



EUROPEAN  
STATISTICAL  
SYSTEM

# European Statistical System

SDMX – Data, metadata and exchange system

# General concepts

Statistical Data and Metadata eXchange (SDMX) standardises the way data are organised and exchanged and provides international guidelines on how to shape the data.

# What

## **SDMX provides**

- \* A logical model to describe statistical data, together with guidelines on how to structure the content
- \* A standard for automated communication from machine to machine
- \* A technology supporting standardised IT tools that can be used by all parties involved in the data exchange and processing

# Why?

The implementation of a *SDMX content-oriented* pilot project aims to enhance the harmonization of both *structural* and *reference* metadata between European Member States

SDMX allows the exchange of metadata between European Member States and other European institutional bodies

# Why?

However, SDMX implementation depends on the interaction between the national and European levels.

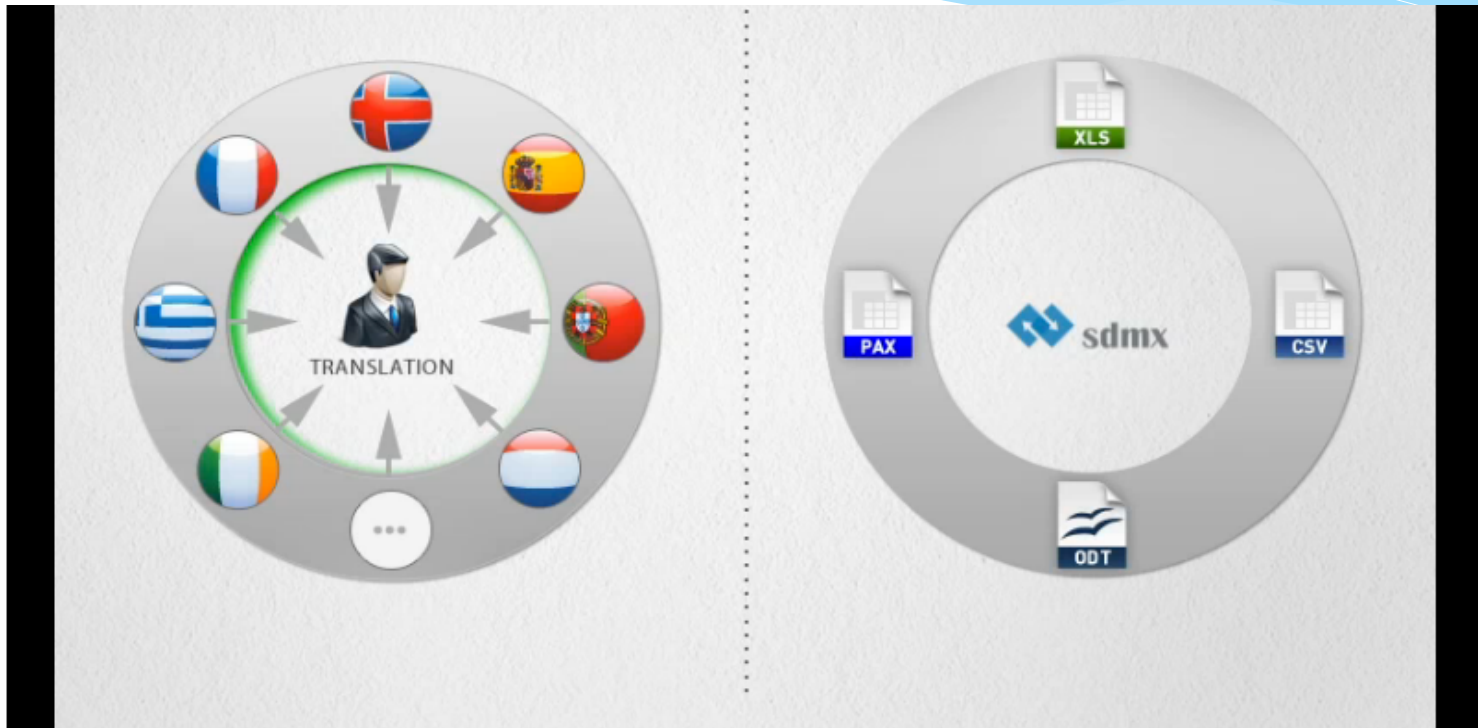
It implies that EU MS should be able to provide metadata to EU institutions, extracting information directly from their national metadata system, applying standards concepts using a common terminology and standardized formats.

