

How to use GTFS

STEP-UP | Marche Region

Second training session

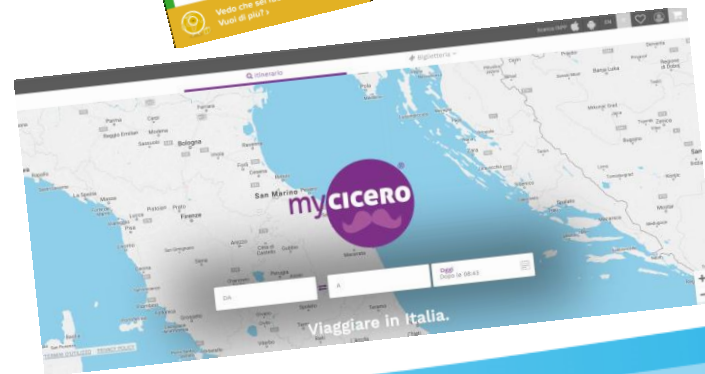
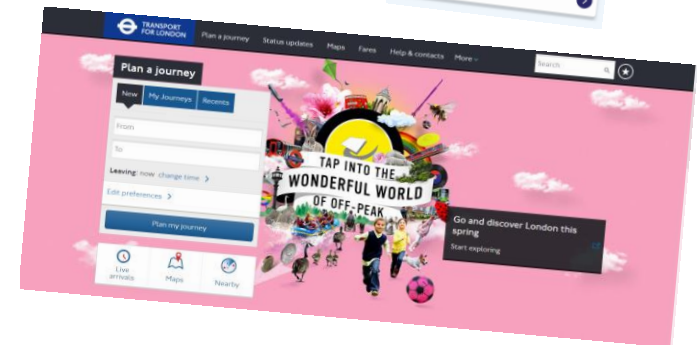
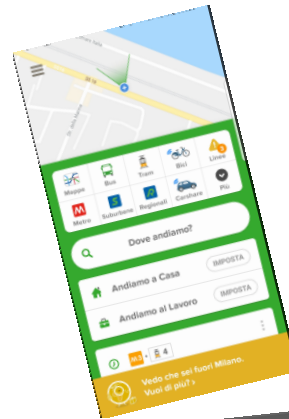
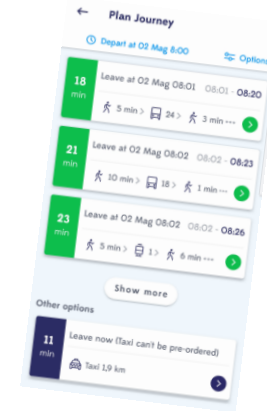
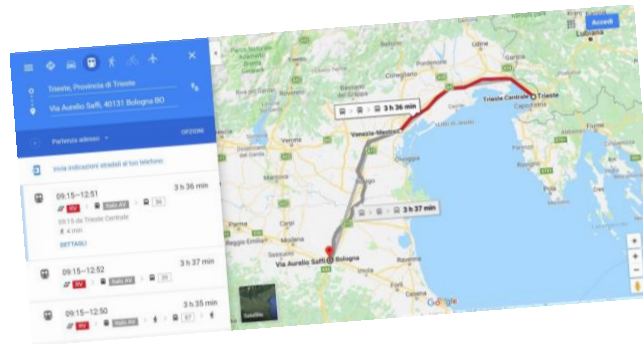
Outline

- The importance of Mobility Data
- What is a GTFS file
- GTFS structure
- How to create a GTFS
- Google validator
- How to find a GTFS file



The importance of Mobility Data

Mobility Data to feed travel planner systems



The importance of Mobility Data

Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003

The re-use of public sector information

Directive 2013/37/EU of the European Parliament and of the Council of 26 June 2013

amending Directive 2003/98/EC on the re-use of public sector information Text with EEA relevance. The new European directive amends the previous one (directive PSI – Public Sector Information) in order to facilitate the re-use of European public administrations data.

In particular, the directive obliges administrations to make their data available, for both commercial and non-commercial purposes, in compliance with the legislation on personal data protection.

Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019

on open data and the re-use of public sector information

After its adoption in 2003 and the significant revision in 2013, the Directive has now been relaunched taking into account the profound technological and social changes that have taken place over the past five years, contemplating, at the same time the reference legislation on data management.

What is GTFS file

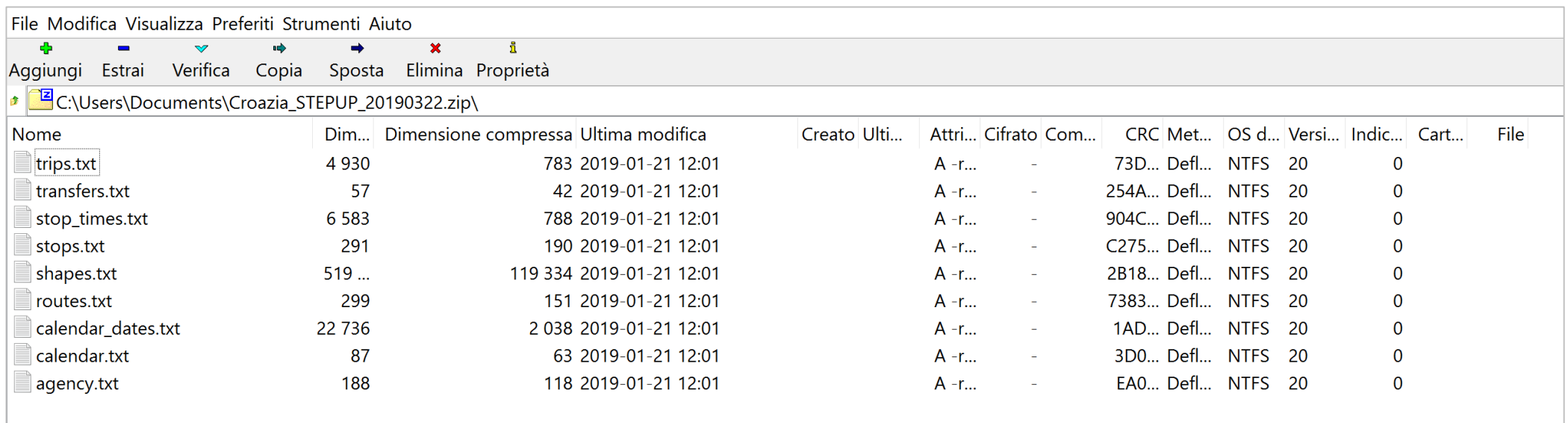
The General Transit Feed Specification (GTFS) defines a common format for public transportation schedules and associated geographic information. GTFS "feeds" allow public transit agencies to publish their transit data in a format that can be consumed by a wide variety of software applications.

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

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

GTFS Structure

A GTFS feed is composed of a series of text files collected in a ZIP file. Each file models a particular aspect of transit information: stops, routes, trips, and other schedule data.



Nome	Dim...	Dimensione compressa	Ultima modifica	Creato	Ulti...	Attri...	Cifrato	Com...	CRC	Met...	OS d...	Versi...	Indic...	Cart...	File
trips.txt	4 930	783	2019-01-21 12:01			A -r...	-		73D...	Defl...	NTFS	20	0		
transfers.txt	57	42	2019-01-21 12:01			A -r...	-		254A...	Defl...	NTFS	20	0		
stop_times.txt	6 583	788	2019-01-21 12:01			A -r...	-		904C...	Defl...	NTFS	20	0		
stops.txt	291	190	2019-01-21 12:01			A -r...	-		C275...	Defl...	NTFS	20	0		
shapes.txt	519 ...	119 334	2019-01-21 12:01			A -r...	-		2B18...	Defl...	NTFS	20	0		
routes.txt	299	151	2019-01-21 12:01			A -r...	-		7383...	Defl...	NTFS	20	0		
calendar_dates.txt	22 736	2 038	2019-01-21 12:01			A -r...	-		1AD...	Defl...	NTFS	20	0		
calendar.txt	87	63	2019-01-21 12:01			A -r...	-		3D0...	Defl...	NTFS	20	0		
agency.txt	188	118	2019-01-21 12:01			A -r...	-		EA0...	Defl...	NTFS	20	0		

GTFS Structure

Agency: One or more transit agencies that provide the data in this feed.

