



# Methodological development for MNO data: the Multi-MNO project

*1<sup>st</sup> meeting with partner MNOs*

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ESTAT.A.5

Methodology; Innovation in official statistics

Eurostat

# The European Statistical System (ESS) and Eurostat

- The ESS is a partnership between
  - Eurostat
  - National Statistical Institutes (NSIs) in each EU country
  - Other National Authorities (ONAs) in each EU country
- Eurostat is
  - The coordinator of the ESS
  - The statistical office of the European Union, responsible for publishing high-quality Europe-wide statistics and indicators
  - A Directorate-General of the European Commission

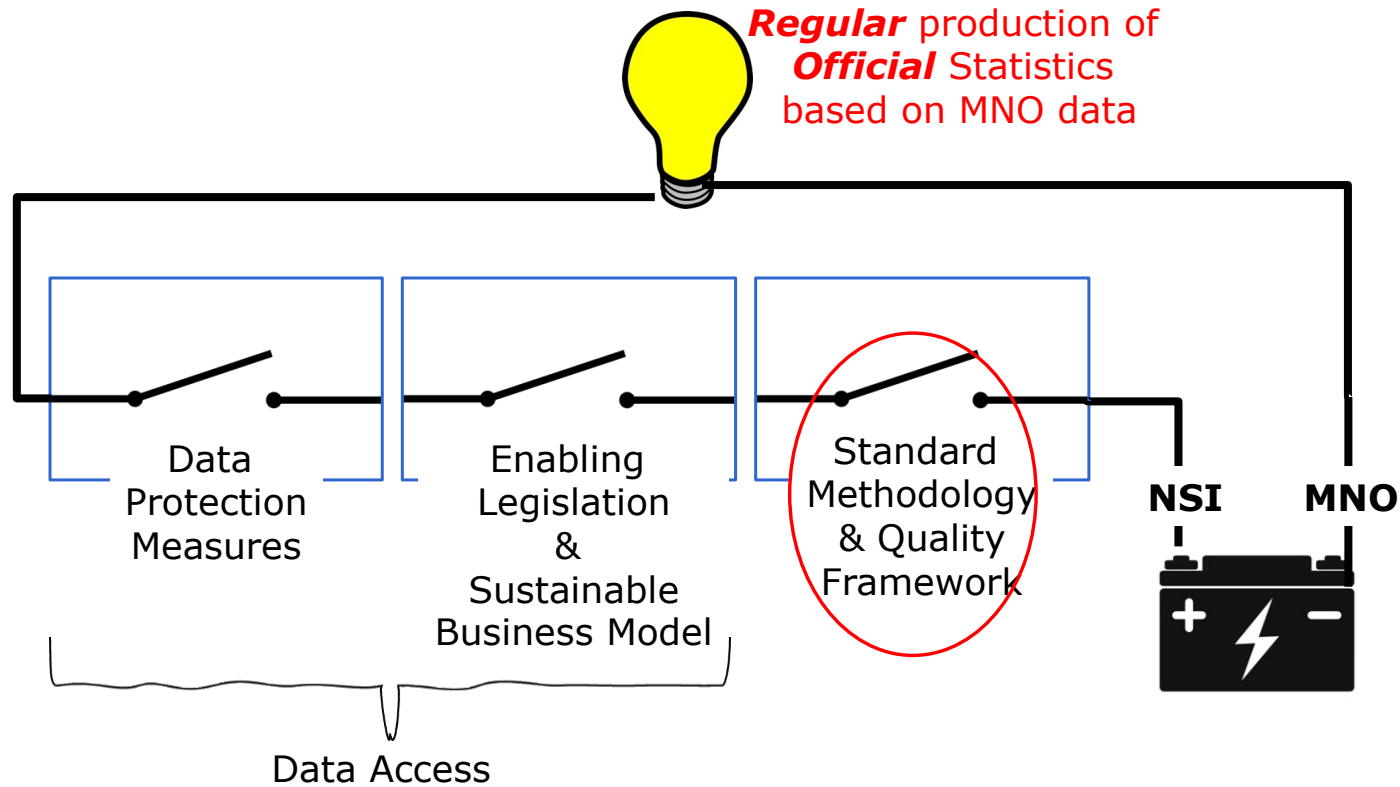
Source: <https://ec.europa.eu/eurostat/web/european-statistical-system>

