



Data-Driven Innovation. A European Perspective

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Vrdnik, 18/09/2019



Context

The **Digital Transformation** happening ...
Effects are still to be fully understood

Europe fit for the digital age

- o Achieve technological sovereignty
- o Jointly define standards for new generation of technologies that will become the global norm.
- o Coordinated approach on the human and ethical implications of Artificial Intelligence
- o **Digital Education** Action Plan
- o Use big data for innovations that create wealth for our societies and our businesses

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Structure

1. Data sources

- Open data portals
- INSPIRE
- Copernicus

2. Data sharing

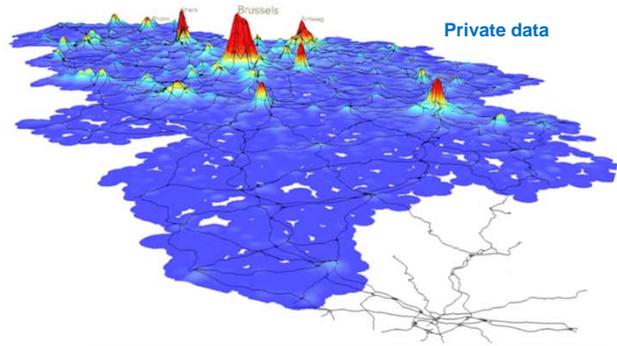
- Standards
- APIs

3. Data utilisation

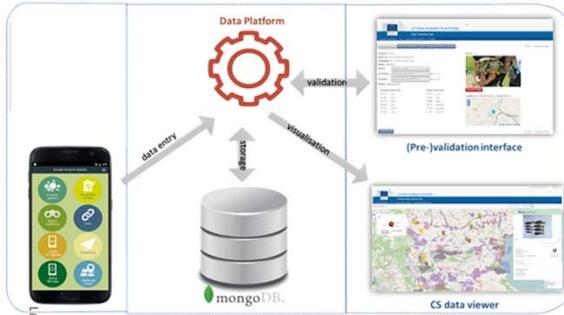


New data sources 1/2

- A multitude of sources
- Real time
- High precision
- Personalised

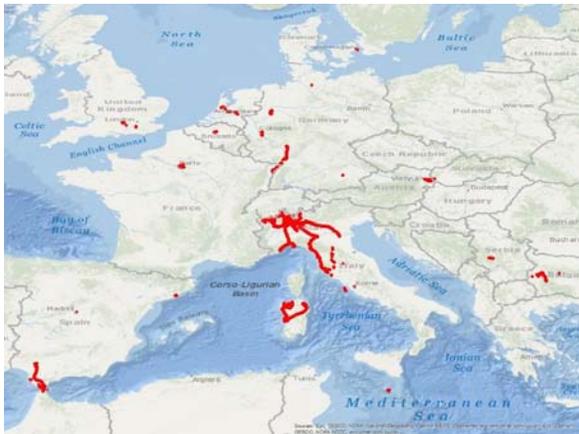


Citizen science



Sensors

New data sources 2/2



Role of the public sector?



1. Quality assurance

- Validation
- Certification

2. Coordinator of data sharing arrangements

- Technical
- Legal
- Organisational

3. Collaborate *versus* compete

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European open data portals

The image displays three screenshots of European open data portals. The left screenshot shows the 'EU Open Data Portal' with search filters and a list of datasets. The middle screenshot shows the 'EU Open Data Portal' with search results and a list of datasets. The right screenshot shows the 'Joint Research Centre Data Catalogue' with search filters and a list of datasets.

