuesday, wednesday, thursday, friday, saturday, sunday, start_date, end_date)
- **Shapes** (id, x, y)
Data Manipulations(1/2)

- For data manipulation purposes it can be loaded into a database (like sqlite) and then filtered using “SELCT” operator.
- For the Chicago model we used python scripts to filter and clean up the data.
- Python shputils package can be used to convert the resulting tables into shape format for the visualization.
Data Manipulations (1/2)

- Only “normal day” trips need to be selected. The filtering should be done on Trips table using the Calendar table.
- All of the “special occasion” trips need to be filtered out.
- For the Chicago model, the trip was considered to be a “normal” if the service was marked to be available on Tuesday and Wednesday.

Service file example:

<table>
<thead>
<tr>
<th>Id, mon, tue, wed, thu, fri, sat, sun, start_date, end_date</th>
</tr>
</thead>
<tbody>
<tr>
<td>29301, 1, 1, 1, 1, 1, 0, 0, 20090510, 20090630</td>
</tr>
</tbody>
</table>
Google Schedule Viewer

Chicago Transit Authority

Yellow Line
1 Indiana-Hyde Park
10 Museum of S & I
100 Jefferson Manor Express
103 West 103rd
106 East 103rd
108 Halsted/55th
111 Lincoln/Dodge
111 Publican/111th
112 Van Buren/111th
119 Michigan/119th
12 Douglas
120 O'Hare/Wacker Express
121 Union/Wacker Express
123 Illinois Centennial Express
124 Canary/砧ham
125 Van Buren/Wacker
126 Canal & Randolph/Washington
126 Chicago, 8 stops, 35 trips
127 West Loop/South Loop
129 Lake Shore Express
130 State/Lincoln Express
135 Madison/Lincoln Express
136 Madison/Lincoln Express
137 Madison/Lincoln Express
138 Madison/Lincoln Express
139 Madison/Lincoln Express
140 Madison/Lincoln Express
141 Madison/Lincoln Express
143 Madison/Lincoln Express
144 Madison/Lincoln Express
145 Madison/Lincoln Express
146 Madison/Lincoln Express
147 Madison/Lincoln Express
148 Madison/Lincoln Express
149 Madison/Lincoln Express
150 Madison/Lincoln Express
151 Madison/Lincoln Express
152 Madison/Lincoln Express
83 Madison/Lincoln Express
84 Madison/Lincoln Express
85 Madison/Lincoln Express

Wacker (Upper) & Columbus (14222)
7(8):30 AM-9:30 PM, 7:30 AM-9:30 PM, 8:00 AM-8:30 PM, 8:30 AM-9:00 PM

Google Schedule Viewer

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GPS Trace (Shapes)
Matching GTF Data to the TRANSIMS Network
Network Adjustment
Stop Projections

GTFS STOP

Projected Stop

TRANSIMS LINK
Potential Problems - Broken Path
Potential Problems - Matching GPS Traces to the Network Links
Steps and Tools Overview

Filter
- Filter out “normal day” routes
- Your favorite scripting language or DBMS

Shapes
- Create shapefiles
- Your favorite scripting language or DBMS with spatial data support (SpaLite)

Network
- Identify missing links and add them to the network to accommodate the routes
- ArcGIS

Project
- Project the transit stops onto the TRANSIMS network
- Your favorite scripting language

Routes
- Calculate transit routes on the TRANSIMS network and assign ID’s
- Your favorite scripting language

Conversion
- Convert data into TRANSIMS format
- Your favorite scripting language/TRANSIMS
References