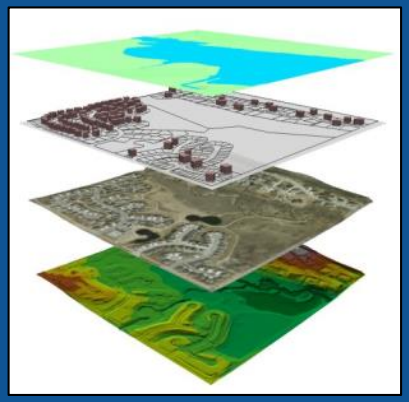
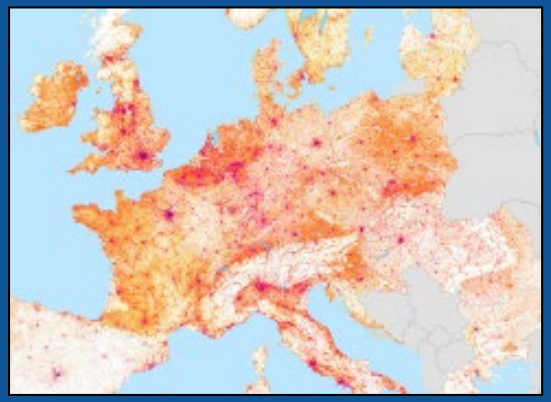
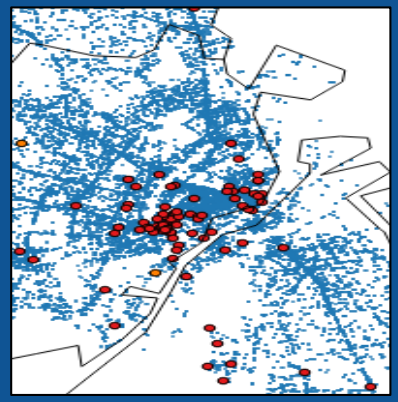
The use of geo-spatial data in official statistics

Eurostat - Regional statistics and geographical information - E4 – GISCO Team - Hannes I. Reuter

Expectation management

- *You will not be a Geospatial data experts but*

  - **You know a bit about geo domain**
  - **You know what is possible**
  - **You know whom to ask for help….**

European Commission

Overview

- *Introduce Eurostat and GISCO services*
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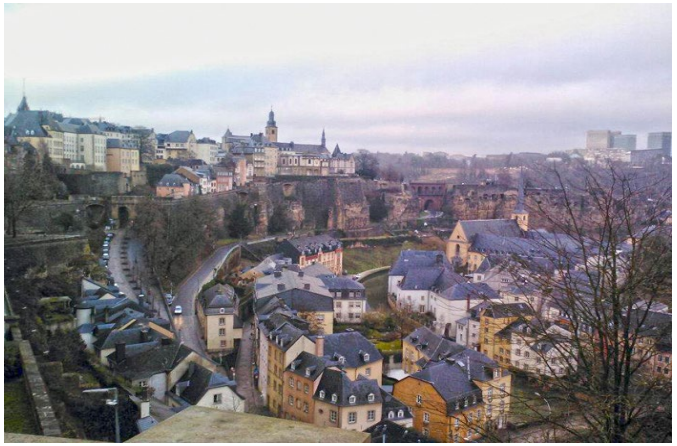
- *Showcase Examples at MS and EU level*

European Commission

Eurostat – statistical office of the EU

- *Statistical office of the European Union and part of the European Commission*
- *Chairs the European Statistical System (ESS)*
- *Prepares legislation on European statistics*

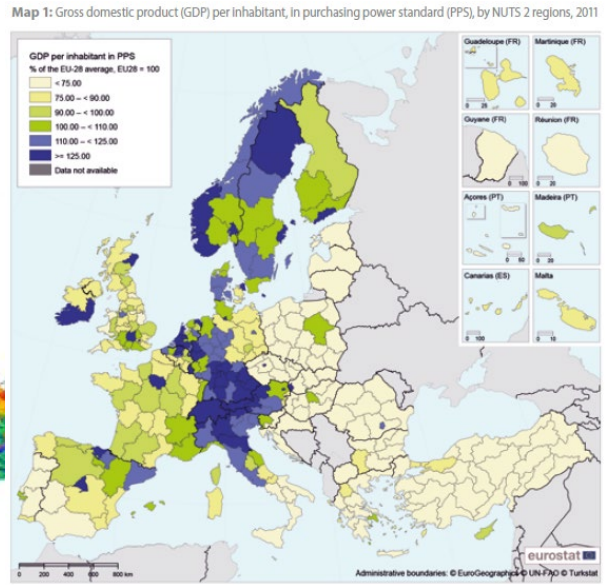
- *~ 800 staff, located in Luxembourg*



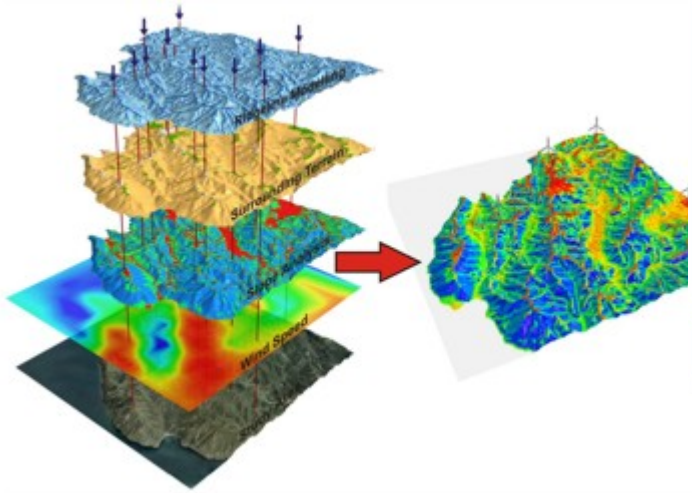
European Commission

GISCO - the Geographic Information System of the COmmission

visualise



analyse



localise

European Commission

What is GISCO? - triple role

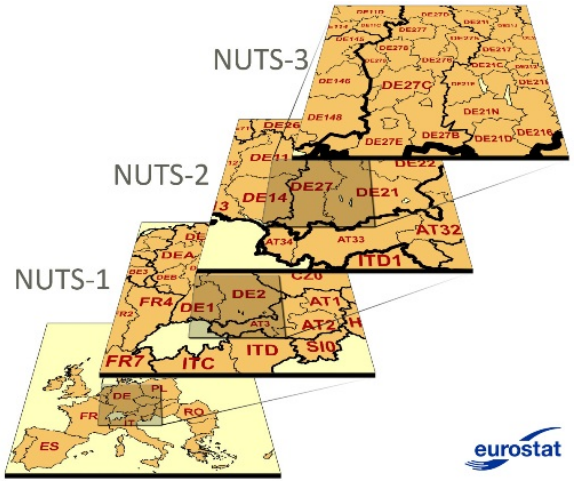
"GISCO is a permanent service of Eurostat that answers the needs of Eurostat and the European Commission for geographical information at the level of the European Union (EU), its Member States and regions."

- *Service provider for Eurostat*
- *Service provider for the European Commission (and the EU)*
- *Coordination and partnership with Member States*

European Commission

Service provider to Eurostat and the European Commission+

- *Map making*
- *Spatial analysis projects*
- *Support statistical production*
- *Provision of Commission wide geospatial data, software and services*
- *GISCO reference database*
- *GISCO as coordinator of geospatial information use within the European Commission and Agencies*
- *Disputed Areas WIKI*



European Commission

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European Commission

Where are the most densely populated places in the EU ?

European Commission

Figure 8.1: The most densely populated places in the EU, 2011 (1)
(inhabitants/km²)

European Commission

Figure 8.1: The most densely populated places in the EU, 2011 (1)
(inhabitants/km²)

Barcelona

Paris

(1) The maps show the position of the three most densely populated 1 km² grid cells in the EU. France: 2010.

Source: Eurostat, GEOSTAT Population Grid 2011 (http://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/population-distribution-demography)

European Commission

Every information has a geographic component

(even a legal text)

European Commission

Geospatial data is essential for …

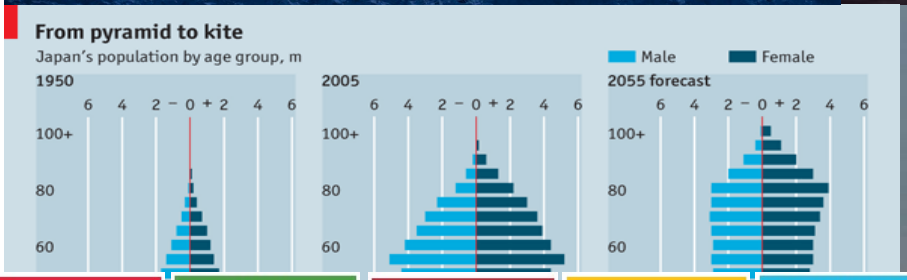
Location *- just as time - is a key factor in statistics for:*

- **collecting,**
- **processing,**
- **storing,**
- **analysing and**
- **aggregating data.**

Statistics on a specific area help understanding the relevance of information.