# The vision

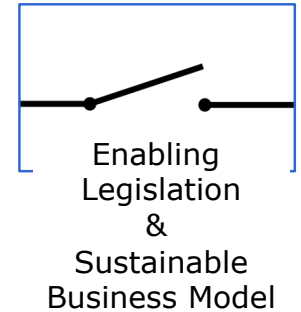
Starting in 202x, MNO data will be used to produce **regular official statistics** in all EU countries

- based on a **sustainable partnership model** between NSI and MNOs enabled by a revised legislative framework;
- based on data from all major MNOs in each EU country;
- in combination with other non-MNO data (e.g., statistical data);
- based on a **common, standardized and open end-to-end methodology**;
- incorporating very strong technical and organisational measures for data protection, agreed at the EU level, for safeguarding both individual privacy and business secrets.

# Multiple challenges



# Enabling legislation & sustainable business models



- Expert Group on facilitating the use of new data sources for official statistics (B2G4S)
  - Final report with recommendations, June 2022  
<https://ec.europa.eu/eurostat/en/web/products-statistical-reports/-/ks-ft-22-004>
  - Overview of the critical aspects of Privately Held Data, applicable also to MNO
- Legislation: EC proposal for amending Regulation N. 223/2009 on European statistics
  - Relevant for all Privately Held Data
  - Target adoption by 2024 (?)
  - sSecondary legislation may be still needed afterwards to define operational aspects



# ESS Task Force on MNO data (TF-MNO)



- TF-MNO established in Jan. 2021 as sub-group of WG Methodology, 19 members
- Focus on steering ESS **methodological aspects**
  - sharing of experiences from national projects; networking of the relevant experts across ESS members
  - **identify key methodological directions to be prioritized** for further development
  - **proposing activities to further develop methods and tools** for the (re)use of MNO data in the ESS.
- Milestones in 2023
  - **Position paper** ([link](#)) outlining the global ESS view
  - **Multi-MNO project** (this project) aimed at proposing, implementing and demonstrating (the initial version of) a methodological pipeline – led by GOPA, involves 2x NSI and industry partners
  - **Research grant MNO-MINDS**, parallel research project focusing on integration of MNO data and non-MNO data (e.g. statistical data) – led by ISTAT, involves 10x NSI

# Background: TF-MNO position paper

## Table of Content

### Executive Summary .....

#### 1. Introduction .....

#### 2. What are MNO data and why they are relevant for Official Statistics .....

#### 3. Methodological challenges .....

#### 4. MNO data analytics in the private sector: current state of play .....

#### 5. MNO data and official statistics: current state of play .....

#### 6. The case for methodological standardisation .....

#### 7. An open methodological standard for official statistics based on MNO data .....

#### 8. The importance of taking a multi-MNO perspective .....

#### 9. Fusion of MNO data with other data sources .....

#### 10. Data access .....

#### 11. The way forward .....

Focus of  
MNO-MINDS  
research grant

Focus of  
Multi-MNO project



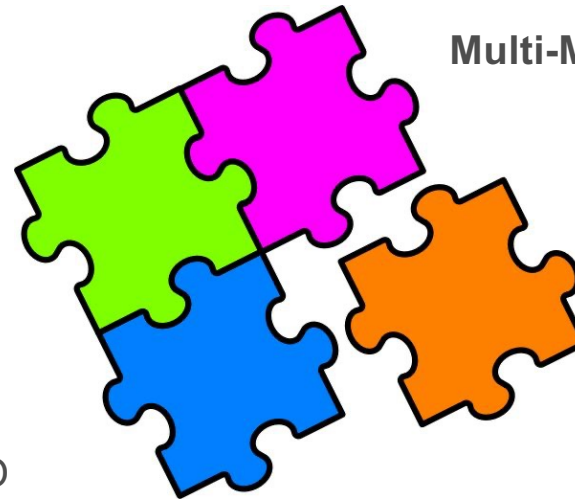
# Pieces of a bigger picture ...

