



POLITECNICO
DI TORINO



e-Lite



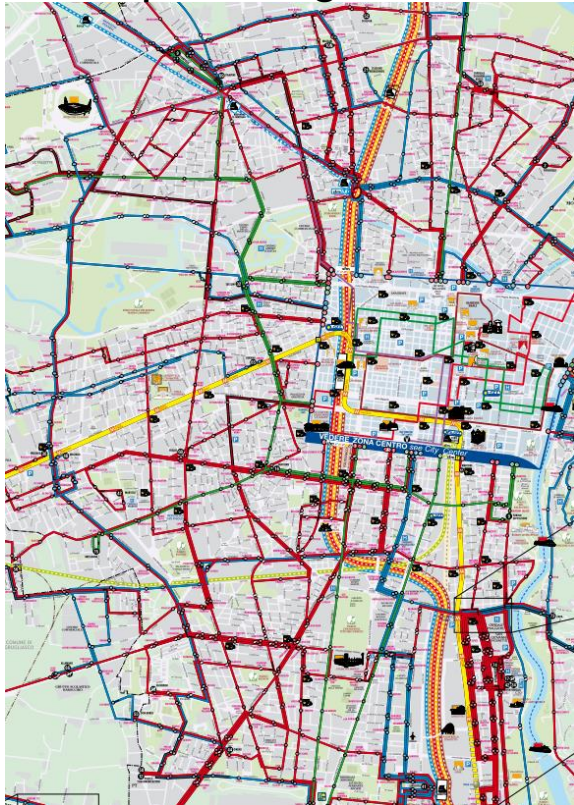
Datasets

Tecniche di Programmazione – A.A. 2014/2015



Example: Turin public transportation

<http://www.gtt.to.it/>



<http://www.sfmtorino.it/>



Google's GTFS standard

<https://developers.google.com/transit/>

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- ▶ GTFS-realtime
- Tools
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- Google Transit

GTFS and GTFS-realtime

Making public transit data universally accessible.

GET STARTED

Learn more about GTFS

The [General Transit Feed Specification](#) (GTFS) can be used to share *static* public transit data.

Learn more about GTFS-realtime

The [GTFS-realtime specification](#) is an extension to GTFS that can be used to share *real-time* public transit data.

Where to find data?



[http://opendata.5t.torino.it/
gtfs/torino_it.zip](http://opendata.5t.torino.it/gtfs/torino_it.zip)



[http://opendata.5t.torino.it/
gtfs/sfm_torino_it.zip](http://opendata.5t.torino.it/gtfs/sfm_torino_it.zip)



<http://www.gtfs-data-exchange.com/>

GTFS Specification

Filename	Required	Defines
agency.txt	Required	One or more transit agencies that provide the data in this feed.
stops.txt	Required	Individual locations where vehicles pick up or drop off passengers.
routes.txt	Required	Transit routes. A route is a group of trips that are displayed to riders as a single service.
trips.txt	Required	Trips for each route. A trip is a sequence of two or more stops that occurs at specific time.
stop_times.txt	Required	Times that a vehicle arrives at and departs from individual stops for each trip.
calendar.txt	Required	Dates for service IDs using a weekly schedule. Specify when service starts and ends, as well as days of the week where service is available.
calendar_dates.txt	Optional	Exceptions for the service IDs defined in the calendar.txt file. If calendar_dates.txt includes ALL dates of service, this file may be specified instead of calendar.txt.
fare_attributes.txt	Optional	Fare information for a transit organization's routes.
fare_rules.txt	Optional	Rules for applying fare information for a transit organization's routes.
shapes.txt	Optional	Rules for drawing lines on a map to represent a transit organization's routes.
frequencies.txt	Optional	Headway (time between trips) for routes with variable frequency of service.
transfers.txt	Optional	Rules for making connections at transfer points between routes.
feed_info.txt	Optional	Additional information about the feed itself, including publisher, version, and expiration information.