European Commission

Geospatial data is essential for statistics and evidence based policy making in the EU



European Commission

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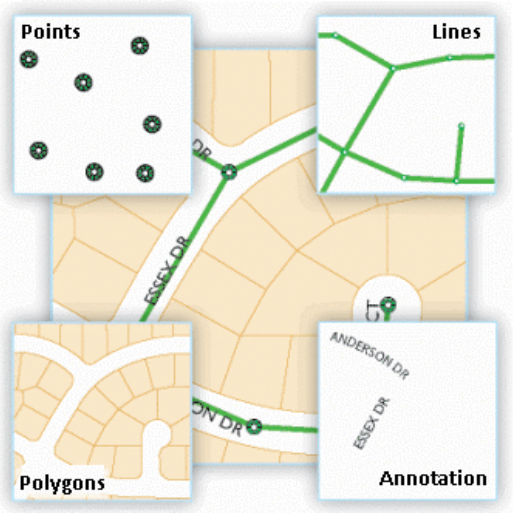
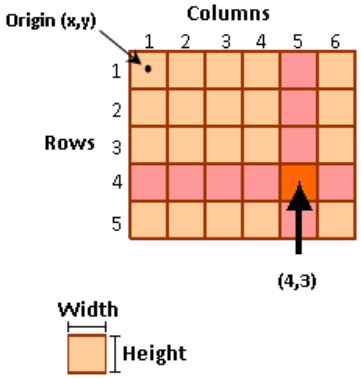
European Commission

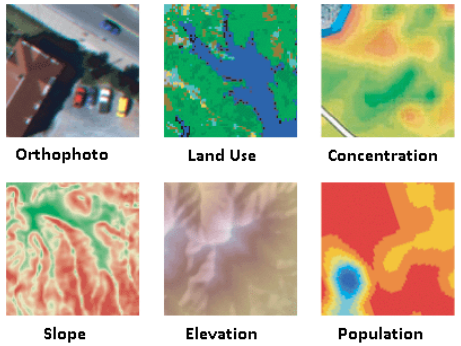
How to represent geographic information?

- *As features*
  - **Vector geometry**
  - **Properties/attributes**



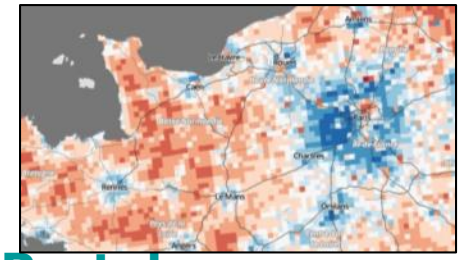
- *As a grid*
  - **Gridded data, like an image**





European Commission

GIS data sources



- *Topographic and cadastral data*
  - **NMCAs, GISCO and EuroGeographics**
- *Statistical data*
  - **NSIs and Eurostat**
- *Environmental data*
  - **National environmental agencies, EEA**
- *Geoportals and geocatalogues*
  - **National, European EC**
- *Open data portals*
  - **Example for Luxembourg, European Data Portal**
- *…*

