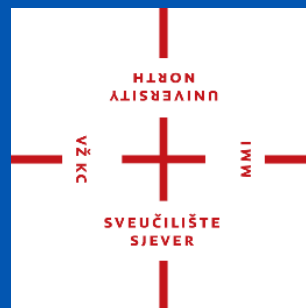




Quo vadis INSPIRE?

Prof. dr. sc. Vlado Ceti

University North
Varaždin, Croatia

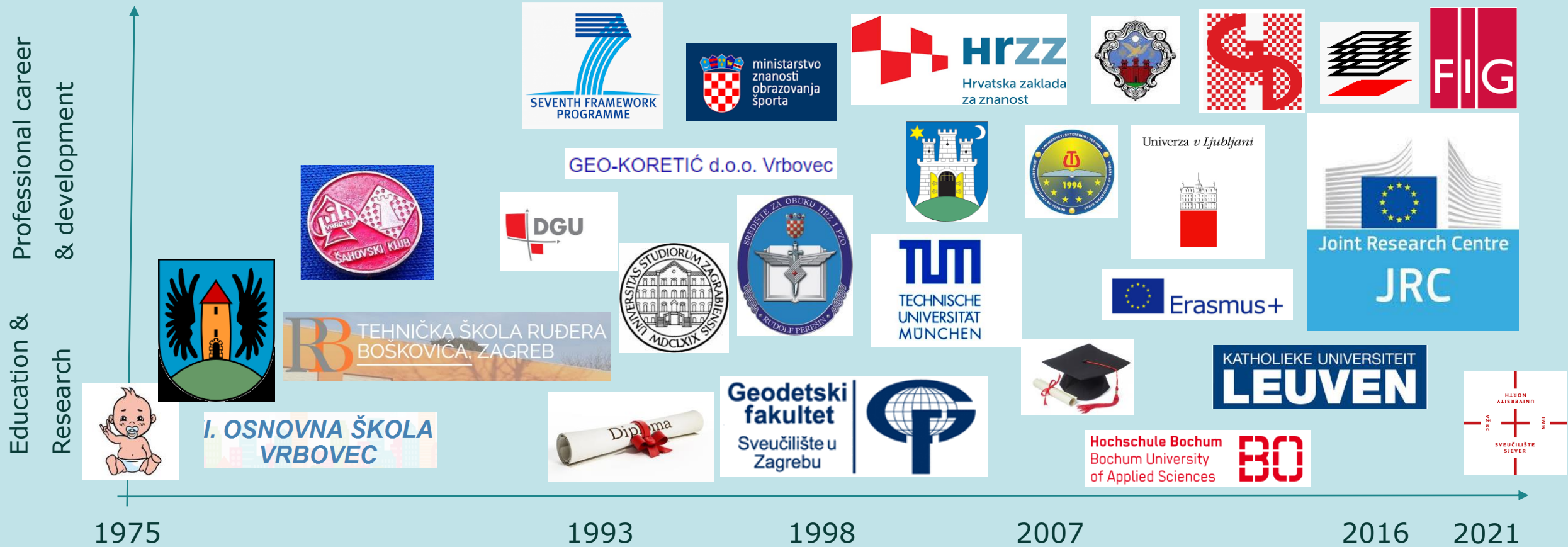


2021-12-10



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About me...



The Evolution of Europe's SDIs

- Where do we stand with SDIs in Europe
- Perspectives for the future
 - 1) Technological
 - 2) Organisational
 - 3) Legal

Kotsev, A., Minghini, M., Tomas, R., Cetl, V., & Lutz, M. (2020). From Spatial Data Infrastructures to Data Spaces—A Technological Perspective on the Evolution of European SDIs. *ISPRS International Journal of Geo-Information*, 9(3), 176.