ESSnet Big Data II –  
WPI and WPK



ESS Task  
Force on  
MNO data

Research Grant  
ESSnet METH-TOO



Multi-MNO project

Projects on  
Privacy-Enhancing  
Technologies



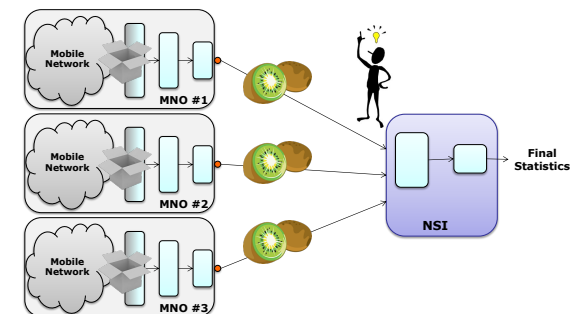
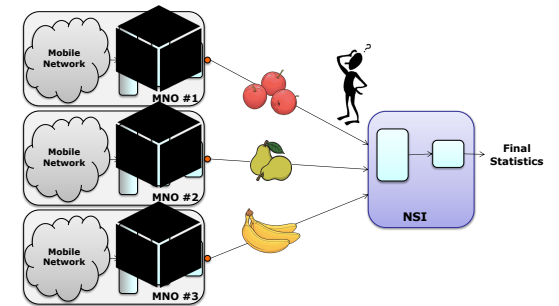
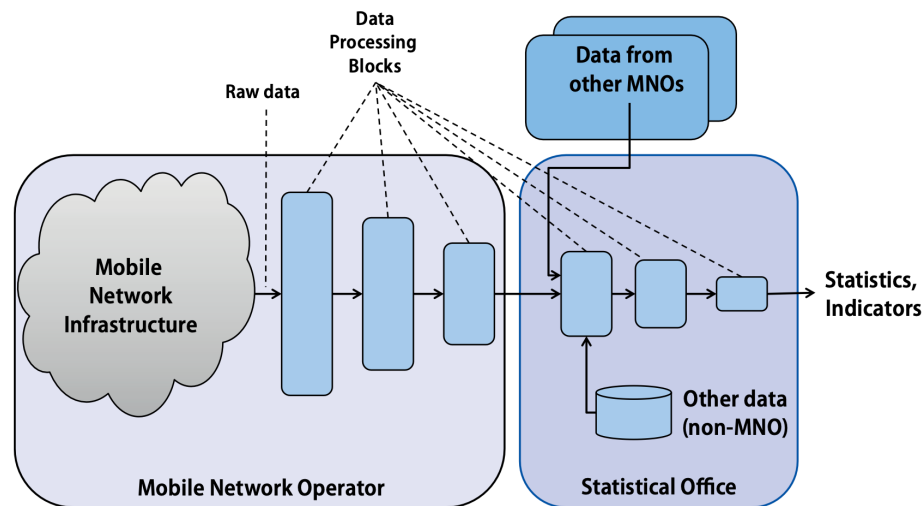


# Multi-MNO project Overview

- First **co-development partnership** between NSI experts + industry experts
  - Service contract ESTAT 2021.0400 based on open call for tenders, budget 1.2 Mio
  - Started in January 2023 for 2.5 years until mid 2025
- Project Objectives
  - Develop a first proposal for an open end-to-end methodological framework (including quality aspects) with focus on an **initial selection of use-cases**
  - Develop and release **open-source reference software implementation** implementing the proposed methodological framework
  - Practical demonstration of processing pipeline on real data from 5 MNOs in 4 countries
- Consortium: GOPA (DE); NOMMON (ES), POSITIUM (EE), ISTAT (IT), CBS (NL) + 5 MNOs (Orange Spain, Vodafone Spain, Vodafone Italy, A1 Slovenia, POST Luxembourg).
- Advisory Board of 14 external experts

# The case for methodological standardisation

- One open ESS methodology instead of multiple proprietary/closed methodologies
  - Ensures comparability and composability across MNOs
  - Enables the definition of **data protection measures** directly at EU level
- Standardisation to cover whole end-to-end data flow
  - Oblivious to where processing takes place, MNO premises vs NSI