European Commission

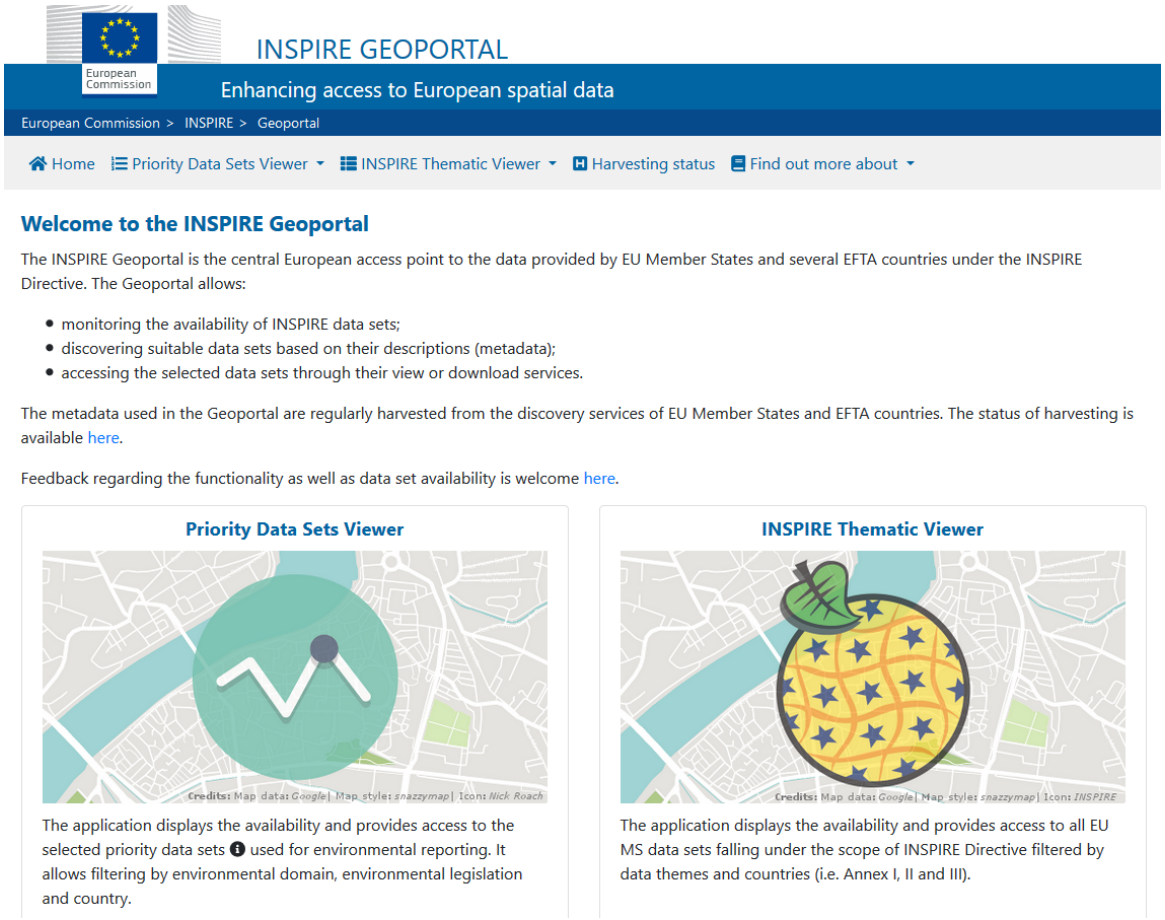
Spatial data sharing infrastructures

- *INSPIRE - sharing geospatial information*

- *Open Data – sharing EU wide open data including geospatial information*

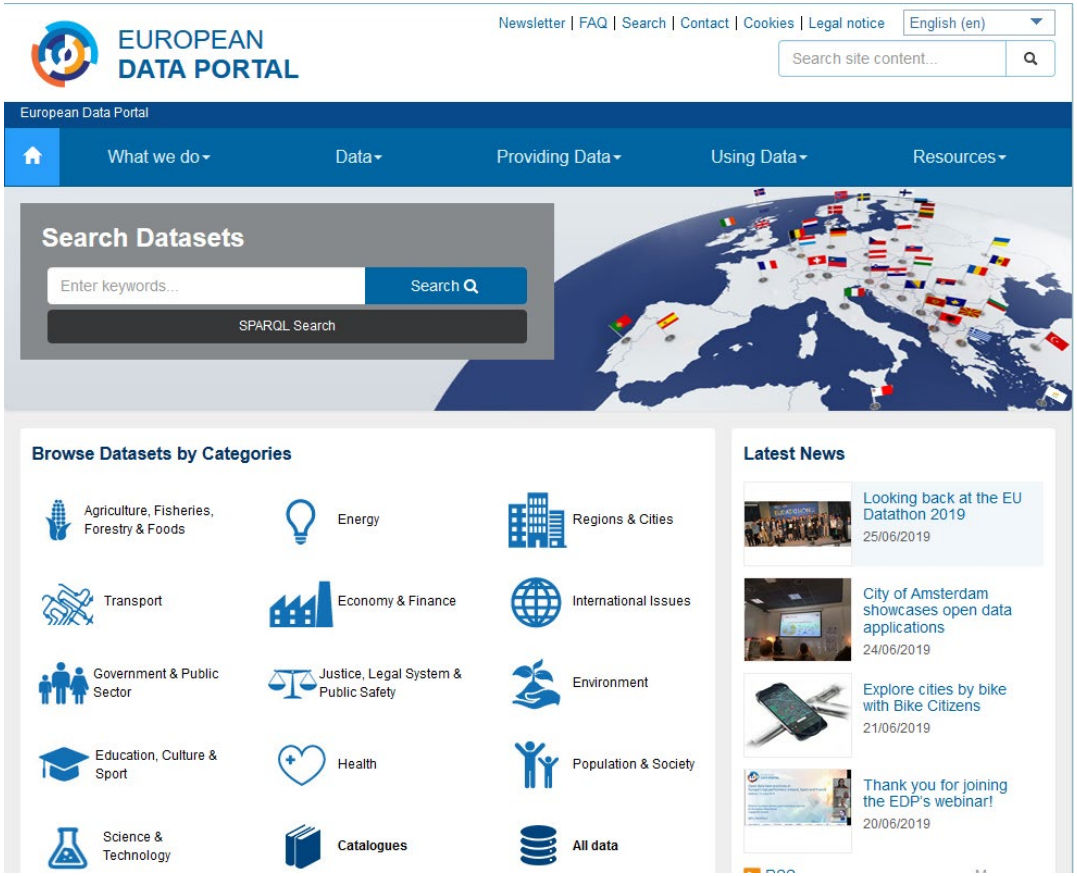
EUROPEAN DATA PORTAL

INSPIRE Geoportal (MS data)



http://inspire-geoportal.ec.europa.eu/

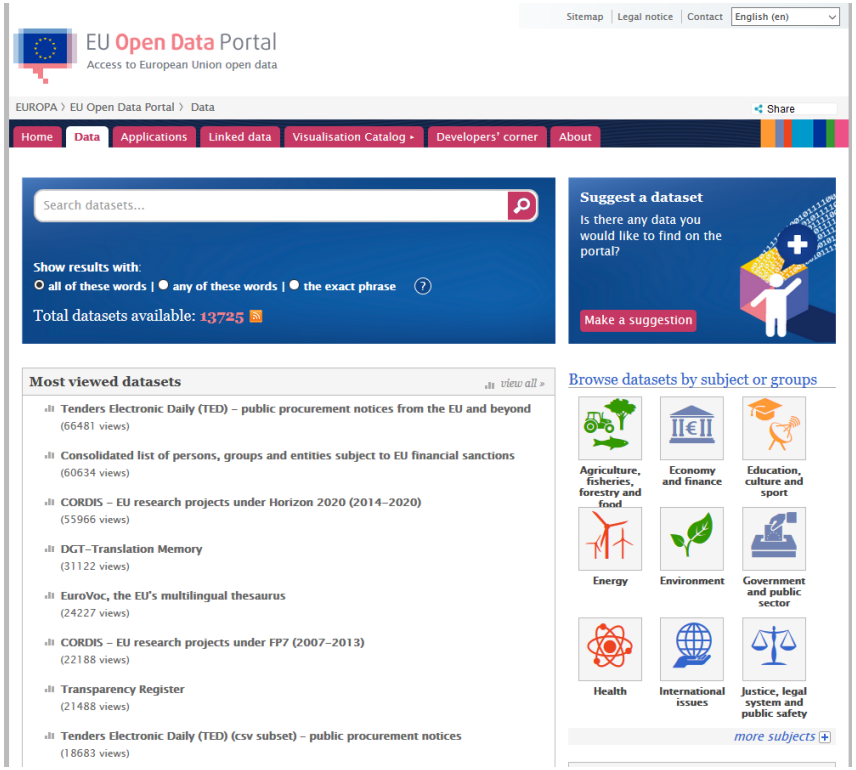
European Data Portal (MS data)



 https://www.europeandataportal.eu/en/homepage

European Commission

European Union Data Portal (EU)



http://data.europa.eu/euodp/en/data/

Communities

- *National Mapping Agency, EuroGeographics, GISCO – WG, INSPIRE groups, OpenData groups*
- *European Forum for Geography and Statistics (EFGS) with EFGS conference – Geostat project*
- *UNGGIM:Europe – Core Reference Data - Meeting*
- *UNECE events – NTTS conference*
- *Tools: Commercial (e.g. ESRI, MapInfo) and Open Source Communities (e.g. QGIS, Grass, SAGA, special libraries)*

European Commission

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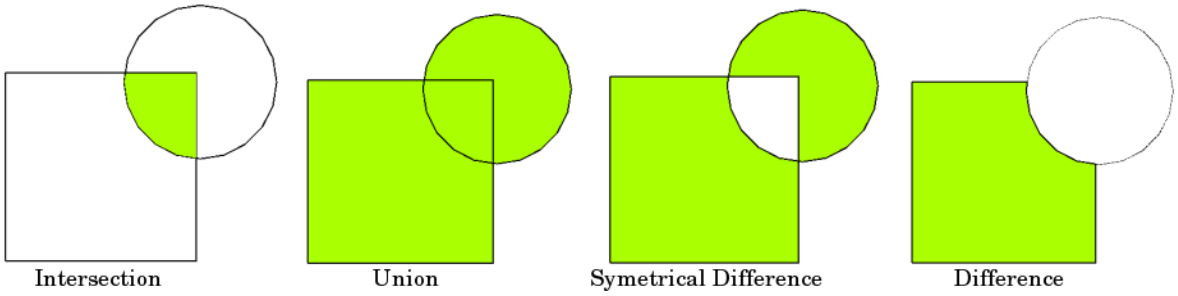
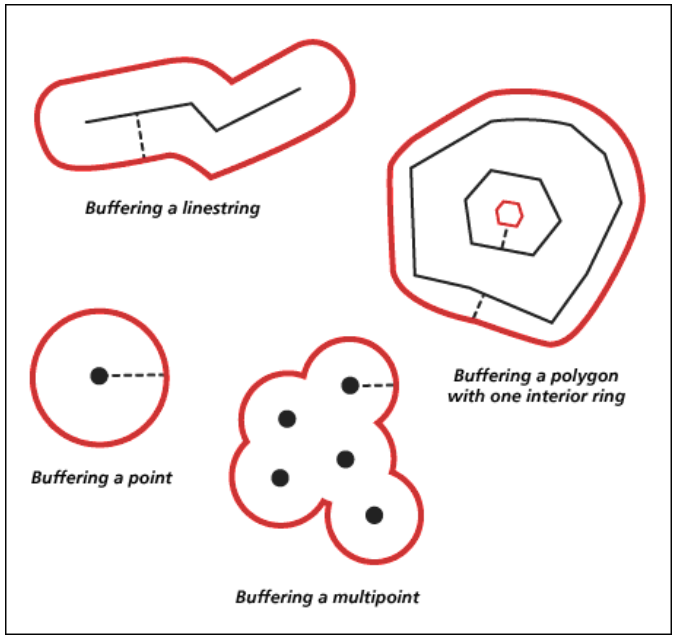
European Commission

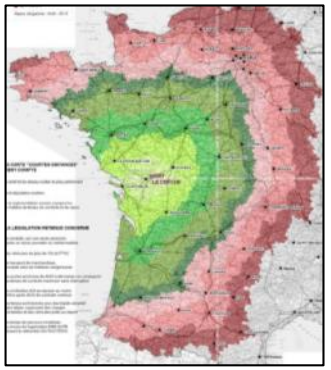
Geo-analytical tasks (I)

- *Basic geometrical operations:*
  - **Distances, length, area**
  - **Intersection, union, difference**
  - **Buffering**
  - **…**

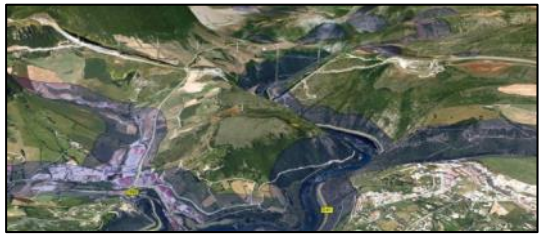




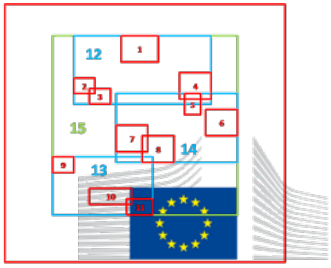
Geo-analytical tasks (II)



- *Network analysis*
  - **Topological queries**
  - **Routing: Shortest path computation, isochrone computation, etc.**
  - **Connectivity analysis**