JRC Science for Policy Report October, 2021



JRC SCIENCE FOR POLICY REPORT

INSPIRE • A Public Sector Contribution to the European Green Deal Data Space

*A vision for the technological evolution of Europe's
Spatial Data Infrastructures for 2030*

*Alexander Kotsev, Marco Minghini, Vlado Cetl,
Friso Penninga, Joeri Robbrecht, Michael Lutz*

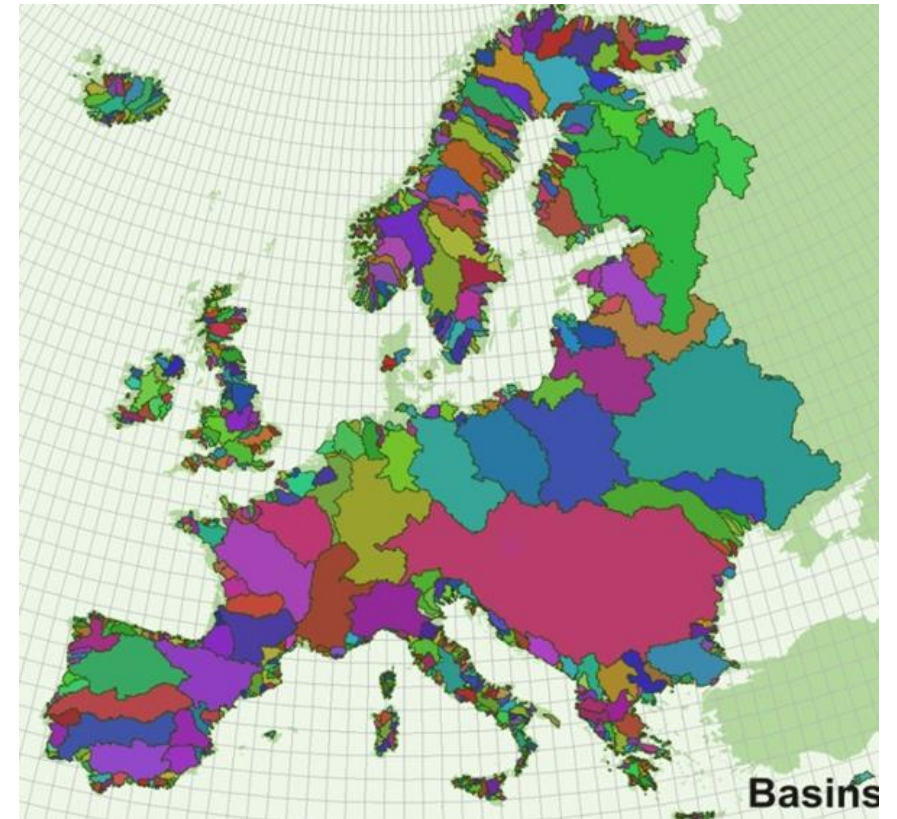
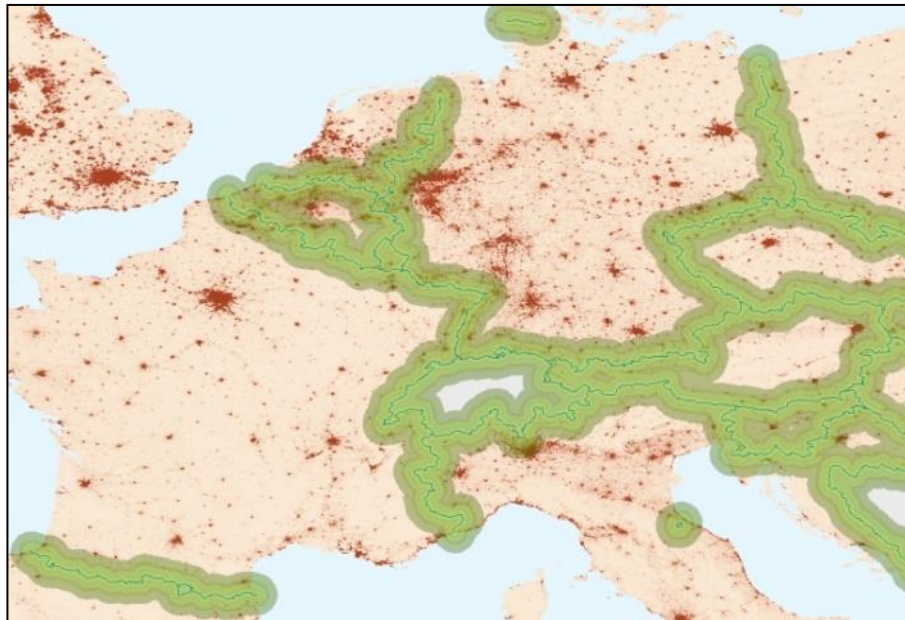
[https://publications.jrc.ec.europa.eu
/repository/handle/JRC126319](https://publications.jrc.ec.europa.eu/repository/handle/JRC126319)

Context

- The EU INSPIRE Directive is 14 years old (now formally a teenager)
- Deadlines for full implementation are in the end of 2021
- New European Commission
 - Ambitious digital and environmental agendas
- Rapid changes in the technological landscape
- Excellent opportunity to look into
 - Where are we and what has changed in the past years?
 - What are our outstanding challenges?
 - Where to go?