INSPIRE Geoportal

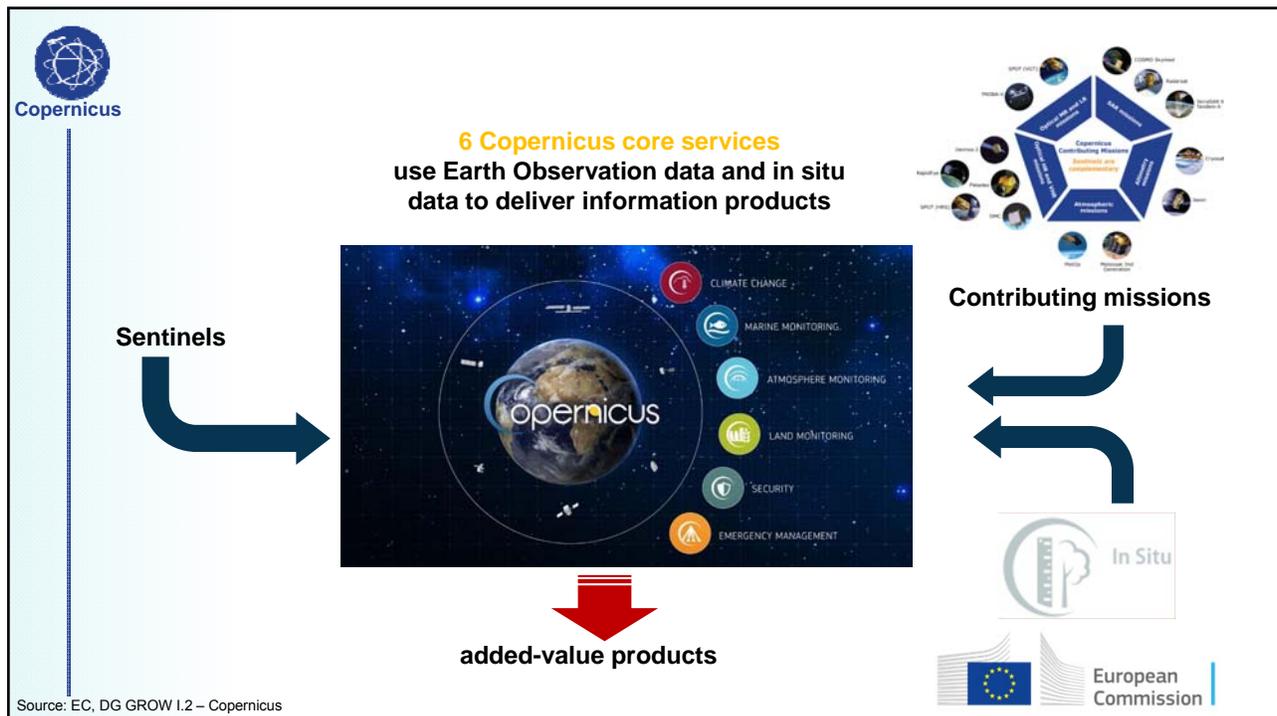
INSPIRE Geoportal Data Set Statistics

- 144713 Metadata records
- 25109 Downloadable Data Sets

Select a COUNTRY

Austria	548 418 463	Finland	554 41 156	Latvia	139 10 20	Ro	
Belgium	599 262 277	France	40027 12588 14736	Liechtenstein	60 10 12	Ro	
Bulgaria	169 4 3	Germany	28832 10666 10656	Lithuania	81 56 12	Slo	
Croatia	112 7 8	Greece	57 2 57	Luxembourg	217 192 163	Slo	
Cyprus	42 3 3	Hungary	112 9 7	Malta	157 136 152	Sp	
Czech Republic	148 37 93	Iceland	147 7 0	Netherlands	204 123 133	Sw	
Denmark	224 39 33	Ireland	50 0 0	Norway	167 42 13	Sw	
Estonia	75 14 23	Italy	20523 7 209	Poland	28856 41 8	Un	