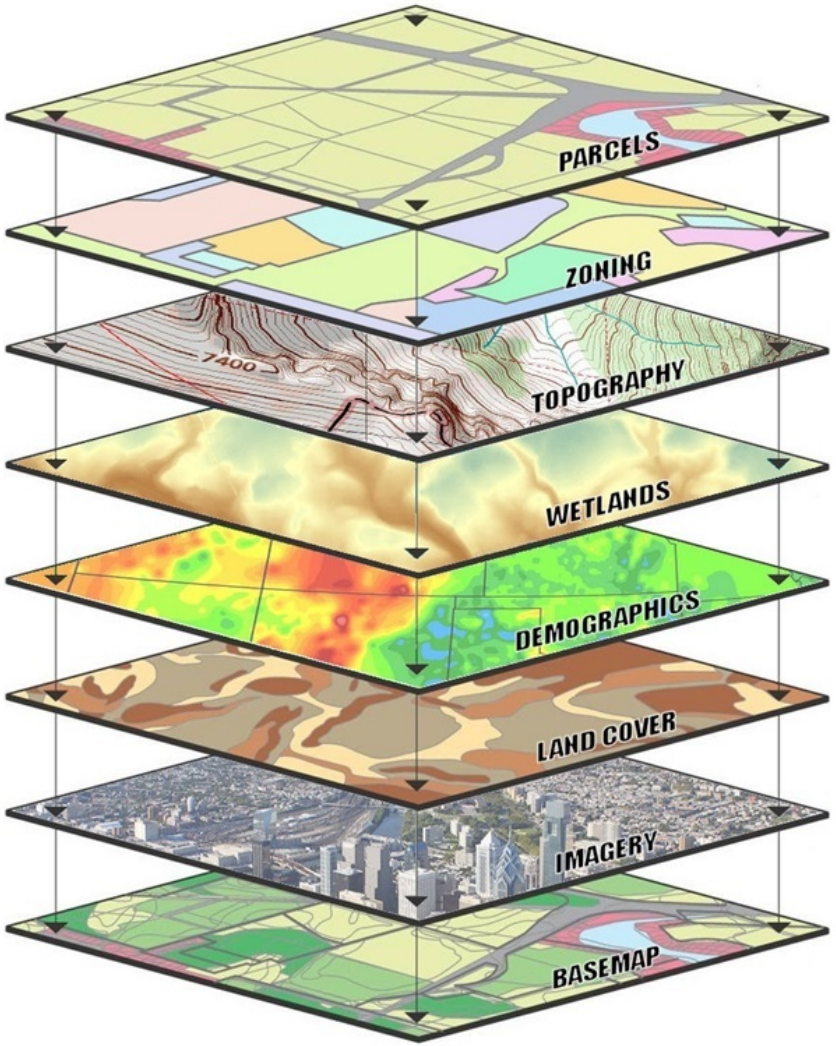


- *Spatial interpolation*
- *Image processing*
- *Spatio-temporal and 3D analyses*
- *Spatial query optimisations (storage, spatial indexing, etc.)*



Geo-analytical tasks (III)

- *Spatial correlation*
- *Cross-thematic analyses*
- *Information value is not only in each single data layer but rather in their combination*
- *Data "mash-up"*



European Commission

Geo-analytical tasks (IV)

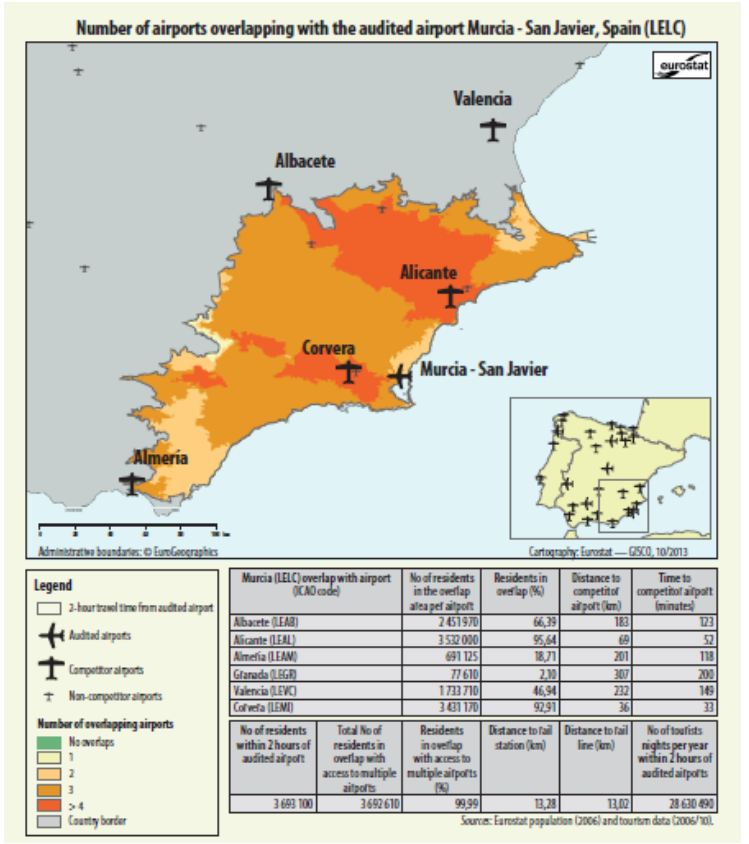
- *Road / Railway / Maritime Distance Matrices*
- *Accessibility analysis*
- *Generalization of map products*

Empty and unused airport infrastructures

The cargo project at Thessaloniki airport in Greece involved building two new cargo terminal buildings, the renovation of two existing cargo buildings and the construction of a parking area. The two newly built cargo buildings remained empty (see ***Picture 7***), and only one of the two renovated cargo buildings was in regular use at the time of the audit visit (EU funds involved: 7 million euro). There was no evidence of any study being carried out to demonstrate a need to extend capacity for air cargo in the region.

Picture 7 — One of the two new cargo buildings at Thessaloniki airport which were empty at the time of the audit visit

Source: European Court of Auditors.



Number of airports overlapping with the audited airport Murcia - San Javier, Spain (LELC)

Legend

- 2-hour travel time from audited airport
- Audited airports
- Competitor airports
- Non-competitor airports

Number of overlapping airports

- No overlaps
- 1
- 2
- 3
- > 4
- Country border

Murcia (LELC) overlap with airport (ICAO code)	No of residents in the overlap area per airport	Residents in overlap (%)	Distance to competitor airport (km)	Time to competitor airport (minutes)
Albacete (LEAB)	2 451 970	66,39	183	123
Alicante (LEAL)	3 532 000	95,64	69	52
Almeria (LEAM)	691 125	18,71	201	118
Granada (LEGR)	77 610	2,10	307	200
Valencia (LEVC)	1 733 710	46,94	232	149
Corvera (LEMI)	3 431 170	92,91	36	33

No of residents within 2 hours of audited airport	Total No of residents in overlap with access to multiple airports	Residents in overlap with access to multiple airports (%)	Distance to rail station (km)	Distance to rail line (km)	No of tourists nights per year within 2 hours of audited airports
3 693 100	3 692 610	99,99	13,28	13,02	28 630 490

Sources: Eurostat population (2006) and tourism data (2006/'10).