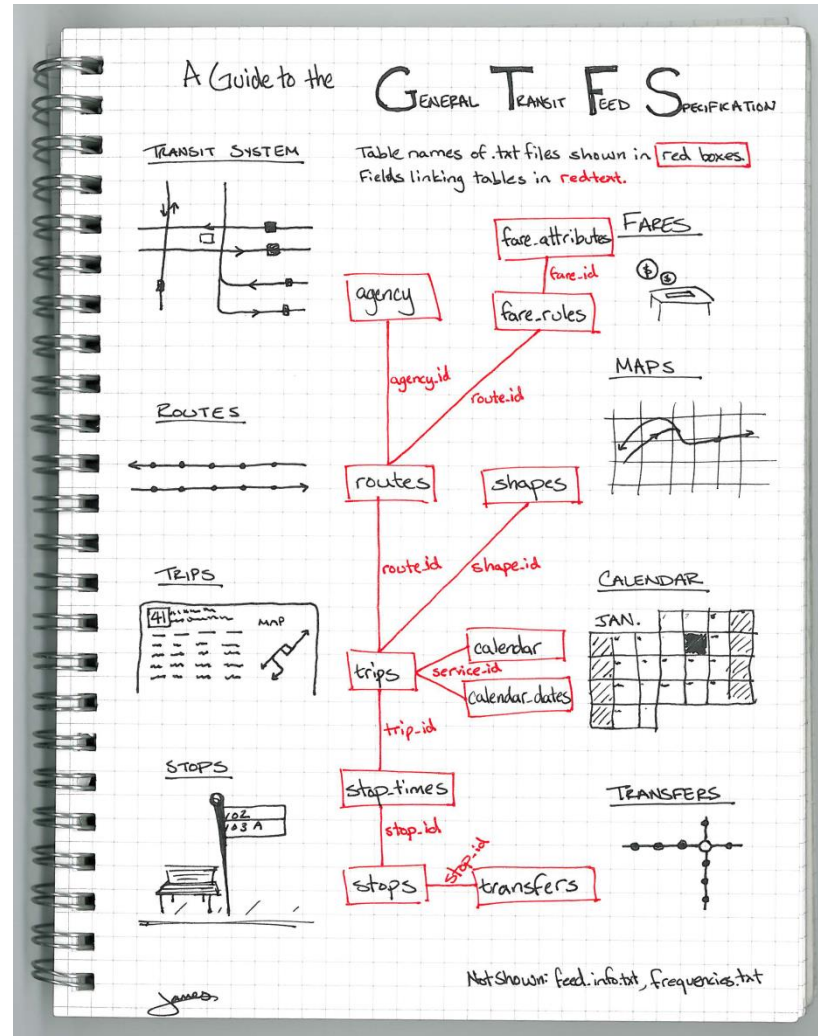
<https://developers.google.com/transit/gtfs/reference>

File format

- ▶ All GTFS files are text files (.txt), encoded in CSV format (comma separated values)
 - ▶ First line = field names
 - ▶ Other lines = values
 - ▶ Fields separated by comma (,) characters

```
route_id,agency_id,route_short_name,route_long_name,route_desc,route_type,route_url,route_color,route_text_color
SFM1,GTT_F,SFM1,Chieri-Rivarolo, ,2,http://www.mtm.torino.it/sfm/sfm1.pdf,FF9900,
SFM1 Pont,GTT_F,SFM1,Rivarolo-Pont, ,2,http://www.mtm.torino.it/sfm/sfm1.pdf,FF9900,
SFM2,FS,SFM2,Pinerolo-Chivasso, ,2,http://www.mtm.torino.it/sfm/sfm2.pdf,00CCFF,
SFM2 Bus,FS,SFM2,Bus sostitutivi linea Pinerolo-Chivasso, ,3,http://www.mtm.torino.it/sfm/sfm2.pdf,00CCFF,
SFM3 Bardonecchia,FS,SFM3,Torino-Bardonecchia, ,2,http://www.mtm.torino.it/sfm/sfm3.pdf,99FF00,
SFM3 Bus,FS,SFM3,Bus sostitutivi linea Torino-Modane, ,3,http://www.mtm.torino.it/sfm/sfm3.pdf,99FF00,
SFM3 Susa,FS,SFM3,Torino-Susa, ,2,http://www.mtm.torino.it/sfm/sfm3.pdf,99FF00,
SFM4,FS,SFM4,Torino-Bra, ,2,http://www.mtm.torino.it/sfm/sfm4.pdf,FF0000,
SFM4 Bus,FS,SFM4,Bus sostitutivi linea Torino-Bra, ,3,http://www.mtm.torino.it/sfm/sfm4.pdf,FF0000,
SFM6,FS,SFM6,Torino-Asti, ,2,http://www.mtm.torino.it/sfm/sfm6.pdf,800000,FFFFFF
SFM7,FS,SFM7,Torino-Fossano, ,2,http://www.mtm.torino.it/sfm/sfm7.pdf,FFCC00,
SFMA,GTT_F,SFMA,Torino Dora - Germagnano, ,2,http://www.mtm.torino.it/sfm/sfmA.pdf,00CCFF,
SFMA Ceres,GTT_F,SFMA,Germagnano-Ceres, ,2,http://www.mtm.torino.it/sfm/sfmA.pdf,00CCFF,
SFMB,FS,SFMB,Cavallermaggiore-Bra-Alba, ,2,http://www.mtm.torino.it/sfm/sfmB.pdf,FF0000,
SFMB Bus,FS,SFMB,Bus sostitutivi linea Cavallermaggiore-Bra-Alba, ,3,http://www.mtm.torino.it/sfm/sfmB.pdf,FF0000,
```