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



Access to Copernicus Data

- Full, free and open access

<http://copernicus.eu/data-access>

1. Access Hubs: <https://www.copernicus.eu/en/access-data/conventional-data-access-hubs>

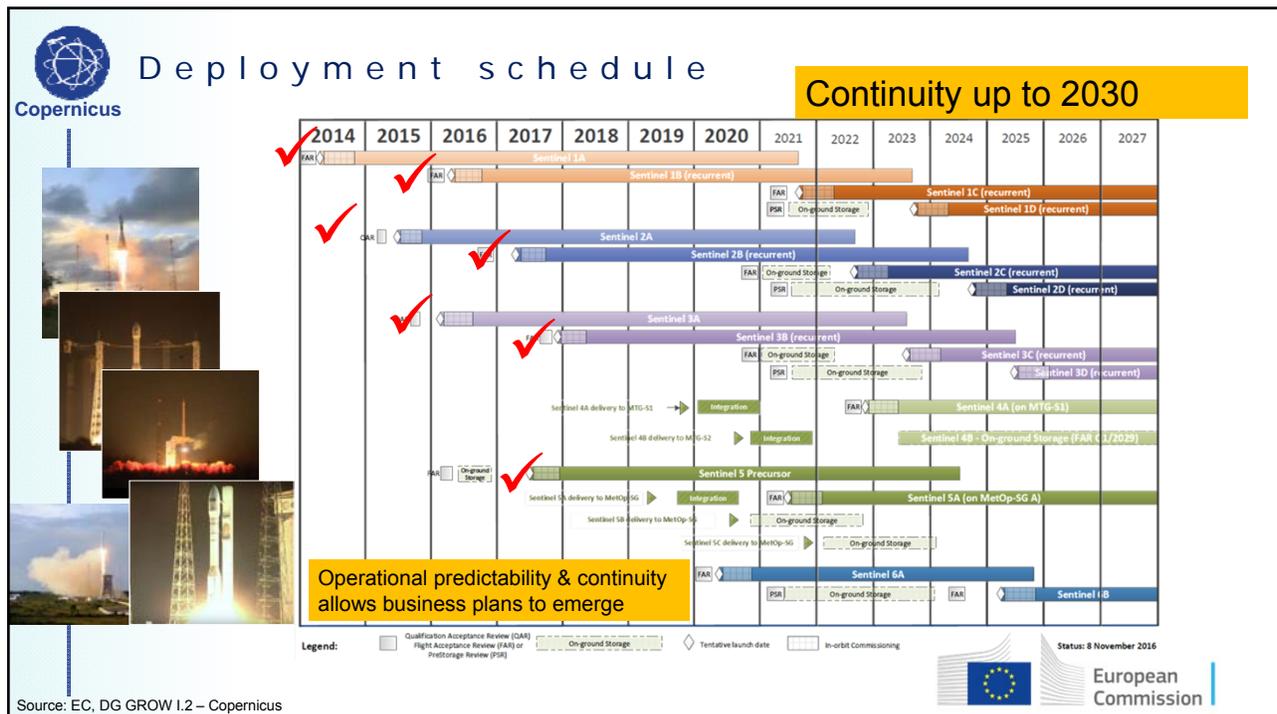
- Sentinel Data: <https://scihub.copernicus.eu/>
- Services data and information : land, atmosphere, emergency, marine, climate and security
- + <https://services-portfolios.copernicus.eu>

2. Data and Information Access Services (DIAS): 5 cloud-based platforms to facilitate integration of Copernicus data and info without the need to download or invest in heavy processing and storage facilities

<https://www.copernicus.eu/en/access-data/dias>

Comparison functionalities 5 DIAS: <https://www.youtube.com/watch?v=cvP2xqiMOh4>

Source: EC, DG GROW I.2 – Copernicus



EuroGEOSS - the European component to the GEOSS

- Under the Group on Earth Observations (GEO)
- Copernicus as major component
- Focus on:
 - Sustainable Development Goals,
 - GEO Societal Benefit Areas
 - GEO priorities in a European context
- Application oriented
- Based on existing elements (umbrella)
- Integrate scattered efforts:
 - Horizon 2020,
 - Copernicus,
 - ESA,
 - national initiatives, ...
- Improving user uptake of the GEOSS assets
- Leverage and make European EO assets visible internationally



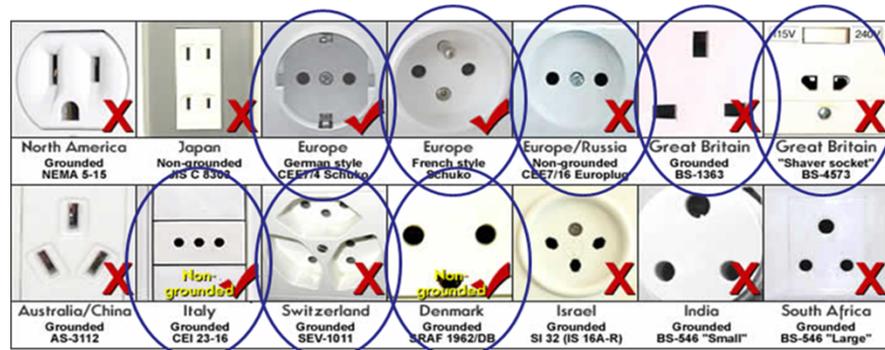
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2. Data Sharing

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Standardisation

- Open data alone is not enough
- We need standards that are:
 - Mature
 - Supported by tools
 - Implemented



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Standardisation 2.0

- **OGC API - Features and OGC SensorThings API**
 - Openness
 - Agility
 - Implementations first
 - Exhaustiveness versus Simplicity
- **Tools**
 - GitHub
 - Hackathons/codesprints

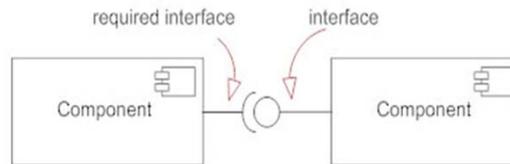


Application Programming Interfaces

I need energy!



