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# **pygtfs Documentation**

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# CHAPTER 1

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Get it

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The source is available on github: <https://github.com/jarondl/pygtfs>



## CHAPTER 2

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### Basic usage

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To include pygtfs functionality in your application, use `import pygtfs`.

The first thing you need to do is to create a new schedule object:

```
sched = pygtfs.Schedule(":memory:")
```

This will create an in memory sqlite database. Instead you can supply a filename to be used for sqlite (such as 'gtfs.sqlite'), or a sqlalchemy database connection.

Then you can load gtfs feeds into the database, by using `append`:

```
pygtfs.append_feed(sched, "sample-gtfs-feed.zip")
```

Where the gtfs feed can be either a `.zip` file, or a folder full of `.txt` files. You can add as many feeds as you want into a single database, without fear of conflicts (but you can't have two stop names for one place, one from each feed for example). Another option to load feeds is to use the 'gtfs2db' script as explained later.

The Schedule object represents a collection of objects that correspond to the contents of a GTFS feed. You can get the list of agencies, stops, routes, etc. with fairly straightforwardly named attributes, see `pygtfs.schedule` for more details.

```
>>> sched.agencies
[<Agency BART: Bay Area Rapid Transit>, <Agency AirBART: AirBART>]
>>> sched.routes
[<Route AirBART: >, <Route 01: >, <Route 03: >, <Route 05: >, <Route 07: >, <Route_
->11: >]
```

For GTFS entities that are identified by a dataset-unique identifier, there is also a function to get them by id:

```
>>> sched.agencies_by_id('AirBART')
[<Agency AirBART: AirBART>]
>>> sched.stops_by_id('SFIA')
[<Stop SFIA: San Francisco Int'l Airport>]
```

The GTFS entity objects have attributes that correspond in name to the field definitions in the [GTFS reference](<https://developers.google.com/transit/gtfs/reference>).

```
>>> sched.stops_by_id('SFIA')[0].stop_name
u"San Francisco Int'l Airport"
>>> sched.routes[1].route_long_name
u'Pittsburg/Bay Point - SFIA/Millbrae'
```

GTFS entities which cross-reference each other can also be obtained straightforwardly with attributes (again, see “Reference” below for full details):

```
>>> sched.trips_by_id('01SF010').service # the service associated with trip 01SF010
<Service WKDY (MTWThFSSu)>
```



## CHAPTER 3

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### gtfs2db

---

*setup.py install* will also install a command-line script *gtfs2db* that takes a GTFS zip file or directory as an argument and will load the data into a database usable with *pygtfs*. Run *gtfs2db -help* for more.



## CHAPTER 4

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Detailed refernce

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The best place to start is *pygtfs.schedule*



## 5.1 The schedule module

**class** `pygtfs.schedule.Schedule` (*db\_connection*)

Represents the full database.

The schedule is the most important object in pygtfs. It represents the entire dataset. Most of the properties come straight from the gtfs reference. Two of them were renamed: calendar is called *services*, and calendar\_dates *service\_exceptions*. One addition is the *feeds* table, which is here to support more than one feed in a database.

Each of the properties is a list created upon access by sqlalchemy. Then, each element of the list as attributes following the gtfs reference. In addition, if they are related to another table, this can also be accessed by attribute.