Consequently, each organization (national as well as European) will enable to document methodologies, describe the production process of data, and assess the quality of data sets.

# Why

For this purpose, the SDMX, improving metadata exchange and sharing, will increase comparability reducing discrepancies between national statistical systems.

# SDMX approach

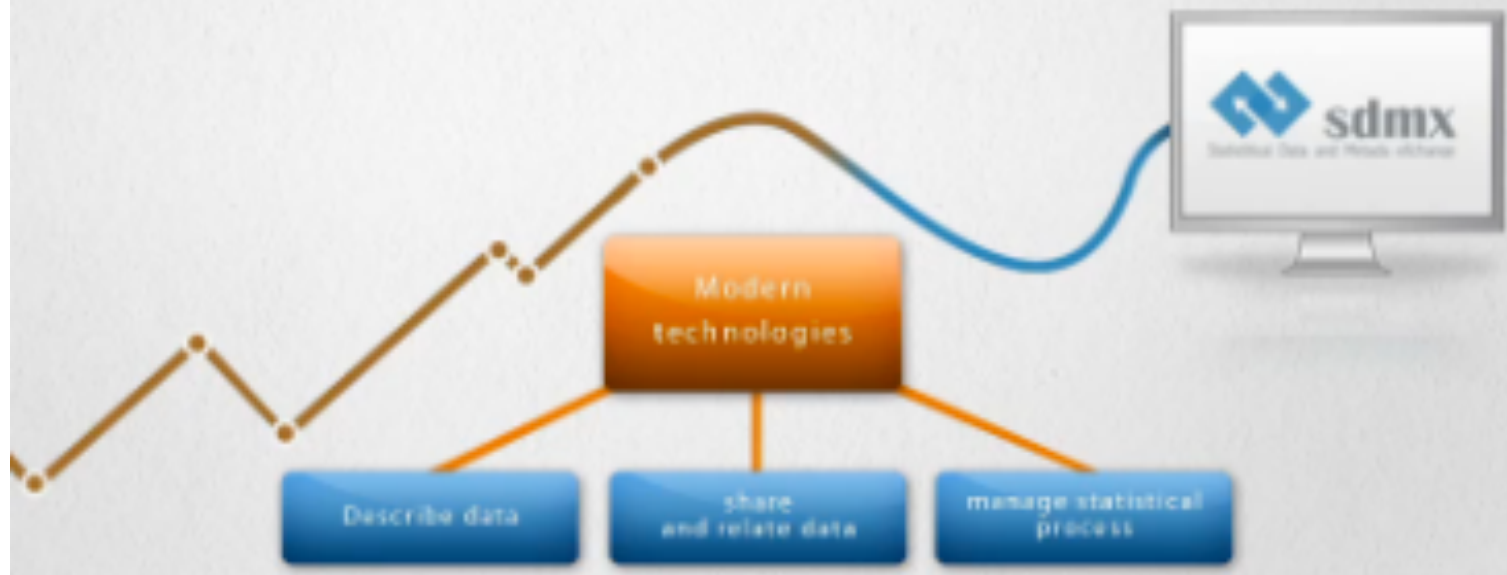


# SDMX approach



# SDMX approach

**SDMX** aims at improving existing standards for the exchange of statistical information, adapting to new demands generated by the Internet revolution



# SDMX structure

**Two main components of SDMX can be identified:**

- \* SDMX information model
- \* SDMX Data exchange

# SDMX structure

## **SDMX information Model**

- \* An information model provides a format to describe a domain (irrespective of the implemented hardware/software), specifying concepts, relationships, constraints, rules and interoperability between data.
- \* The mapping of the information model generates data models.