Why Europe needs a spatial data infrastructure (SDI)?

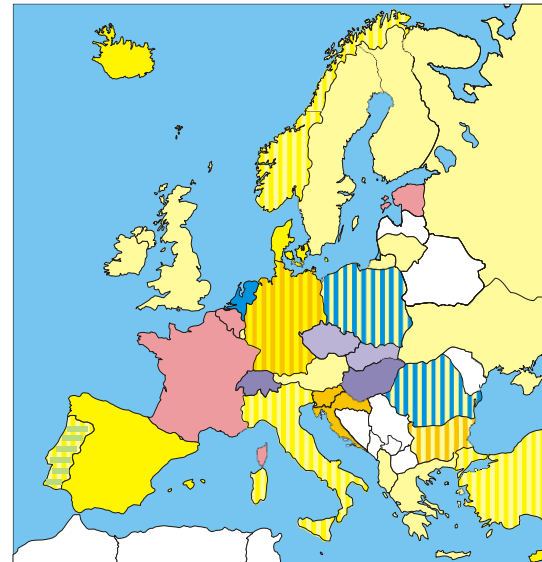
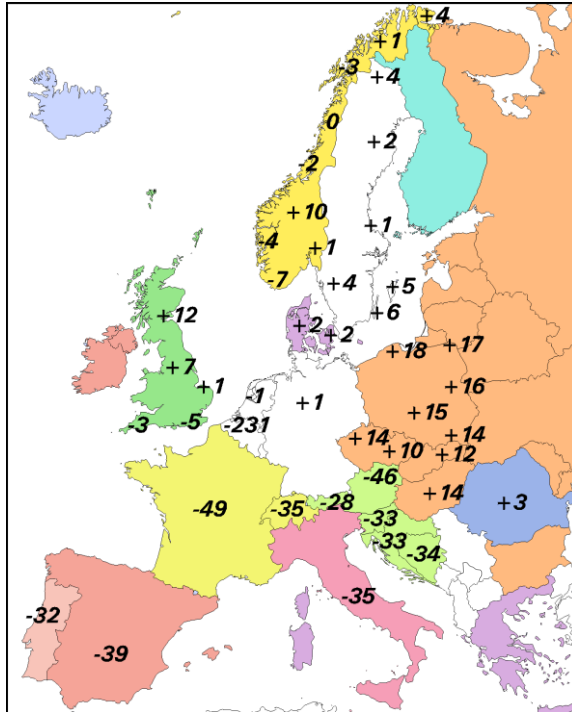
- Natural Disasters and as well as other environmental phenomena do not stop at national borders!
- 20% of the EU citizens (115 million) live within 50 Km from a border



- 70% of all fresh water bodies in Europe are part of a trans-boundary river basin

Building a European SDI is complex

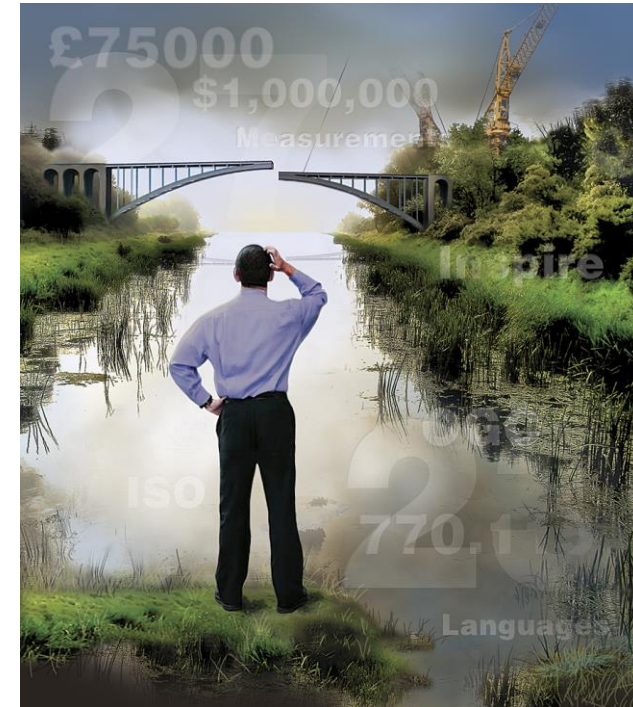
- Europe is a patchwork of several countries with different traditions, cultures and socio-economic models