**Parameters** `db_connection` – Either a sqlalchemy database url or a filename to be used with sqlite.

**agencies**

A list of `pygtfs.gtfs_entities.Agency` objects

**agencies\_by\_id** (*id*)

A list of `pygtfs.gtfs_entities.Agency` objects with matching id

**agencies\_query**

A `sqlalchemy.orm.Query` object to fetch `pygtfs.gtfs_entities.Agency` objects

**drop\_feed** (*feed\_id*)

Delete a feed from a database by feed id

**fare\_rules**

A list of `pygtfs.gtfs_entities.FareRule` objects

**fare\_rules\_query**

A `sqlalchemy.orm.Query` object to fetch `pygtfs.gtfs_entities.FareRule` objects

**fares**

A list of `pygtfs.gtfs_entities.Fare` objects

**fares\_by\_id** (*id*)

A list of *pygtfs.gtfs\_entities.Fare* objects with matching id

**fares\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.Fare* objects

**feed\_infos**

A list of *pygtfs.gtfs\_entities.FeedInfo* objects

**feed\_infos\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.FeedInfo* objects

**feeds**

A list of *pygtfs.gtfs\_entities.Feed* objects

**feeds\_by\_id** (*id*)

A list of *pygtfs.gtfs\_entities.Feed* objects with matching id

**feeds\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.Feed* objects

**frequencies**

A list of *pygtfs.gtfs\_entities.Frequency* objects

**frequencies\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.Frequency* objects

**routes**

A list of *pygtfs.gtfs\_entities.Route* objects

**routes\_by\_id** (*id*)

A list of *pygtfs.gtfs\_entities.Route* objects with matching id

**routes\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.Route* objects

**service\_exceptions**

A list of *pygtfs.gtfs\_entities.ServiceException* objects

**service\_exceptions\_by\_id** (*id*)

A list of *pygtfs.gtfs\_entities.ServiceException* objects with matching id

**service\_exceptions\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.ServiceException* objects

**services**

A list of *pygtfs.gtfs\_entities.Service* objects

**services\_by\_id** (*id*)

A list of *pygtfs.gtfs\_entities.Service* objects with matching id

**services\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.Service* objects

**shapes**

A list of *pygtfs.gtfs\_entities.ShapePoint* objects

**shapes\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.ShapePoint* objects

**stop\_times**

A list of *pygtfs.gtfs\_entities.StopTime* objects

**stop\_times\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.StopTime* objects

**stops**

A list of *pygtfs.gtfs\_entities.Stop* objects

**stops\_by\_id(id)**

A list of *pygtfs.gtfs\_entities.Stop* objects with matching id

**stops\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.Stop* objects

**transfers**

A list of *pygtfs.gtfs\_entities.Transfer* objects

**transfers\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.Transfer* objects

**translations**

A list of *pygtfs.gtfs\_entities.Translation* objects

**translations\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.Translation* objects

**trips**

A list of *pygtfs.gtfs\_entities.Trip* objects

**trips\_by\_id(id)**

A list of *pygtfs.gtfs\_entities.Trip* objects with matching id

**trips\_query**

A sqlalchemy.orm.Query object to fetch *pygtfs.gtfs\_entities.Trip* objects

## 5.2 The loader module

```
pygtfs.loader.append_feed(schedule, feed_filename, strip_fields=True, chunk_size=5000,
                           agency_id_override=None)
```

```
pygtfs.loader.delete_feed(schedule, feed_filename, interactive=False)
```

```
pygtfs.loader.list_feeds(schedule)
```

```
pygtfs.loader.overwrite_feed(schedule, feed_filename, *args, **kwargs)
```

## 5.3 GTFS entities

GTFS entities.

These are the entities returned by the various *pygtfs.schedule* lists. Most of the attributes come directly from the gtfs reference. Also, when possible relations are taken into account, e.g. a *Route* class has a *trips* attribute, with a list of trips for the specific route.

```
class pygtfs.gtfs_entities.Agency(**kwargs)
```

```
    agency_email
```

```
    agency_fare_url
```

```
    agency_id
```

agency\_lang  
agency\_name  
agency\_phone  
agency\_timezone  
agency\_url  
feed\_id  
id  
routes

```
class pygtfs.gtfs_entities.Fare(**kwargs)
```

agency\_id  
currency\_type  
fare\_id  
feed\_id  
id  
payment\_method  
price  
transfer\_duration  
transfers

```
class pygtfs.gtfs_entities.FareRule(**kwargs)
```

contains\_id  
destination\_id  
fare\_id  
feed\_id  
origin\_id  
route\_id

```
class pygtfs.gtfs_entities.Feed(**kwargs)
```

agencies  
fare\_rules  
fares  
feed\_append\_date  
feed\_id  
feed\_name  
feedinfo  
frequencies



`id`  
`routes`  
`service_exceptions`  
`services`  
`shape_points`  
`stop_times`  
`stops`  
`transfers`  
`translations`  
`trips`

```
class pygtfs.gtfs_entities.FeedInfo(**kwargs)
```

`feed_end_date`  
`feed_id`  
`feed_lang`  
`feed_publisher_name`  
`feed_publisher_url`  
`feed_start_date`  
`feed_version`

```
class pygtfs.gtfs_entities.Frequency(**kwargs)
```

`end_time`  
`exact_times`  
`feed_id`  
`headway_secs`  
`start_time`  
`trip_id`

```
class pygtfs.gtfs_entities.Route(**kwargs)
```