# SDMX structure

## SDMX Data exchange

- \* Interoperability refers to the ability of diverse systems to work together.
- \* If two or more systems are able to communicate and exchange data, a syntactic interoperability exists.
- \* If two or more systems are capable to automatically interpret the exchanged information and produce expected and pre-defined results – it means that what is sent is the same as what is understood – a semantic interoperability has been created.

# SDMX Information Model

## **SDMX Metadata**

Statistical concepts (metadata) are defined to understand the meaning of numerical observations.

# SDMX - Metadata

SDMX Content-Oriented Guidelines recommend practices for creating interoperable data and metadata sets using the SDMX technical standards.

They are intended to be applicable to all statistical subject-matter domains.

The Guidelines focus on harmonising specific concepts and terminology that are common to a large number of statistical domains.

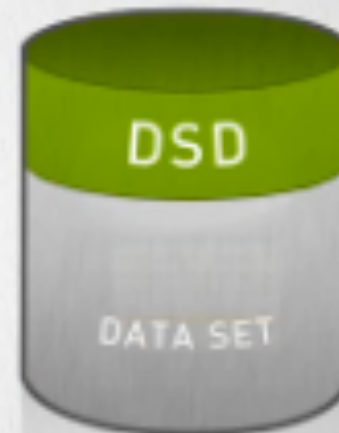
# SDMX Metadata structure

- \* Based on the SDMX-COG, Eurostat selected 21 of the 66 cross-domain concepts in order to create a structure to be used for the dissemination of reference metadata on its website. These 21 concepts have also been further broken down into several sub-concepts.
- \* The generated complete structure is called Euro-SDMX Metadata Structure (ESMS) and is in use in Eurostat since 2010 where it fully replaced the previous structure in place: the Statistical Data Dissemination Standard (SDDS)

# Data Structure Definition

The screenshot shows the OECD R&D dataset table. A blue box labeled "Table structure" points to the first row of the table, which contains the column headers: "Year", "Country", "Sector", "R&D", "GDP", "Population", and "R&D/GDP". Another blue box labeled "Codelist" points to the "Sector" column, which lists various economic sectors. The table data is as follows:

Year	Country	Sector	R&D	GDP	Population	R&D/GDP
2008	Belgium	Manufacturing	1.87	2.07	1.08	1.87
2009	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2010	Belgium	Manufacturing	1.87	2.05	1.08	1.87
2011	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2012	Belgium	Manufacturing	1.87	2.05	1.08	1.87
2013	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2014	Belgium	Manufacturing	1.87	2.05	1.08	1.87
2015	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2016	Belgium	Manufacturing	1.87	2.05	1.08	1.87
2017	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2018	Belgium	Manufacturing	1.87	2.05	1.08	1.87
2019	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2020	Belgium	Manufacturing	1.87	2.05	1.08	1.87
2021	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2022	Belgium	Manufacturing	1.87	2.05	1.08	1.87
2023	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2024	Belgium	Manufacturing	1.87	2.05	1.08	1.87
2025	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2026	Belgium	Manufacturing	1.87	2.05	1.08	1.87
2027	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2028	Belgium	Manufacturing	1.87	2.05	1.08	1.87
2029	Belgium	Manufacturing	1.81	2.05	1.08	1.81
2030	Belgium	Manufacturing	1.87	2.05	1.08	1.87



# Data Structure Definition

Number of touristic establishments in Italy, annual data			
Indicator	A100	B010	B020
Time	Hotels and similar	Tourist Campsites	Holiday dwellings
2003A00	33411	2374	41479
2003A00	33480	2530	58526
2004A00	33518	2529 E	68376
2005A00	33527	2411 P	61810