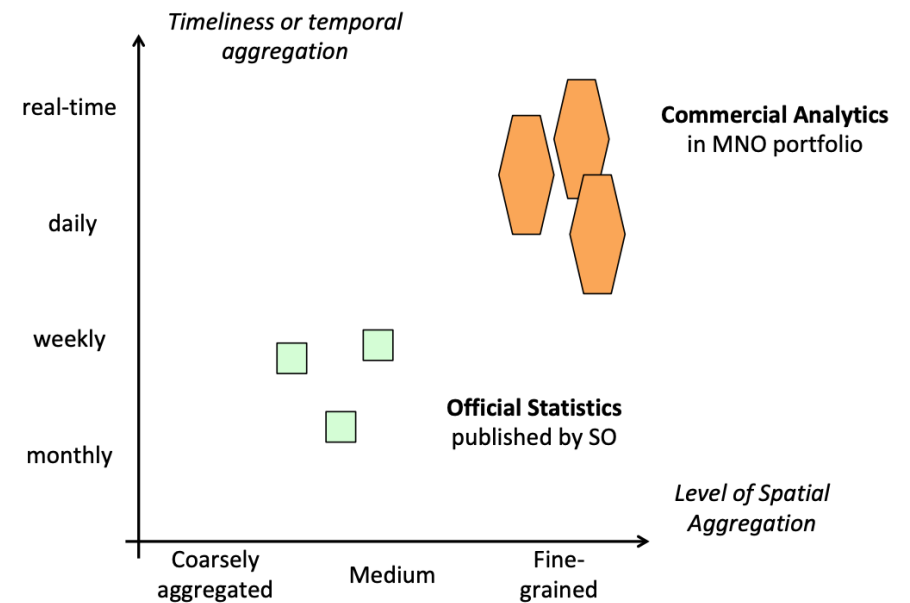
# Pan-European perspective

- *Assuming* comparable data access situation across EU countries (legal, business)
- Develop a methodological framework that may work for all MNOs in all EU countries
  - Built-in flexibility to accommodate differences about mobile infrastructures and business processes
  - Setting reasonably ambitious minimum standards (neither bound to current “worst case” nor unrealistic “ideal case”)
- Tailored to European state-of-play in mobile technology, services, usage and statistical needs
  - May be different from other non-European regions



# Official Statistics and Commercial Analytics

- Clear definition of use-cases = unambiguous and detailed definition of what statistics will be eventually published by NSI
- Differentiation from “commercial analytics” along multiple dimensions
  - Use-cases, variables, spatial and temporal granularity, timeliness, ...
- Potential indirect benefit to commercial analytics reminiscent of freemium model (\*,\*\*)



(\*) F. Ricciato et al. *Processing of Mobile Network Operator data for Official Statistics: the case for public-private partnerships*, DGINS 2018 conference. Available from <https://zenodo.org/records/10246468>

# Multi-MNO project

## Tasks and Deliverables

- Task 1 – Website and dissemination
- Task 2 - **Scenarios, use-cases and methodology**
  - **D2.1 (interim, out now)** – D2.2 (update, 06/2024) – D 2.3 (final, EoP)
- Task 3 – **Quality framework**
  - D3.1 (interim, 03/2024) - D3.2 (update, 09/2024) - D 3.3 (final, EoP)
- Task 4 – Open-source **software implementation**
  - 1<sup>st</sup> partial release 03/2024, 2<sup>nd</sup> release 07/2024, 3<sup>rd</sup> release 12/2024
- Task 5 – **Testing and demonstration** on real-world data
  - Starting in Q3/2024