- Lambert Conformal Conic
- Oblique Conformal Conic
- Oblique Conformal Cylindric
- Oblique Stereographic
- Transverse Mercator
- Transverse Mercator (Gauss-Krüger-System)
- Transverse Mercator (UTM)
- Bonne

Various
Map
projections

- This is reflected in the different ways in which geo-spatial data is managed



The INSPIRE Directive (2007)

Objective: create a European Union spatial data infrastructure to enable the sharing of environmental spatial information among public sector organisations, facilitate public access to spatial information across Europe and assist in policy-making across boundaries.

Rules

- Builds on existing Spatial Data Infrastructures
- Spatial data held by/on behalf of public authorities
- Does not require collection of new data
- Framework Directive with detailed implementing provisions in Implementing Rules

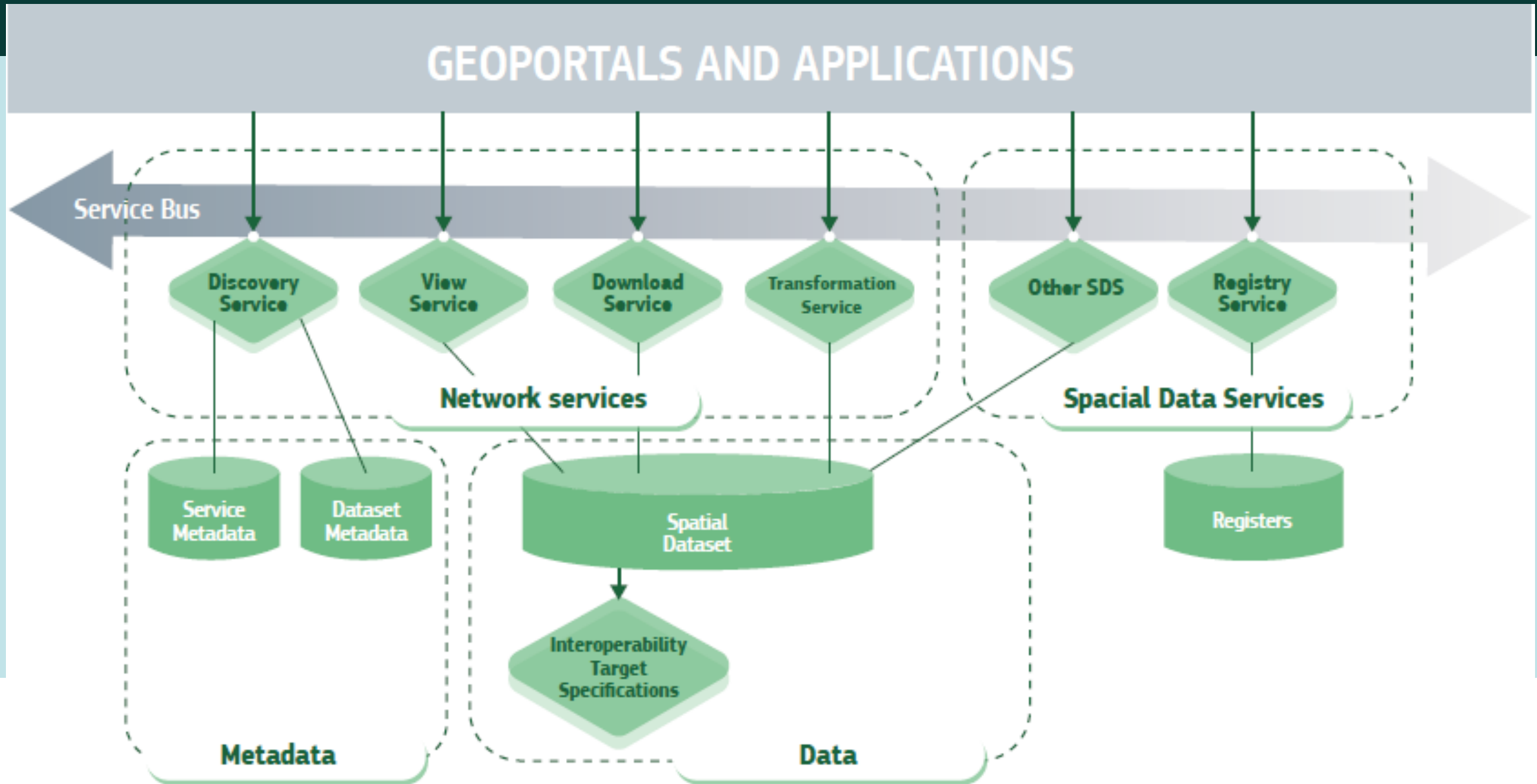
Implementation

- Defines 34 spatial data themes that are in scope
- Requires Member States to
 - transpose the Directive
 - set up a national coordination structure
 - identify relevant spatial data
 - document identified data
 - publish data and metadata for download, view and reuse
 - make data interoperable

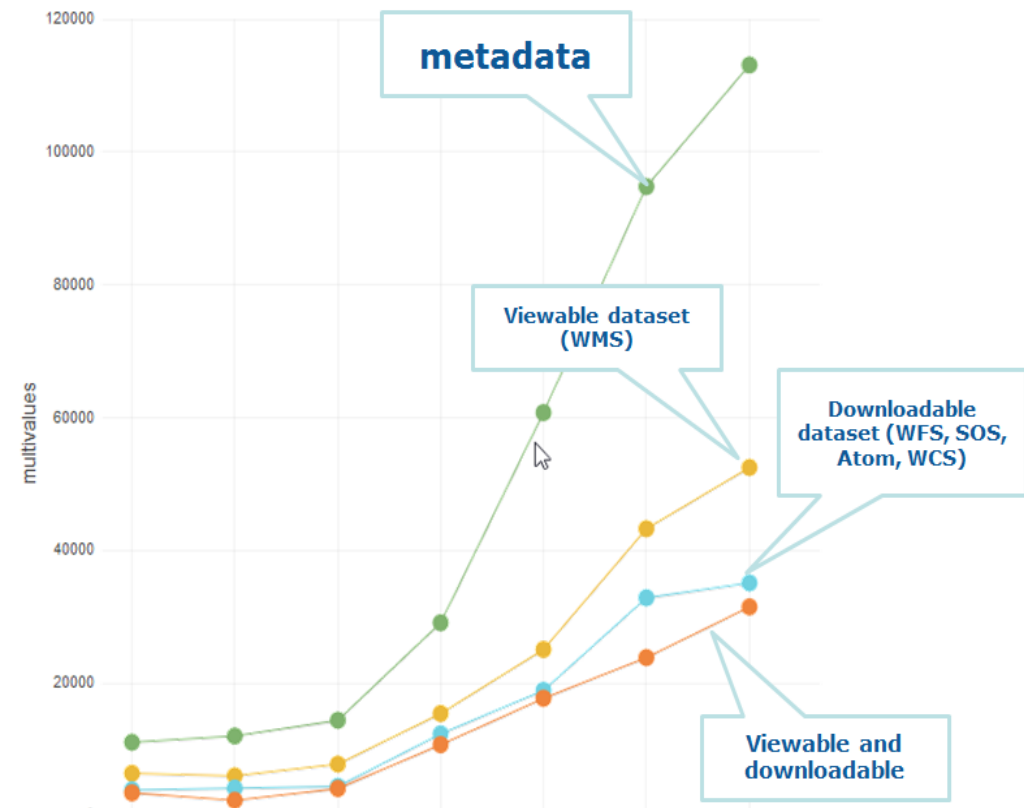
Monitoring & Reporting

- Monitoring data is harvested from 35 online catalogs in the Member States and indicators are automatically calculated on a yearly basis.
- Reporting consist of yearly updating an online country fiche.

INSPIRE now



Where do we stand with INSPIRE?