# Data Structure Definition

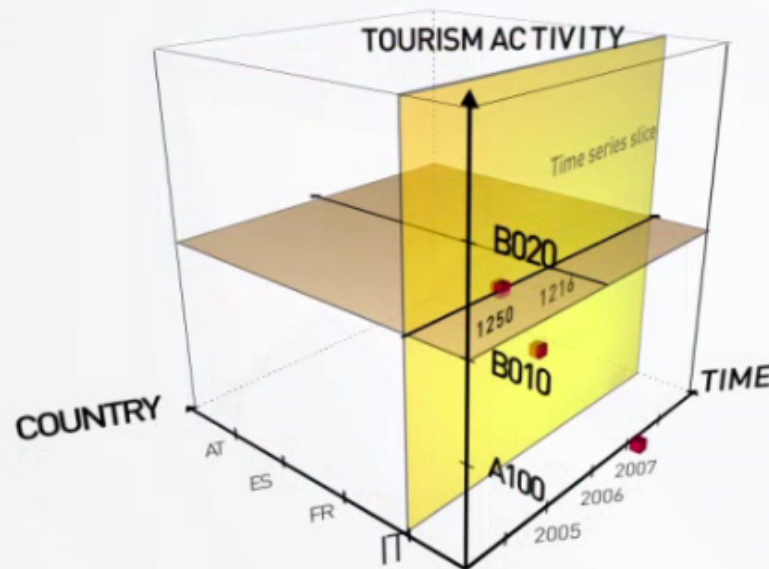
DERIVING A DATA STRUCTURE FROM A TABLE

TIME	Indicator	A100 Hotels and similar	B010 Tourist Campsites	B020 Holiday dwellings
2002A00		33411	2374	60479
2003A00		33480	2538	
2004A00		33518	2529 E	60376
2005A00		33629	2411 P	61818

Annotations:

- COUNTRY: Italy
- FREQUENCY: annual data
- TOURISM\_T
- OBS\_STATUS
- OBS\_VAL

# Data Structure Definition



**Time series**  
Number of tourist campsites  
Italy - annual data

time/activity		B010	
2005		1250	
2006		1216	
2007		1220	

# Data Structure Definition

## DERIVING A DATA STRUCTURE FROM A TABLE



Dimension or attribute name	Identifier	Attachment level	Code list
Frequency	FREQ		CL_FREQ
Country	COUNTRY		CL_AREA
Tourism topic	TOURISM_TOPIC		CL_TOPIC
Time Period	TIME		
Observation status	OBS_STATUS	Observation	CL_OBS_STATUS

# Example

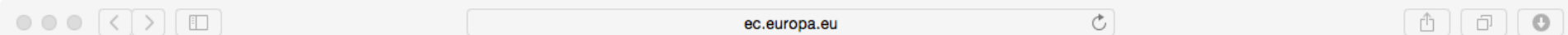
The screenshot displays the Eurostat website interface. At the top, the URL is [ec.europa.eu](http://ec.europa.eu). The main header features the Eurostat logo and the tagline "Your key to European statistics". Navigation links include "Sign In | Register", "Legal notice", "RSS", "Cookies", "Links", "Contact", and a language selector set to "English". A search bar prompts users to "Type a keyword, a code, a title...".

The main content area is divided into several sections:

- News:** Features a "LATEST NEWS RELEASES" section with a headline "Euro area unemployment rate at 11.0%" dated 30/09/2015. The text states: "The euro area (EA19) seasonally-adjusted unemployment rate was 11.0% in August 2015, stable compared to July 2015, and down from 11.5% in August 2014. The EU28 unemployment rate was 9.5% in August 2015, also stable compared to July 2015, and down from 10.1% in August 2014. These figures are... [more](#)". Below this is a "Release calendar" and a link to "See complete list of news releases".
- Data:** Includes links for "Most popular tables", "Complete database", and "Apps & Tools".
- Publications:** Links to "About Eurostat" and "Help".
- Key figures:** A table showing key indicators for 2014 and 2013 for the EU, with a line chart for "Population aged 80 years or older" showing an upward trend from 2004 to 2014. The chart includes data for France (FR), the EU average (EU), and Sweden (SE).
- Looking for information on a specific topic:** A grid of icons representing various statistical categories: General and regional statistics, Economy and finance, Population and social conditions, Industry, trade and services, Agriculture and fisheries, International trade, Transport, Environment and energy, and Science and technology.
- Statistics explained - Encyclopedia of EU statistics:** A section titled "Environmental accounts - establishing the links between the environment and the economy" updated on 01/10/2015.
- Recent publications:** A section for "Focus on" with a corresponding graphic.