https://www.eca.europa.eu/Lists/ECADocuments/SR14_21/QJAB14021ENC.pdf

European Commission

Visualisation

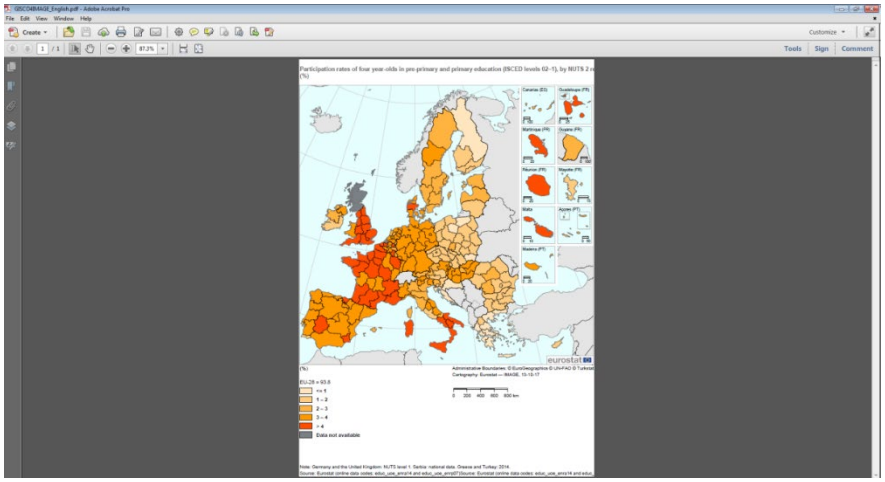
Static / Dynamic

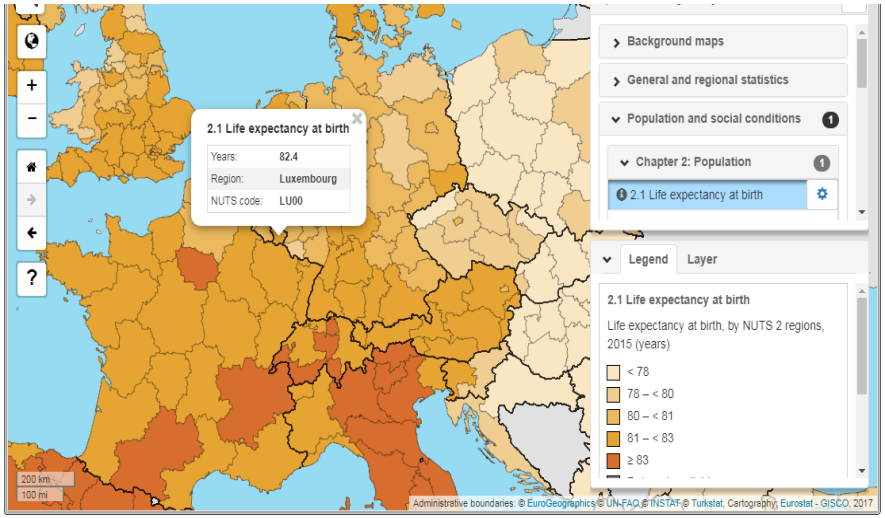
Audience

Target

Message

Tools





http://ec.europa.eu/eurostat/statistical-atlas/gis/viewer/

European Commission

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European Commission

The use of geo-spatial data in official statistics

Every statistical officer uses geospatial information on an everyday basis for the production of official statistics !

Census
FSS
LFS
Business Register
.....

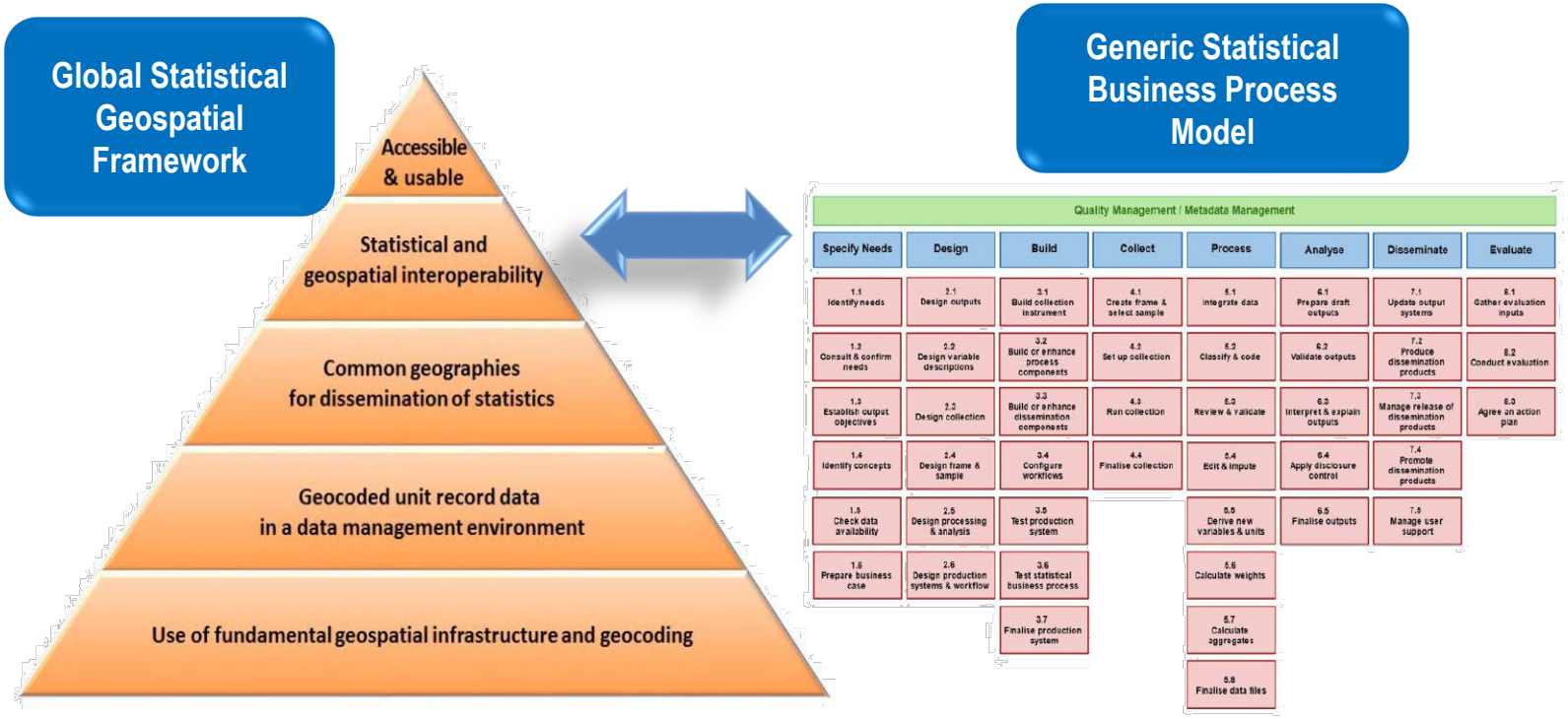
Every information has a geographic component

(even a legal text)

European Commission

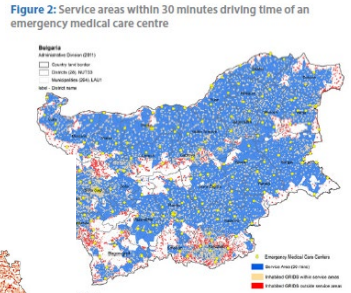
Enhancing the generic business process model to integrate GSGF into the GSBPM

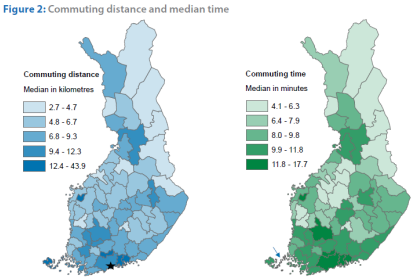
GEOSTAT-3: Implementation guide for the GSGF Europe

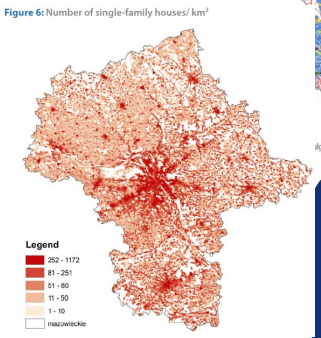


European Commission

Supporting the Integration of Statistics and Geospatial data

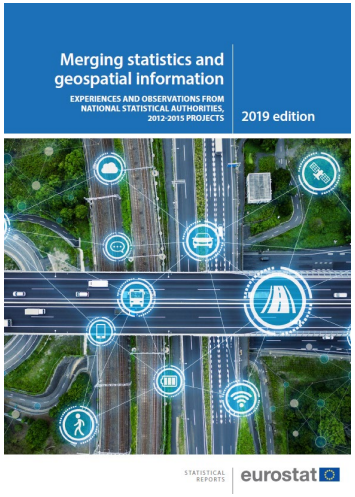


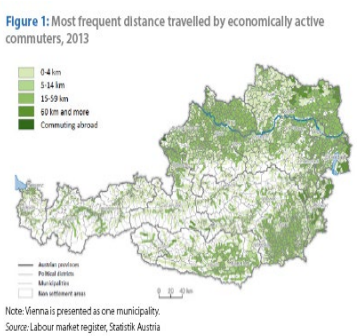


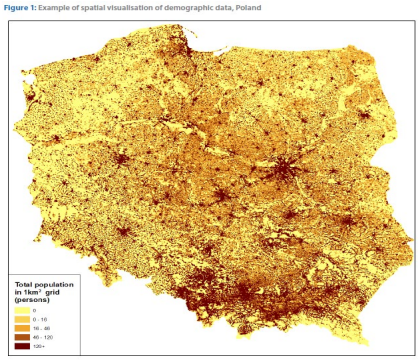


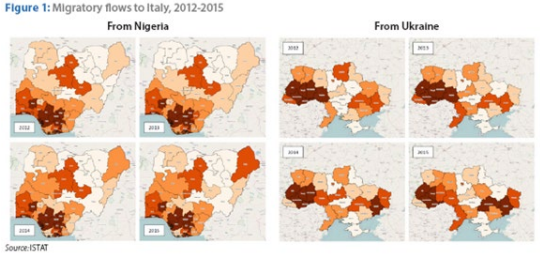
2012 - 2019

Over 40 national projects on merging statistics and geospatial information supported by Eurostat









https://ec.europa.eu/eurostat/web/products-statistical-reports/-/KS-FT-19-004

European Commission

Examples from Memberstates (HU)