NSI  
partners  
responsible

Industry  
partners  
responsible

# Multi-MNO project

## D2.1 highlights

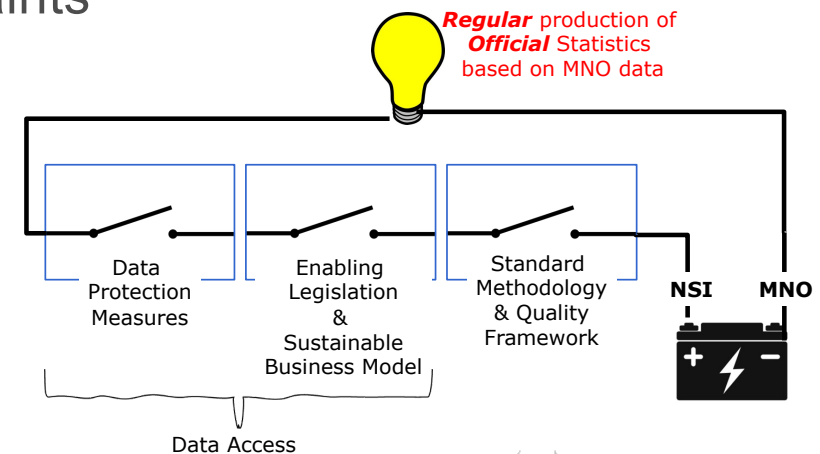
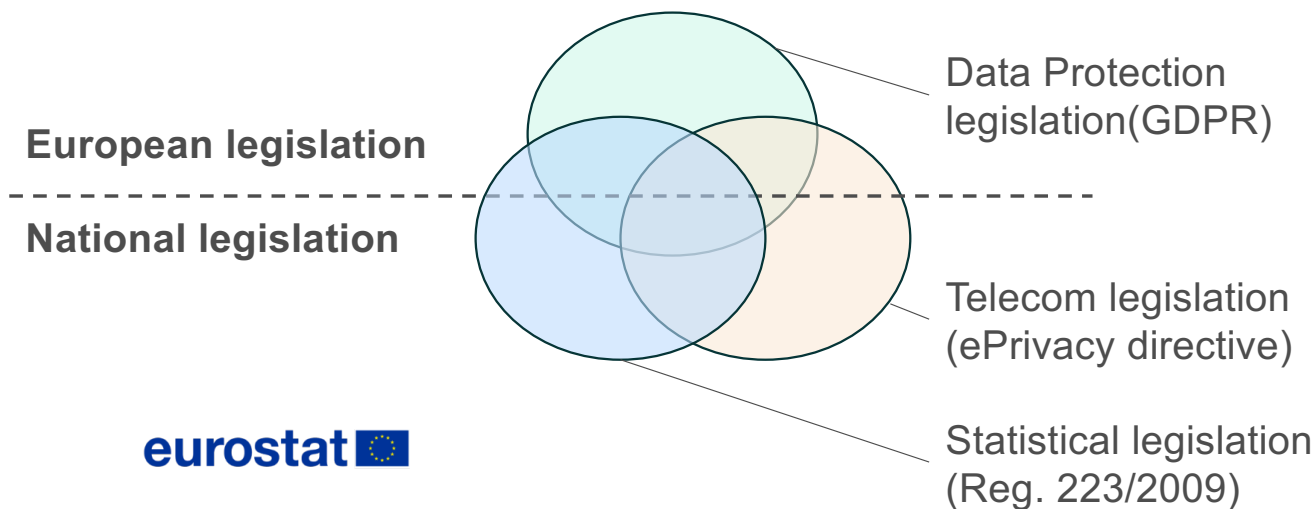
- Reference scenario vs. testing scenario
- Initial list of 6 use-cases (to be extended in D2.2)
- Modular and evolvable methodological workflow
- Longitudinal analysis with built-in “privacy by design” elements
- Incorporates advanced geolocation approaches and probabilistic reasoning from past ESS work
- Focused on intra-MNO processing (inter-MNO left for D2.2)



# Deliverable D2.1

## Reference scenario vs. testing scenario

- Legal framework: fragmented (across MS) and evolving (223/2009 revision)
- Implications for data protection, data availability, access conditions
- Decoupling “*what is aimed for*” tomorrow from “*what is possible*” today
- Reference scenario: plausibly optimistic assumptions about future state
- Testing scenario: current limitations and constraints



# Deliverable D2.1

## Initial list of use-cases

- Focus on intra-MNO processing and home subscribers (use-cases related to roaming users to be worked out for D2.2 update).
- UC "present population" heavily based on past ESS work (ESSnet Big Data II)
- 5 out of 6 involve longitudinal analysis (not covered in past ESSnet)