`agency_id`  
`fare_rules`  
`feed_id`  
`id`  
`route_color`  
`route_desc`  
`route_id`  
`route_long_name`

```
    route_short_name
    route_text_color
    route_type
    route_url
    trips
    valid_extended_route_types = [0, 1, 2, 3, 4, 5, 6, 7, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]
class pygtfs.gtfs_entities.Service(**kwargs)

    end_date
    feed_id
    friday
    id
    monday
    saturday
    service_id
    start_date
    sunday
    thursday
    trips
    tuesday
    wednesday

class pygtfs.gtfs_entities.ServiceException(**kwargs)

    date
    exception_type
    feed_id
    id
    service_id

class pygtfs.gtfs_entities.ShapePoint(**kwargs)

    feed_id
    shape_dist_traveled
    shape_id
    shape_pt_lat
    shape_pt_lon
    shape_pt_sequence
    trips
```

```
class pygtfs.gtfs_entities.Stop(**kwargs)
```

```
    feed_id
    id
    location_type
    parent_station
    platform_code
    stop_code
    stop_desc
    stop_id
    stop_lat
    stop_lon
    stop_name
    stop_times
    stop_timezone
    stop_url
    transfers_from
    transfers_to
    translations
    wheelchair_boarding
    zone_id
```

```
class pygtfs.gtfs_entities.StopTime(**kwargs)
```

```
    arrival_time
    departure_time
    drop_off_type
    feed_id
    pickup_type
    shape_dist_traveled
    stop_headsign
    stop_id
    stop_sequence
    timepoint
    trip_id
```

```
class pygtfs.gtfs_entities.Transfer(**kwargs)
```

```
    feed_id
```

```
    from_stop_id
    min_transfer_time
    to_stop_id
    transfer_type
class pygtfs.gtfs_entities.Translation(**kwargs)

    feed_id
    lang
    trans_id
    translation
class pygtfs.gtfs_entities.Trip(**kwargs)

    bikes_allowed
    block_id
    direction_id
    feed_id
    frequencies
    id
    route_id
    service_id
    shape_id
    stop_times
    trip_headsign
    trip_id
    trip_short_name
    wheelchair_accessible
pygtfs.gtfs_entities.create_foreign_keys(*key_names)
    Create foreign key constraints, always including feed_id, and relying on convention that key name is the same
```

## 5.4 The gtfs2db script

This is a script to manage the database. Here is its help message:

```
gtfs2db - convert a gtfs feed to a pygtfs database
Usage:
  gtfs2db append <feed_file> <database> [--chunk-size <integer>]
  gtfs2db overwrite <feed_file> <database> [-i, --interactive] [--chunk-size <integer>]
  ↪
  gtfs2db delete <feed_file> <database> [-i, --interactive]
```

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```
gtfs2db list <database>
gtfs2db (-h | --help)
gtfs2db --version
```

## Options:

```
-h --help          Show this help screen.
--version         Show version.
-i --interactive   Ask before deleting or overwriting existing feeds.
--chunk-size <int> How often to flush database. If memory consumption is high,
                  lower this number. [default: 10000]
<feed_file>      The gtfs file on which to operate. Can be either a folder
                  containing .txt files, or a .zip file.
<database>       The database. Can be either a file, which is interpreted
                  as an sqlite database stored in this file, or a sqlalchemy
                  database connection.
```

## Commands:

```
append           appends the gtfs feed to the database
overwrite        delete any existing feeds which had the same original
                  filename as the new file, and then append the new file.
delete           delete from the database any feeds with the name supplied.
list             list existing feeds in the database.
```

## Description:

This is a tool to manage a database containing several gtfs feeds. The database is in a pygtfs 0.1.0 format, and can be stored as any database supported by sqlalchemy (the default being sqlite). The database file can later be used to create a `pygtfs.Schedule` instance.

## 5.5 Internally used modules

```
class pygtfs.feed.CSV(rows, feedtype='CSVTuple', columns=None)
```

A CSV file.

```
next ()
```

```
class pygtfs.feed.Feed(filename, strip_fields=True)
```

A collection of CSV files with headers, either zipped into an archive or loose in a folder.

```
python2_reader (filename)
```

```
python3_reader (filename)
```

```
read_table (filename, columns)
```

```
pygtfs.feed.derive_feed_name(filename)
```



## CHAPTER 6

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### Indices and tables

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