Figure 1: Example of the geostatistical system created within the Hungarian Central Statistical Office

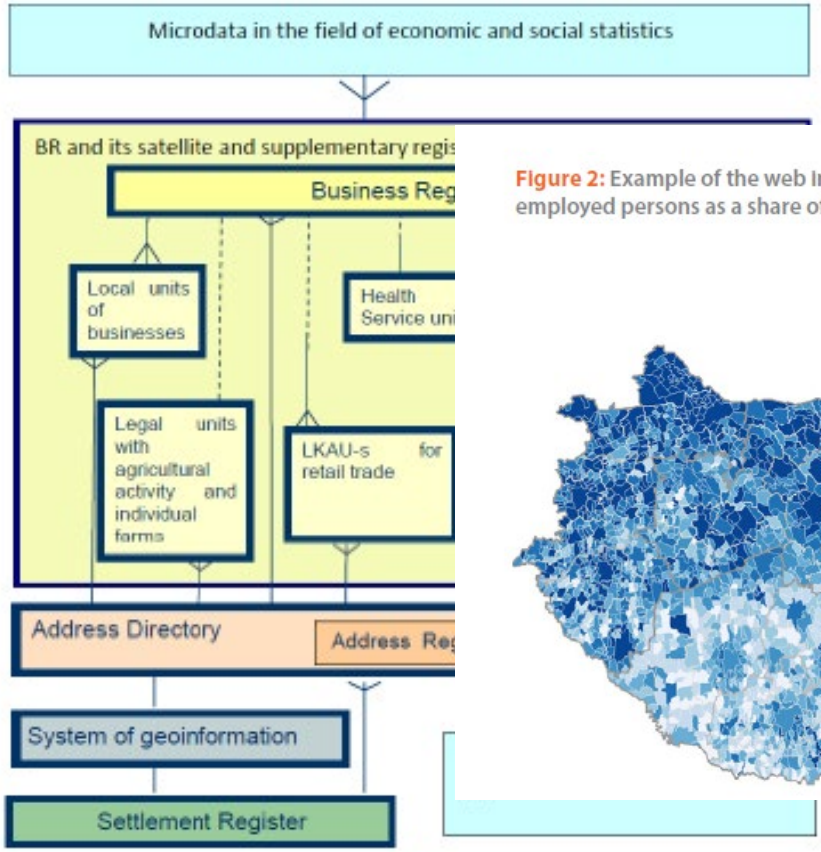
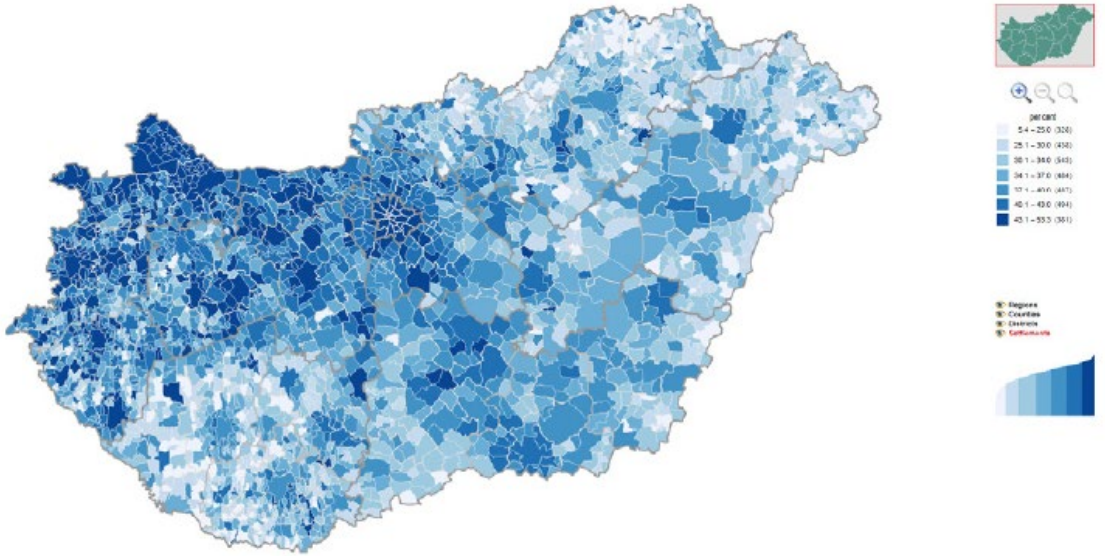


Figure 2: Example of the web interface developed by the HCSO showing results of the 2011 census detailing employed persons as a share of the resident population, by settlement



https://ec.europa.eu/eurostat/web/products-statistical-reports/-/KS-FT-19-004

European Commission

Examples from Memberstates (RO)

Figure 1: Organisation of the project

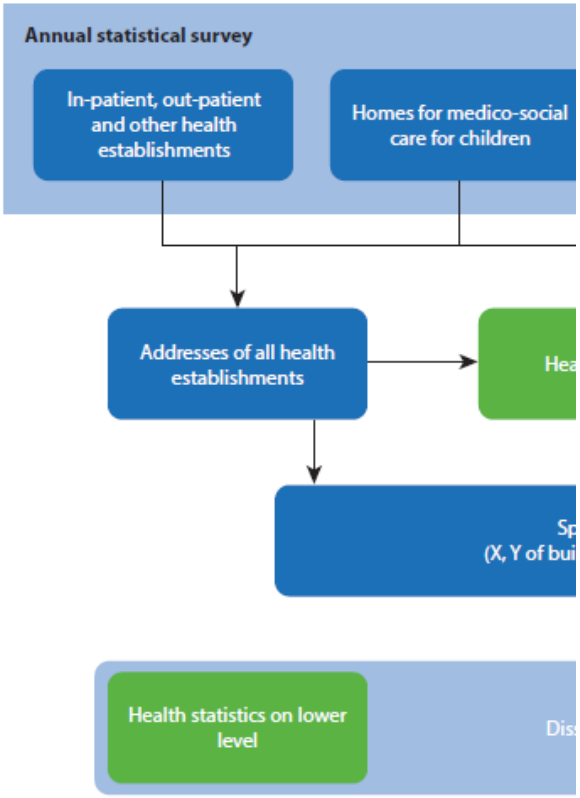
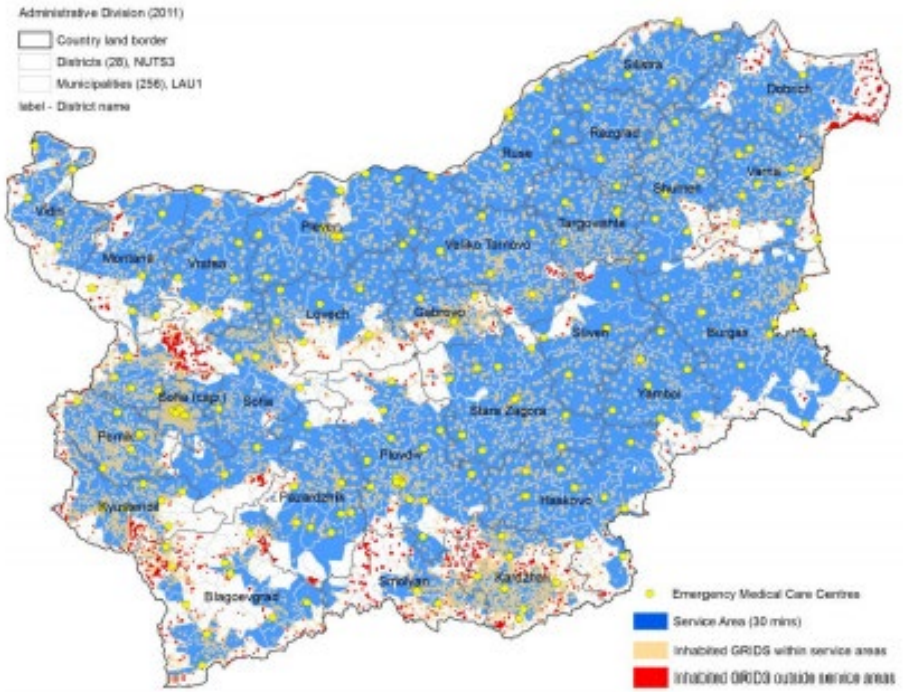