Stops: Individual locations where vehicles pick up or drop off passengers.

Routes: Transit routes. A route is a group of trips that are displayed to riders as a single service.

Trips: Trips for each route. A trip is a sequence of two or more stops that occurs at specific time.

Stop_times: Times of vehicle arrivals at and departures from individual stops for each trip.

Calendar: Defines service dates when service is available for particular routes. Uses a weekly schedule.

Calendar dates: Defines exceptions for the services defined in the calendar.txt. If calendar_dates.txt includes ALL dates of service, this file may be specified instead of calendar.txt.

Shapes: Rules for drawing lines on a map to represent a transit organization's routes.

GTFS Structure – Agency_id

File Agency.txt

agency_id	agency_name	agency_url	agency_timezone	agency_lang	agency_phone	agency_fare_url
xxx	vettore xxx	https://www.mycicero.it/	Europe/Rome	it	NULL	NULL
yyy	vettore yyy	https://www.mycicero.it/	Europe/Rome	it	NULL	NULL

File Routes.txt

route_id	agency_id	route_short_name	route_long_name	route_type	route_color	route_text_color	route_desc	route_url
51	xxx		51 Zadar-Ancona	4	F2160B	14DFEC	NULL	NULL
53	xxx		53 Split-Ancona	4	F2160B	14DFEC	NULL	NULL
53_1	xxx		53 Stari Grad-Split-Ancona	4	F2160B	14DFEC	NULL	NULL
D001	yyy	SNAV	Ancona-Split	4	F2160B	14DFEC	NULL	NULL

GTFS Structure – Route_id

File Routes.txt

route_id	agency_id	route_short_name	route_long_name	route_type	route_color	route_text_color	route_desc	route_url
51	xxx	51	Zadar-Ancona	4	F2160B	14DFEC	NULL	NULL
53	xxx	53	Split-Ancona	4	F2160B	14DFEC	NULL	NULL
53_1	xxx	53	Stari Grad-Split-Ancona	4	F2160B	14DFEC	NULL	NULL
D001	yyy	SNAV	Ancona-Split	4	F2160B	14DFEC	NULL	NULL

File Trips.txt

route_id	service_id	trip_id	trip_headsign	direction_id	block_id	shape_id	trip_short_name	trip_type	wheelchair_accessible	bikes_allowed
51	ZAJ400GI2019010120191231	64	Zadar - Luka	1	NULL	ZZZ5100012	z008	NULL	NULL	NULL
51	ZAJ400VE2019010120191231	65	Zadar - Luka	1	NULL	ZZZ5100012	z008	NULL	NULL	NULL
51	ZAJ400SA2019010120191231	66	Zadar - Luka	1	NULL	ZZZ5100012	z008	NULL	NULL	NULL
51	ZAJ400DO2019010120191231	67	Zadar - Luka	1	NULL	ZZZ5100012	z008	NULL	NULL	NULL
53	00SV00SV2019122620191226	7	Split - Luka	1	NULL	ZZZ5300012	7	NULL	NULL	NULL
53	00B00DO2019010120191231	8	Ancona - Porto	0	NULL	ZZZ5300011	8	NULL	NULL	NULL
53_1	00C00LU2019010120191231	19	Split - Luka	1	NULL	ZZ53_100022	19	NULL	NULL	NULL
53_1	00C00ME2019010120191231	20	Split - Luka	1	NULL	ZZ53_100022	20	NULL	NULL	NULL
53_1	00C00SA2019010120191231	21	Split - Luka	1	NULL	ZZ53_100022	21	NULL	NULL	NULL
53_1	00C00VE2019010120191231	22	Stari Grad - Luka	1	NULL	ZZ53_100012	22	NULL	NULL	NULL
D001	SNAVLMEV2019010120191231	31	Split - Luka	0	NULL	ZZD00100011	1001	NULL	NULL	NULL
D001	SNARMAGD2019010120191231	32	Ancona - Porto	1	NULL	ZZD00100012	1002	NULL	NULL	NULL
D001	SNA1MAGS2019010120191231	33	Ancona - Porto	1	NULL	ZZD00100012	1003	NULL	NULL	NULL