# Example:

[http://ec.europa.eu/eurostat/cache/metadata/en/tour\\_occ\\_esms.htm](http://ec.europa.eu/eurostat/cache/metadata/en/tour_occ_esms.htm)



eurostat 

## Capacity and occupancy of tourist accomodation establishments

Reference Metadata in Euro SDMX Metadata Structure (ESMS)

Compiling agency: Eurostat, the statistical office of the European Union

### Eurostat metadata

#### Reference metadata

- [1. Contact](#)
  - [2. Metadata update](#)
  - [3. Statistical presentation](#)
  - [4. Unit of measure](#)
  - [5. Reference Period](#)
  - [6. Institutional Mandate](#)
  - [7. Confidentiality](#)
  - [8. Release policy](#)
  - [9. Frequency of dissemination](#)
  - [10. Dissemination format](#)
  - [11. Accessibility of documentation](#)
  - [12. Quality management](#)
  - [13. Relevance](#)
  - [14. Accuracy](#)
  - [15. Timeliness and punctuality](#)
  - [16. Comparability](#)
  - [17. Coherence](#)
  - [18. Cost and Burden](#)
  - [19. Data revision](#)
  - [20. Statistical processing](#)
  - [21. Comment](#)
- [Related Metadata](#)
- [Annexes](#) (including footnotes)

### National metadata

#### National reference metadata

National metadata produced by countries and released by Eurostat

<a href="#">Belgium</a>	<a href="#">Bulgaria</a>	<a href="#">Czech Republic</a>	<a href="#">Denmark</a>
<a href="#">Germany</a>	<a href="#">Estonia</a>	<a href="#">Ireland</a>	<a href="#">Spain</a>
<a href="#">France</a>	<a href="#">Croatia</a>	<a href="#">Italy</a>	<a href="#">Latvia</a>
<a href="#">Lithuania</a>	<a href="#">Luxembourg</a>	<a href="#">Hungary</a>	<a href="#">Malta</a>
<a href="#">Netherlands</a>	<a href="#">Austria</a>	<a href="#">Poland</a>	<a href="#">Romania</a>
<a href="#">Slovenia</a>	<a href="#">Slovakia</a>	<a href="#">Finland</a>	<a href="#">Liechtenstein</a>
<a href="#">Switzerland</a>	<a href="#">Serbia</a>		

For any question on data and metadata, please contact: [EUROPEAN STATISTICAL DATA SUPPORT](#)

[Download](#)

# *SDMX Data exchange*

- \* The SDMX data exchange includes data exchange formats to establish interoperability. For this purpose, SDMX identifies three basic process patterns – bilateral, gateway and data sharing – and two models – push and pull – for sharing statistical data and metadata.
- \* A data sharing architecture often contains a SDMX registry, which is local structured repertory of data sets and metadata available from the available data sources

# SDMX Exchange

- \* Global Registry: each local registry is connected with a Global Registry, which is a central repository or central point Yellow pages for the access of organizations using SDMX, developed in the cloud to be easily accessible by the SDMX community.

# SDMX exchange – data sharing

The business vision for *SDMX* envisages a "data sharing" model to facilitate data and metadata exchange.

The *SDMX* Registry is tasked with providing structure, organisation, and maintenance and query interfaces for most of the *SDMX* components required to support the data sharing vision.

The "data sharing" model is based on the possibility of discovering easily where data and metadata are available and how to access them.

