FROM BIG COPERNICUS DATA TO BIG INFORMATION AND BIG KNOWLEDGE: THE COPERNICUS APP LAB PROJECT
Copernicus App Lab
Linked Data Technologies

Linked Open Data
SPARQL endpoints
Motivation

- Lots of Earth Observation (EO) data has been made freely available recently in Europe and the United States.

- Europe is a pioneer in this area with its flagship Earth Observation Programme Copernicus.
Copernicus Services

- **Copernicus Services** transform the wealth of satellite and in-situ Copernicus data into *value-added products* by processing and analysing the data.

- There are six Copernicus services covering the following thematic areas: **Atmosphere, Marine, Land, Climate, Emergency** and **Security**.
Copernicus App Lab - Technical Pillars

- Provision of Copernicus linked open data via a cloud infrastructure
- Tools for semantic linkage of Copernicus data with other societal or business information
- Improved data access via a streaming data library
Why Linked Data?

The vision of linked data is to go from a Web of documents to a Web of data:

- Unlock data dormant in their silos
- Make it available on the Web
- Interlink it with other data

This is especially useful for Earth Observation data.
Copernicus Data as Linked Data

• Make Copernicus data more **easily discoverable by search engines** by using technologies such as **schema.org** for encoding the metadata. schema.org is now used by all major search engines.

• Once datasets are transformed into linked data (e.g., the CORINE land cover dataset), we can **interlink** them with other open linked data sources (e.g., GADM, OpenStreetMap or DBpedia data) to build **geo-knowledge graphs**.

• Enable **semantics-based querying** and **visualization** of these graphs.

• This works for **static** but also **dynamic (frequently changing) datasets**.

• **Therefore: enable easier utilization** e.g., by software developers who may not be specialists in Earth Observation.
Linked Data Benefits

• More and more datasets are becoming available as linked data everyday (1163 datasets in LOD cloud today, 570 datasets in LOD cloud in 2014)
• Easy to combine different data sources without the need to integrate them
• Dereferenced URIs are used to identify things and expose them on the Web as resources
• Easy to build services/applications
Linked Open Data Cloud

Legend

- Cross Domain
- Geography
- Government
- Life Sciences
- Linguistics
- Media
- Publications
- Social Networking
- User Generated

- Incoming Links
- Outgoing Links
Linked Data Technologies
# Building Apps with Linked Data

## Approach without Copernicus App Lab Tools
- Download all datasets from their respective repositories
- Understand the data
- Make conversions to comply with standards
- Align data from different datasets to be able to combine the information (interlinking process)
- Store the transformed data using a new model
- Consume data
- Analyse data
- Visualisation

## Approach with OPeNDAP only
- View metadata to understand the data
- Consume data
- Make conversions to comply with standards
- Align data from different datasets to be able to combine the information (interlinking process)
- Analyse data
- Visualisation

## Approach with all Copernicus App Lab Tools
- View metadata to understand the data
- Consume data
- Analyse data
- Visualisation
Demo Use Case - LAI in Paris