Figure 2: Service areas within 30 minutes driving time of an emergency medical care centre



Source: Statistics Bulgaria

https://ec.europa.eu/eurostat/web/products-statistical-reports/-/KS-FT-19-004

Examples from Memberstates (EE)

January

July

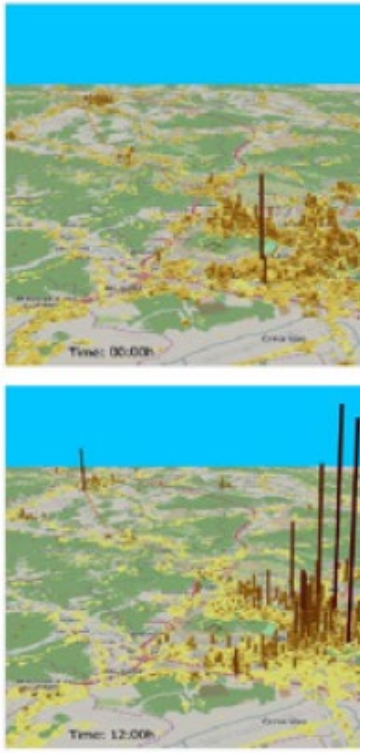
https://ec.europa.eu/eurostat/web/products-statistical-reports/-/KS-FT-19-004

statistics estonia

European Commission

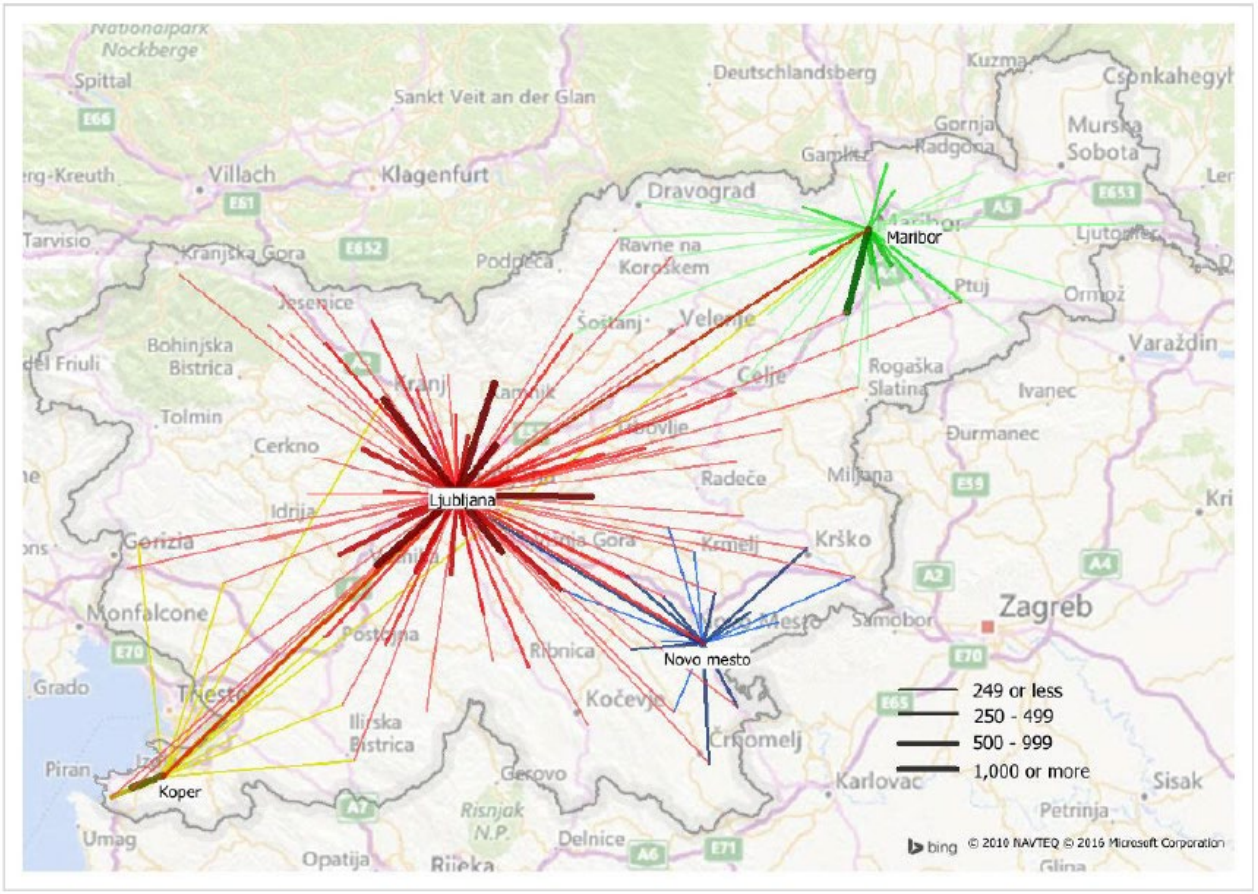
Examples from Memberstates (SI)