I need data!



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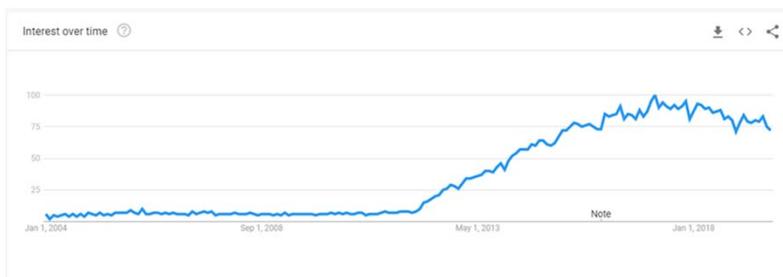
Application Programming Interfaces

1. APIs are new and old!

DATA STRUCTURES FOR COMPUTER GRAPHICS
Data structures and techniques for remote computer graphics. 533 I. Colton,
F. S. Greston, Jr.

2. An API may be:

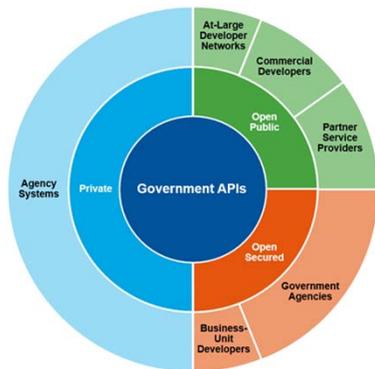
- web backends
- software libraries
- operating systems
- database systems
- hardware



AFIPS
CONFERENCE
PROCEEDINGS
VOLUME 33
PART ONE
1968
FALL JOINT
COMPUTER
CONFERENCE
December 9-11, 1968
San Francisco, California

APIs in the context of government innovation

GovAPI



Source: Gartner (December 2017)

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- **API is a connector** that enables machine to machine communication
- **API solutions can facilitate government interactions:**
 internal (G2G)
 external (G2G, G2C, C2G, G2B, B2G, B2B)

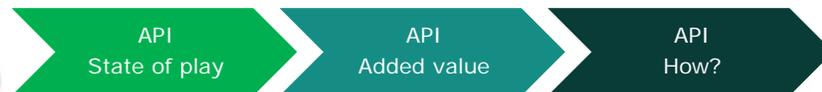


APIs4DGov

1. Why governments should invest resources in setting up an API ecosystem?
2. Which government actions should be taken in developing government APIs?



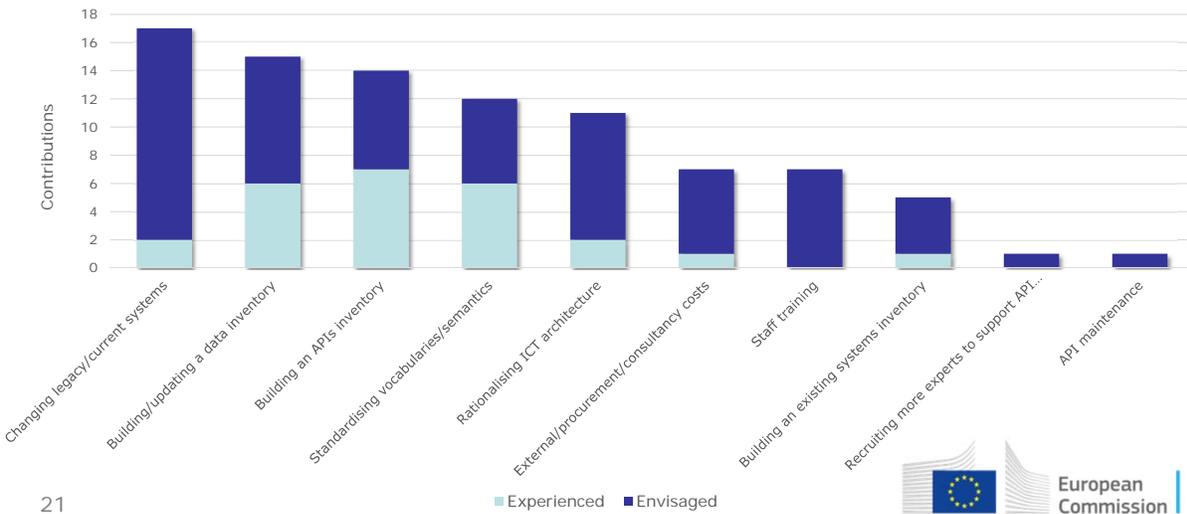
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- **Definitions**
- **Policy links**
- Assess digital government **APIs landscape, opportunities, current trends and horizons**
- Identify the **key enablers, drivers, barriers, potential risks and mitigates**
- Identify **socio-economic impacts** of data sharing, data-driven government services and APIs
- Identify relevant **ICT standards and specifications**, select **best practices** and develop **recommendations**
- Provide a set of **policy recommendations** and propose **domains and thematic areas** to focus on