GTFS Structure – Service_id

File Trips.txt

route_id	service_id	trip_id	trip_headsign	direction_id	block_id	shape_id	trip_short_name	trip_type	wheelchair_accessible	bikes_allowed
51	ZAJ400VE2019010120191231STEPUP	64	Zadar - Luka	1	NULL	ZZZ5100012	z008	NULL	NULL	NULL
51	ZAJ400SA2019010120191231STEPUP	66	Zadar - Luka	1	NULL	ZZZ5100012	z008	NULL	NULL	NULL

File Calendar Dates.txt

service_id	date	exception_type
ZAJ400VE2019010120191231STEPUP	20190726	0
ZAJ400VE2019010120191231STEPUP	20190802	0
ZAJ400VE2019010120191231STEPUP	20190809	0
ZAJ400VE2019010120191231STEPUP	20190816	0
ZAJ400VE2019010120191231STEPUP	20190823	0
ZAJ400SA2019010120191231STEPUP	20190727	1
ZAJ400SA2019010120191231STEPUP	20190803	1
ZAJ400SA2019010120191231STEPUP	20190810	1
ZAJ400SA2019010120191231STEPUP	20190817	1
ZAJ400SA2019010120191231STEPUP	20190824	1

File Calendar.txt

service_id	Monday	tuesday	thursday	wednesday	friday	saturday	sunday	start_date	end_date
ZAJ400VE2019010120191231STEPUP	1	1	1	1	1	1	1	0 20190130	20190830

GTFS Structure – Trip_id

File Trips.txt

route_id	service_id	trip_id	trip_headsign	direction_id	block_id	shape_id	trip_short_name	trip_type	wheelchair_accessible	bikes_allowed
51	ZAJ400VE2019010120191231STEPUP	64	Zadar - Luka	1	NULL	ZZZZ5100012	z008	NULL	NULL	NULL
51	ZAJ400SA2019010120191231STEPUP	66	Zadar - Luka	1	NULL	ZZZZ5100012	z008	NULL	NULL	NULL

File Stop_times.txt

trip_id	arrival_time	departure_time	stop_id	stop_sequence	stop_headsign	pickup_type	drop_off_type	shape_dist_traveled	timepoint	arrival_time_seconds	departure_time_seconds	stop_headsigns
64	22.00.00	22.00.00	P_AN	1	Zadar - Luka	0	0	NULL	NULL	NULL	NULL	NULL
64	31.00.00	31.00.00	L_ZA	2	Ancona - Porto	0	0	NULL	NULL	NULL	NULL	NULL
66	16.00.00	16.00.00	P_AN	1	Zadar - Luka	0	0	NULL	NULL	NULL	NULL	NULL
66	22.00.00	22.00.00	L_ZA	2	Ancona - Porto	0	0	NULL	NULL	NULL	NULL	NULL

GTFS Structure – Shape_id

File Trips.txt

route_id	service_id	trip_id	trip_headsign	direction_id	block_id	shape_id	trip_short_name	trip_type	wheelchair_accessible	bikes_allowed
51	ZAJ400VE2019010120191231STEPUP	64	Zadar - Luka	1	NULL	ZZZ5100012	z008	NULL	NULL	NULL

File Shapes.txt

shape_id	shape_pt_lat	shape_pt_lon	shape_pt_sequence	shape_dist_traveled
ZZZ5100012	43.622258	13.508942	1	
ZZZ5100012	43.622380	13.509070	2	
ZZZ5100012	43.622260	13.509290	3	

How to create a GTFS file

To create a GTFS file there are several proprietary and open tools.