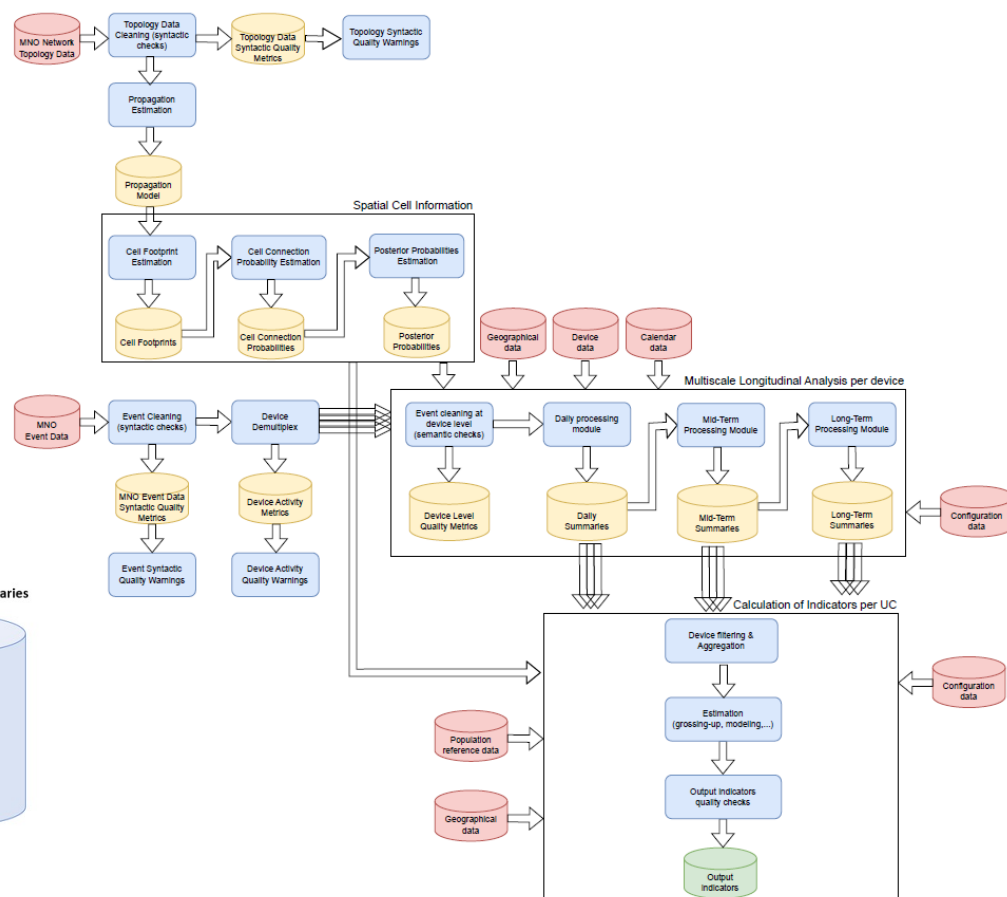
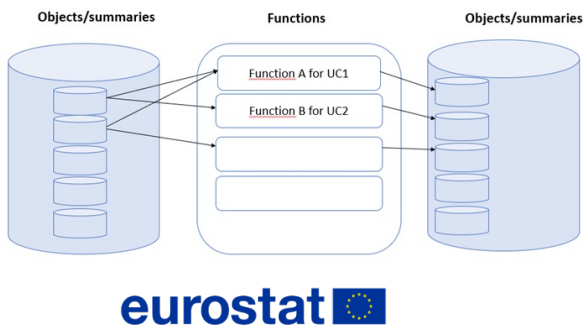
4	Use cases.....
4.1	UC 1.A: Present population estimation .....
4.2	UC 2.A: Usual environment .....
4.3	UC 2.B: MNO-Home location .....
4.4	UC 2.C: Access to services .....
4.5	UC 3: Commuting .....
4.6	UC 4: Functional urban areas and greater city .....
4.7	UC 5.A: Domestic touristic arrivals and nights spent .....
4.8	UC 5.B: Domestic same day visits .....
4.9	UC 6: Exposure to risks .....