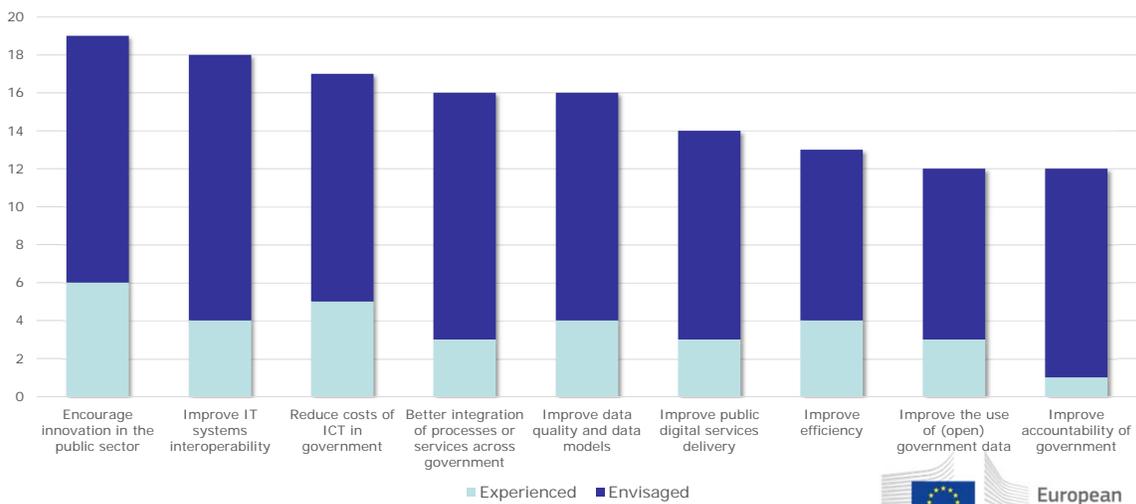


Main costs



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Main benefits



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Data utilisation: Sentinel-2 and INSPIRE

11 L1C Sentinel-2
11 L2A images
4 bands

Input SDI data:

1	low-density vegetation
2	grassland
3	cropland
4	built-up
5	forest
6	other
7	water
8	remaining classes

European Commission

Data utilisation: Sentinel-2 and INSPIRE

Convolutional Encoder-Decoder

Pooling Indices

Legend:

- Conv + Batch Normalisation + ReLU
- Pooling
- Upsampling
- Softmax

Logos: Copernicus, INSPIRE, JEO-lab, JEO-desk, JEO-batch, Keras, theano, ANACONDA, Pandas, TensorFlow, NumPy, Kaggle, learn, python

Thank you!

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Questions?

Inspire Helsinki 2019

22–24 October, Finland



- Organised by the Finnish National Land Survey and Ministry of Agriculture and Forestry & supported by the JRC of the European Commission and Spatineo.
- A technical event focused on **new technologies** for geospatial data:
 - keynote presentations
 - hands-on workshops
 - data challenges
 - team registration open until **September 8, 2019**
 - **prizes and benefits** worth more than 20'000€!

27 <https://www.inspire-helsinki-2019.fi>



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Let's make the most out of INSPIRE!

Figure out ways to improve how data is being delivered and encoded in particular use cases (e.g. building a cross-border dataset, or using a specific dataset in a particular software product).

[Learn more](#)

- Join us in Helsinki
 - **Address one of the 4 challenges**
 - **Awards :)**
 - **Possible follow-up**

<https://www.inspire-helsinki-2019.fi>