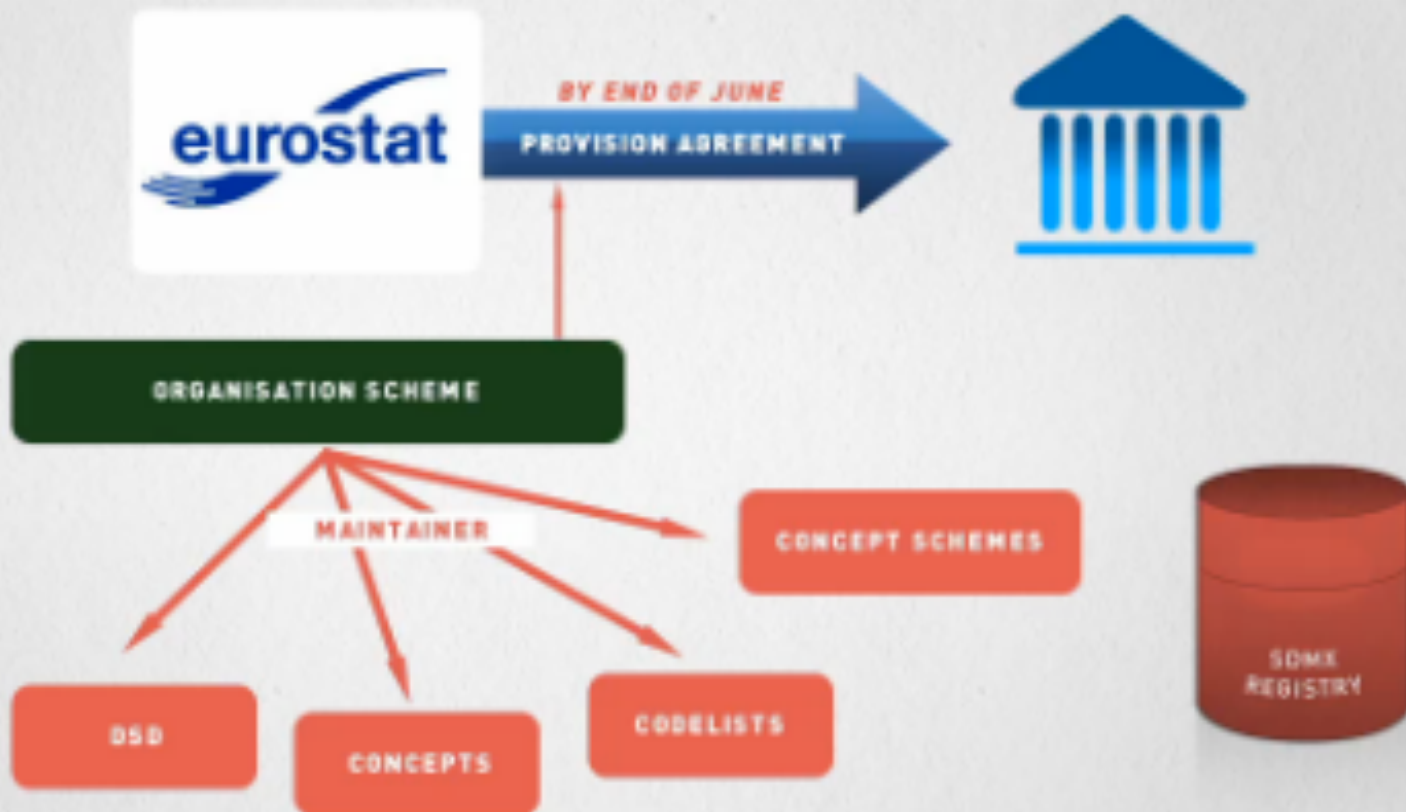
# SDMX exchange – data sharing

The SDMX Registry plays an important role in this architecture, in fact it can be seen as a central application which is accessible to other programs over the Internet (or an Intranet or Extranet) to provide information needed to facilitate the reporting, collection and dissemination of statistics.

In its broad terms, the SDMX Registry – as understood in web services terminology – is an application which stores metadata for querying, and which can be used by any other application in the network with sufficient access privileges.

# SDMX Data exchange

## DESCRIBING THE DATA EXCHANGE



# *SDMX Data exchange*

HOW TO GET THERE?

PREPARATION



COMPLIANCE



IMPLEMENTATION



PRODUCTION



# *SDMX Data exchange*

## DID WE ACHIEVE WHAT WE WANT?



- › Described data and the exchange process



- › Automated processes



- › Commonly available tools and web services
- › Corporate benefits through standardisation

A common

# European Statistical System