# Deliverable D2.1

## Methodological workflow – overview

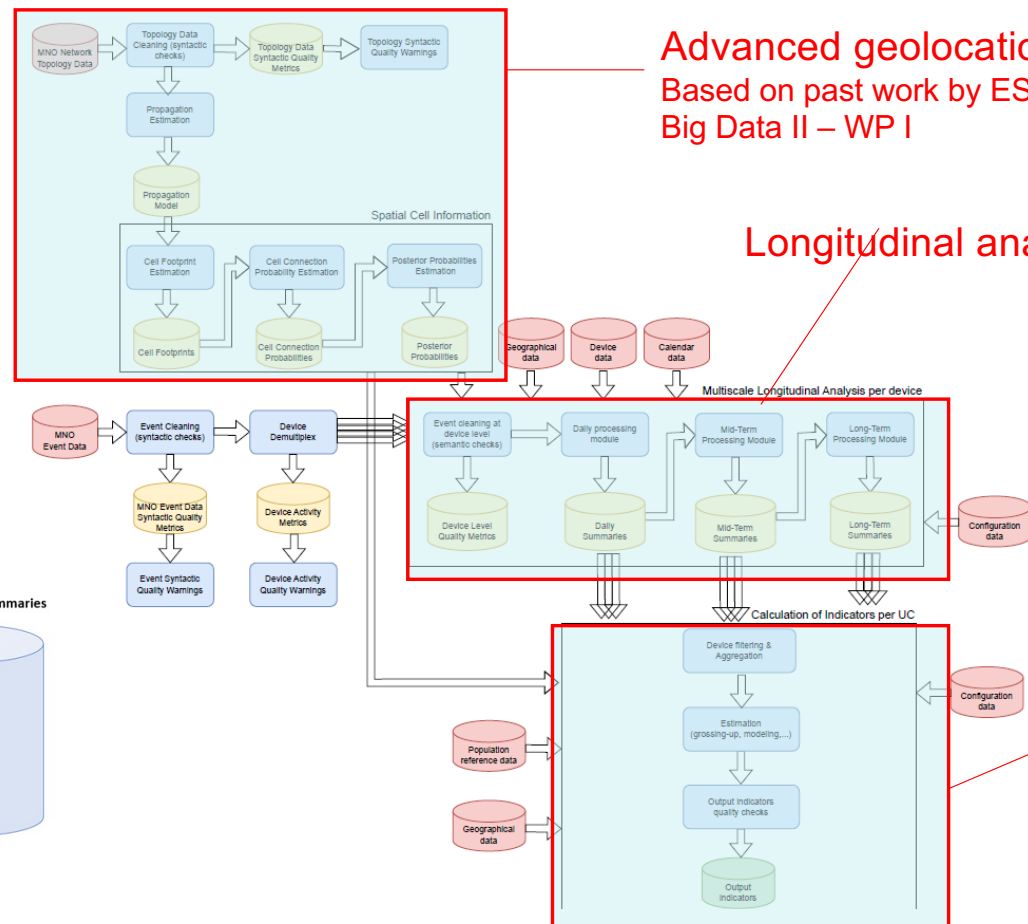
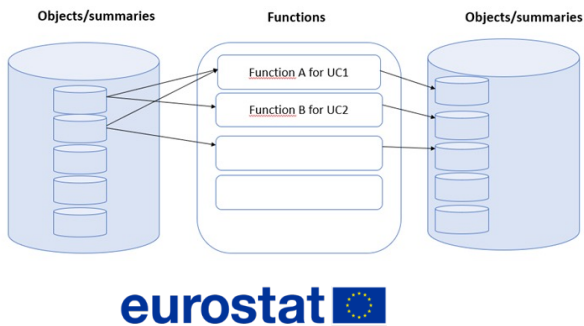
- Modularity, flexibility, and evolvability
- Data (sub)objects
  - Processing (sub)modules



# Deliverable D2.1

## Methodological workflow – highlights

- Modularity, flexibility, and evolvability
- Data (sub)objects
  - Processing (sub)modules



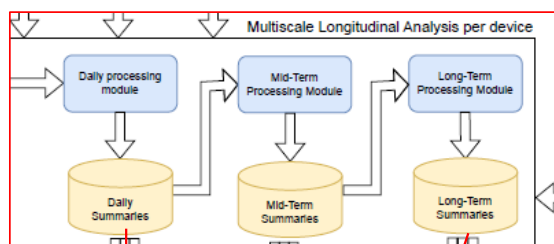
Advanced geolocation  
Based on past work by ESSnet  
Big Data II – WP I