Steps to generate a GTFS:

- 1 Creation of **Agency** file
- 2 Definition of lines and creation of **routes** file (the lines is associated to the agency)
- 3 Creation of **stops** file based on the bus stops
- 4 Creation of **trips** file → trips are linked to the routes
- 5 As the routes are created, it is necessary to create the **calendar** (calendar.txt or calendar dates)
- 6 Creation of **Stop_times** file → association routes, timetables and stops
- 7 Creation of **shapes** file (optional) → to sketch the trip, it is important to enter latitude and longitude to each shape

Google validator

Before loading the zip file, GTFS feeds should be validated in order to catch errors.
On internet it is possible to find several validation tools.

GTFS validation results for feed:

C:\GTFS\STEPUP_20190322.zip

FeedValidator extension used: None

Agencies: [jadrolinija](#), [SNAV](#)

Routes: 4

Stops: 4

Trips: 67

Shapes: 8

Effective: January 02, 2019 to December 30, 2019

During the upcoming service dates Thu Jul 04 to Sun Sep 01:

Average trips per date: 3

Most trips on a date: 6, on 2 service dates (Sat Aug 03, Sat Aug 10)

Least trips on a date: 2, on 11 service dates (Fri Jul 05, Sun Jul 07, Mon Jul 08, ...)

feed validated successfully

Generated by [FeedValidator](#) version 1.2.15 on July 04, 2019 at 10:21 AM ora legale Europa occidentale.

Found these problems:

36 errors **872 warnings**

12 [Invalid Values](#) 1 [Expiration Date](#)
24 [Missing Values](#) 182 [Stops Too Closes](#)
677 [Too Fast Travels](#)
12 [Too Many Consecutive Stop Times With Same Times](#)

Errors:

Invalid Value

- Invalid value 430001 in field agency_id
Route uses an unknown agency_id.
in line 36 of routes.txt

route_id	agency_id	route_short_name	route_long_name	route_type	route_color	route_text_color
109035	430001	109035	SANREMO-IMPERIA-TORINO	3	FFFFFF	000000

- Invalid value 430001 in field agency_id
Route uses an unknown agency_id.
in line 37 of routes.txt

route_id	agency_id	route_short_name	route_long_name	route_type	route_color	route_text_color
109086	430001	109086	BIKE SAN ROMOLO	3	FFFFFF	000000