Main GTFS relationships

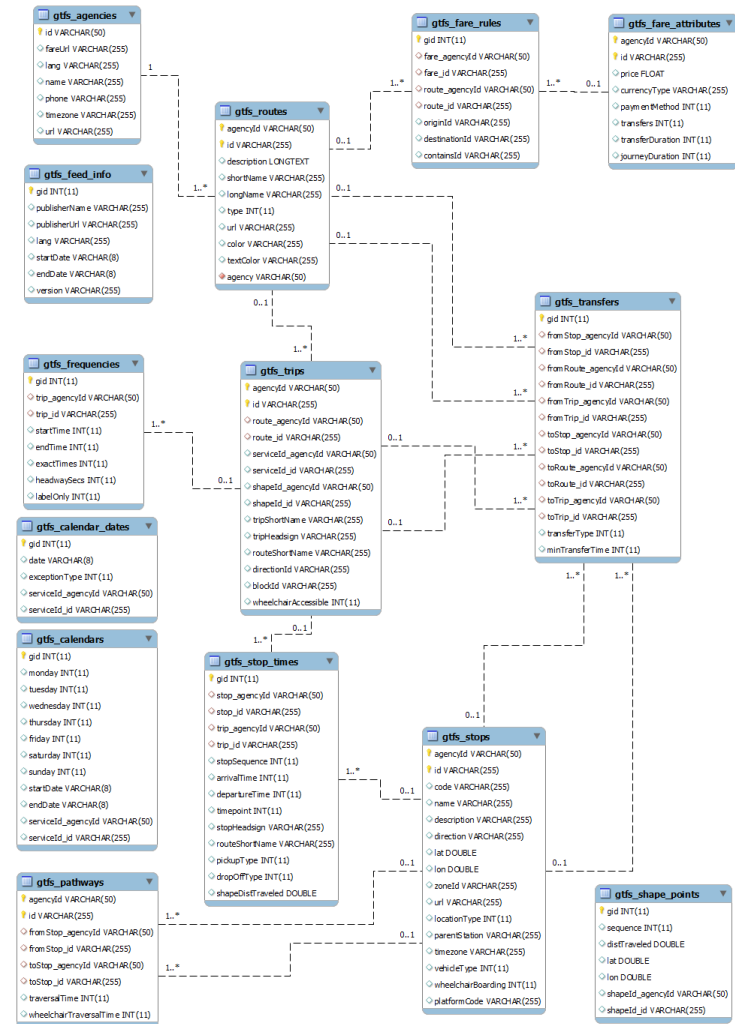


Mapping into SQL Database

- ▶ Open source project 'onebusaway'
 - ▶ <http://onebusaway.org/>
 - ▶ <https://github.com/OneBusAway/onebusaway/wiki>
- ▶ Provides Java-based library for reading, writing, and transforming public transit data in the GTFS format, including database support
 - ▶ <http://developer.onebusaway.org/modules/onebusaway-gtfs-modules/current/>
 - ▶ <https://github.com/OneBusAway/onebusaway-gtfs-modules/wiki>



onebusaway
Tools for improving the usability of public transit



SFM Map 2015



Linee / Network

- sfm **1** Pont-Rivarolo-Chieri
- sfm **2** Pinerolo-Chivasso
- sfm **A** Torino-Aeroporto-Ceres
- sfm **3** Torino-Susa/Bardonecchia
- sfm **4** Torino-Bra
- sfm **B** Cavallermaggiore-Bra-Alba
- sfm **6** Torino-Asti
- sfm **7** Torino-Fossano

Importing into SQL

▶ Command-line tool

- ▶ <http://developer.onebusaway.org/modules/onebusaway-gtfs-modules/current/onebusaway-gtfs-hibernate-cli.html>
- ▶ Reads a set of CSV files and populates a SQL database
 - ▶ CSV files in current directory: .
 - ▶ Database identified by JDBC URL

```
java -classpath onebusaway-gtfs-hibernate-cli-1.3.3.jar;mysql-connector-java-5.1.15-bin.jar org.onebusaway.gtfs.GtfsDatabaseLoaderMain --driverClass=com.mysql.jdbc.Driver --url=jdbc:mysql://localhost/GTFS_sfm_torino_it --username=root --password=root
```

.





Resources

▶ GTFS

- ▶ <https://developers.google.com/transit/>
- ▶ <https://github.com/OneBusAway/onebusaway-gtfs-modules/wiki>
- ▶ CSV format: <http://tools.ietf.org/html/rfc4180>
- ▶ The story: <http://beyondtransparency.org/chapters/part-2/pioneering-open-data-standards-the-gtfs-story/>

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