Longitudinal analysis of individual data

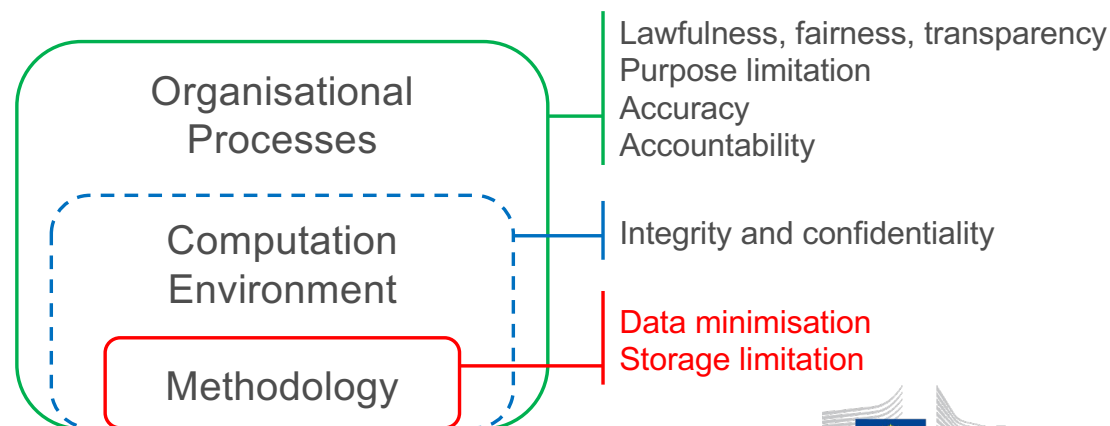
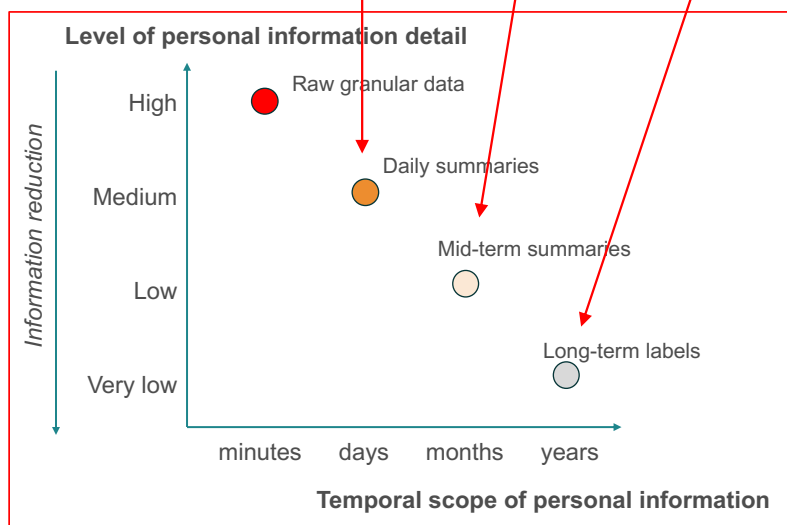
Aggregation, estimation  
Designed to embed methods  
from ongoing ESSnet  
MNO-MINDs

# Deliverable D2.1

## Multiscale longitudinal analysis, privacy-by-design



- **Data minimisation and Storage minimisation by methodological design** within longitudinal analysis module
- Individual data never exported outside the safe computation environment at MNO premises
- Further supplementary Technical and Organisational Measures (TOM) may be added<sup>(\*)</sup> preferably defined at EU level – definition of methodological workflow *enables* discussion with EDPS/EDPB



# Next steps

- D2.1 (interim version deliverable from Task 2) serves also as basis for collecting feedback from stakeholders, to be taken into account for D2.2 (revised version)
  - **Project Advisory Board (AB)**
  - **Task Force on the reuse of MNO for Official Statistics (TF MNO)**
  - Eurostat, ESS domain experts
  - MNOs
- Similar process for Task 3 on Quality aspects
  - D3.1 expected by end March 2024; D3.2 by end of September 2024



# Thank you

eurostat 



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