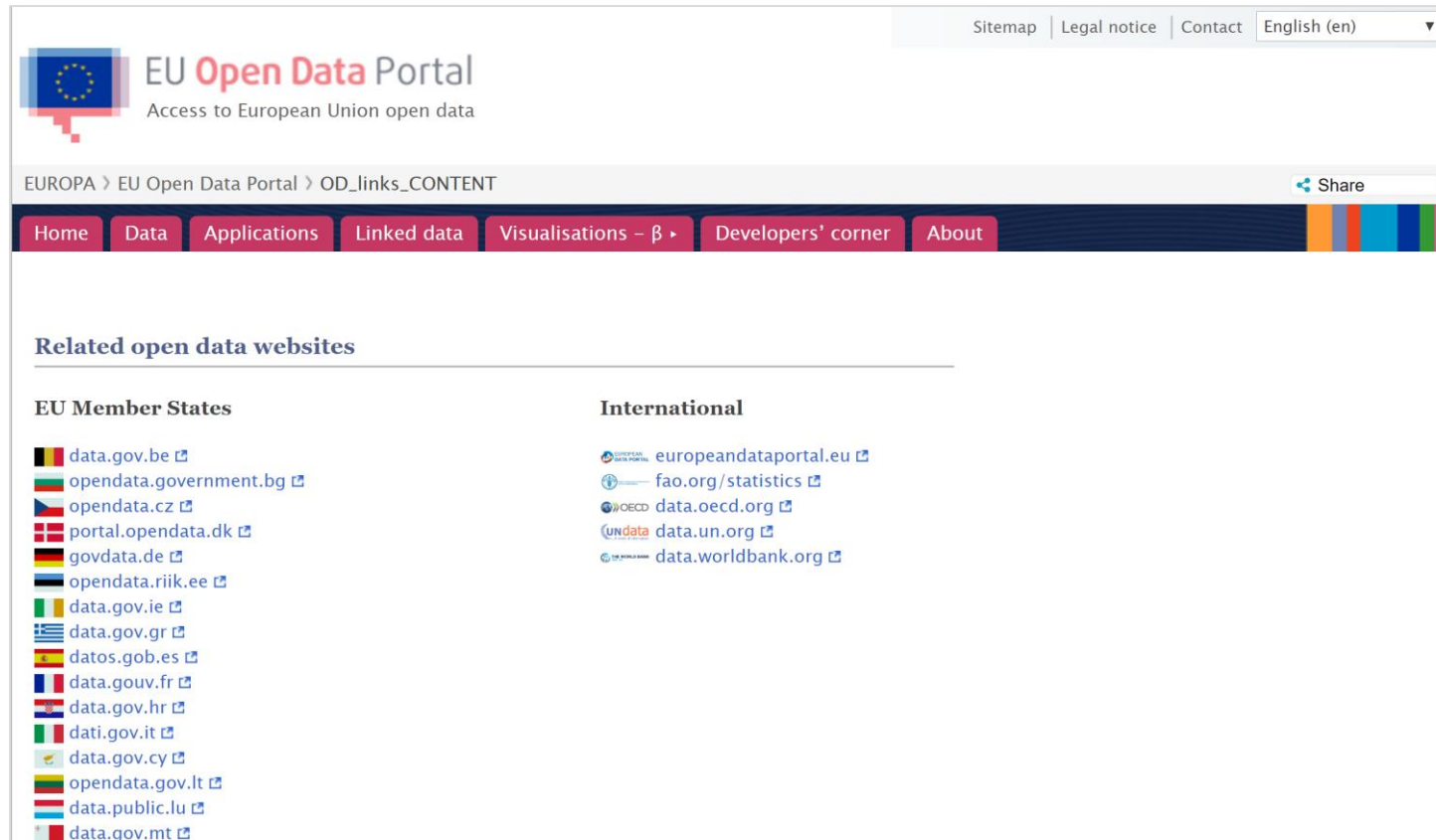
- Invalid value 109035 in field route_id
in line 279 of trips.txt

route_id	service_id	trip_id	trip_headsign	trip_short_name	direction_id	block_id	shape_id
109035	590008	590008	Sanremo (Autostazione)		1	590008	10903560012

How to find a GTFS file

EU Open Data Portal offers a list of Related open data website (including GTFS file)

http://data.europa.eu/euodp/it/open_data_portals



The screenshot shows the EU Open Data Portal interface. At the top, there is a navigation bar with links for Sitemap, Legal notice, Contact, and a language dropdown set to English (en). The main header features the EU flag and the text "EU Open Data Portal" with the subtitle "Access to European Union open data". Below the header, a breadcrumb trail reads "EUROPA > EU Open Data Portal > OD_links_CONTENT" and a "Share" button is visible. A horizontal menu contains buttons for Home, Data, Applications, Linked data, Visualisations - β, Developers' corner, and About. The main content area is titled "Related open data websites" and is divided into two columns: "EU Member States" and "International".

EU Member States


- data.gov.be
- opendata.government.bg
- opendata.cz
- portal.opendata.dk
- govdata.de
- opendata.riik.ee
- data.gov.ie
- data.gov.gr
- datos.gob.es
- data.gouv.fr
- data.gov.hr
- dati.gov.it
- data.gov.cy
- opendata.gov.lt
- data.public.lu
- data.gov.mt

International


- europeandataportal.eu
- fao.org/statistics
- data.oecd.org
- data.un.org
- data.worldbank.org

Thank you for your attention!

Giorgia Fanesi

 Pluservice srl – S.S. Adriatica Sud 228/d – 60019, Senigallia - Italy

 Giorgia.fanesi@pluservice.net

 +39 347 7488730