Figure 2: Estimated population, Ljubljan



Source: SURS

Figure 3: Attractiveness in terms of daily commuter inflows, 2015



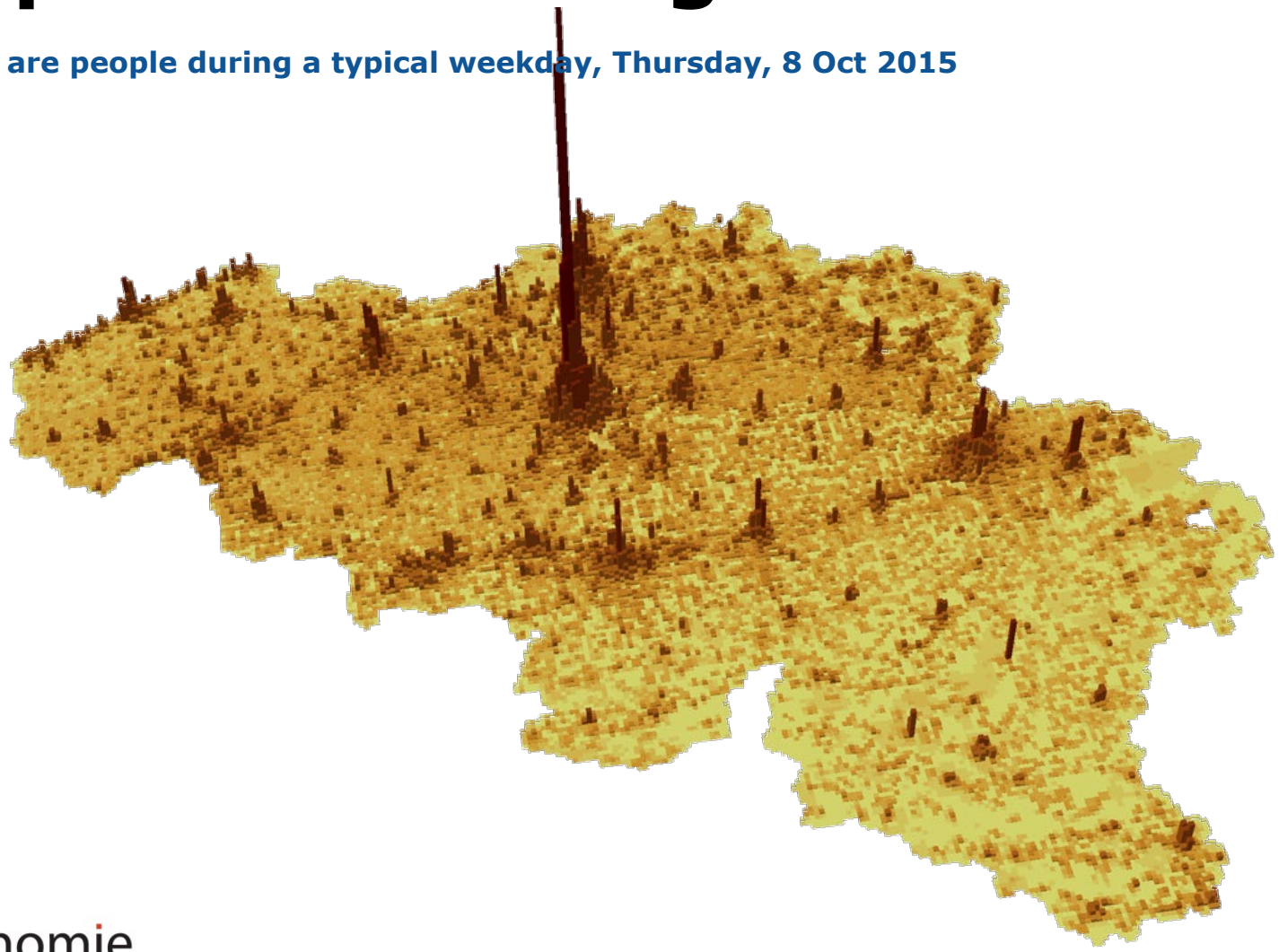
Source: SURS

https://ec.europa.eu/eurostat/web/products-statistical-reports/-/KS-FT-19-004

European Commission

Population: at Night – at Noon

Where are people during a typical weekday, Thursday, 8 Oct 2015



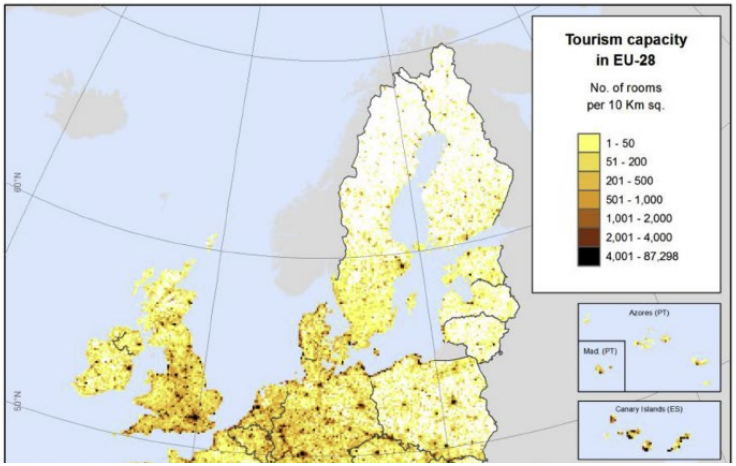
economie
FPS Economy, S.M.E.s, Self-employed and Energy

proximus

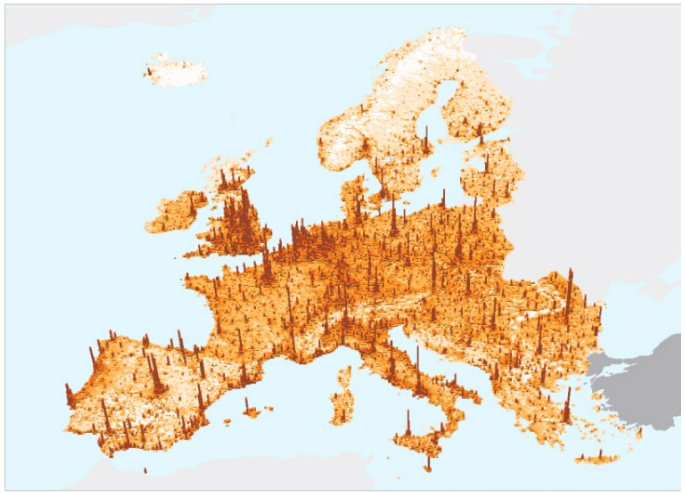
Source:
De Meersman et al. 2016

European Commission

Gridded Statistics

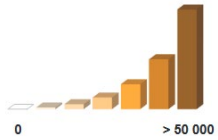


Population density based on the GEOSTAT population grid, 2011
(number of inhabitants/10 km²)

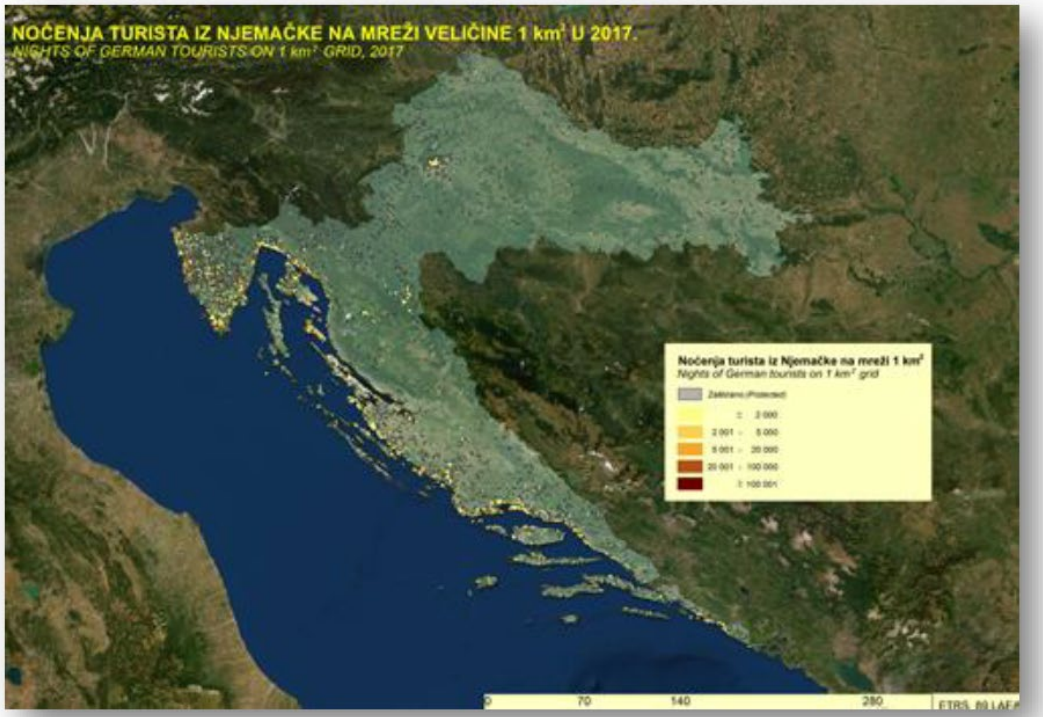


Administrative boundaries: © EuroGeogra
Cartography: Eurostat — GISCO, 06/201

(number of inhabitants/10 km²)



Picture 3 NIGHTS OF GERMAN TOURISTS ON 1 km² GRID, 2017

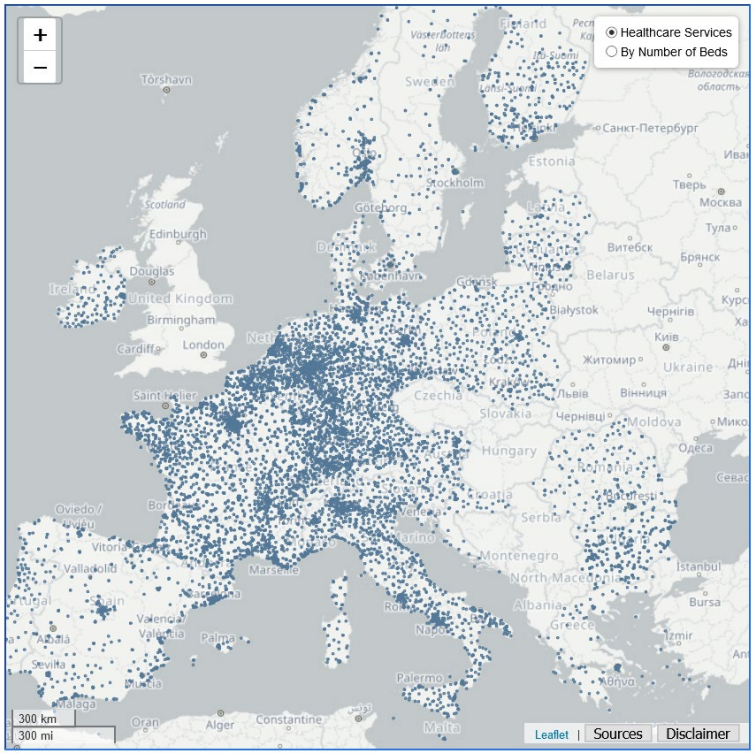


Locations of Healthcare facilities in EU

geolocalised healthcare information to facilitate spatial analyses at European level for European Commission services and other GIS users.

The data is extracted from official national registers and may contain inconsistencies or inaccuracies.

Not all European countries are currently included, however the coverage is being improved progressively.



https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/healthcare-services

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What did you learn ?

- *Every information has a location*
- *Knowledge about the type and use of geospatial data, analytical task and visualizations*
- *Know whom to contact – Where to look for data*

- *Examples from the use of geospatial information at Member State and the European Union for official statistics*

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Thanks !

Email: ESTAT-GISCO@ec.europa.eu

Data: https://ec.europa.eu/eurostat/web/gisco

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