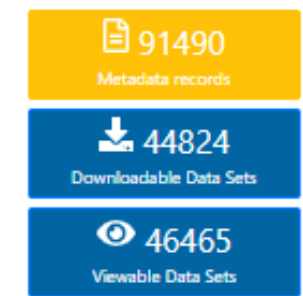


<https://inspire-geoportal.ec.europa.eu/>

INSPIRE Data Sets - EU & EFTA Country overview



INSPIRE Geoportal Data Set Statistics



Spatial scope coverage: National Regional

Select a COUNTRY

Austria	630 410 493	Finland	626 95 235	Latvia	167 101 100	Portugal	609 438 490
Belgium	584 370 480	France	218 75 17	Liechtenstein	69 10 12	Romania	103 35 38
Bulgaria	263 97 99	Germany	65,393 41,149 42,184	Lithuania	132 126 59	Slovakia	339 85 92
Croatia	144 11 29	Greece	59 59 59	Luxembourg	306 267 257	Slovenia	91 14 46
Cyprus	42 32 34	Hungary	121 23 20	Malta	150 149 150	Spain	246 136 169
Czech Republic	144 56 86	Iceland	147 7 0	Netherlands	208 110 138	Sweden	243 104 216
Denmark	207 113 99	Ireland	76 0 0	Norway	161 71 28	Switzerland	218 2 4
Estonia	87 42 53	Italy	119544 536 681	Poland	163 111 97		

Select the whole EUROPE

[Download stats](#)

INSPIRE Evaluation



The European
Green Deal

#EUGreenDeal

SHAPING EUROPE'S
DIGITAL FUTURE

The evaluation of the INSPIRE Directive & the links
with the GreenData4All initiative and the broader
green/digital agenda

Preliminary findings of the evaluation

- Overall, the **implementation** of the INSPIRE Directive **has matured** compared to 2014 and has led to an increased availability and better access to spatial data and services. **However, still the implementation is incomplete.**
- While the INSPIRE Directive is **still largely fit for purpose**, the objective of harmonisation and interoperability within the INSPIRE framework entails **technical specificities for standards that are too rigid to be fit-for-the-future** in the context of evolving standards and technologies.
- INSPIRE has **facilitated the work of the stakeholders** in the area of spatial data provision through improved discoverability, availability and accessibility to spatial data. There is a **simplification potential** of the implementation by addressing the requirement for interoperability.

Preliminary findings of the evaluation

- INSPIRE is **legally coherent** with environmental legislation with geospatial reporting obligations and with other relevant areas of EU policy. The INSPIRE Directive has been **designed to be consistent with the EU legal framework on data/information sharing and dissemination** and can **support implementation of Public Access to Environmental Information Directive** (managed by unit E4) and the Open Data Directive. Synergies between the three Directives could however be better exploited.
- The **added value** of the Directive mainly consisted of promoting data sharing as a common principle, the establishment of governance structures, achieving interoperability in a broader scope (EU-wide), unlocking public data, improving transparency and creating a pool of EU level expertise. Important EU added value of the Directive can be maintained and further enhanced through its effective positioning in the emerging European data governance landscape and to become one of the key drivers of the upcoming Green Deal data space.

Recommendations

- A number of issues that hamper the full implementation of the Directive have been identified and show the **need for a revision** to make the INSPIRE Directive fully coherent and complementary in support of more recent digital and data legislation.
- Remaining **implementation gaps in Member States need to be closed** to optimise the reuse of spatial data and facilitate its pan-European use.
- **New data sources should be included** (3D, linked data, sensor data, citizen science ...) beyond the current spatial data scope to better address information needs of a larger stakeholder community and to better help meeting the objectives of the European Green Deal.
- The further implementation (data and services availability, accessibility and interoperability) of the INSPIRE Directive should be **user-driven** by a common demand across administrative levels and use cases to improve the EU added value of the infrastructure and its cost-benefit balance.

Lessons learned

- The **legal framework should be technology neutral**. Implementers should have the option and the freedom to deploy cost-effective off-the-shelf tools that apply state of the art technology to share data in a user-friendly way.
- **More work is needed**
 - on standardising data reuse conditions and licensing
 - on increased flexibility of the legal framework to make it future and technology proof
 - on further simplification of the minimal interoperability mechanisms to strike a cost-effectiveness balance.

Revision of the INSPIRE Directive (indicative)

- Politically validated by ENV Director-General Fink-Hooijer / CAB Commissioner Sinkevičius / CAB Vice-President Timmermans
- November 2021 – Publication of the Inception Impact Assessment roadmap for public consultation
- January 2022 – Start Impact Assessment study
- March 2022 – Public consultation
- ...

Bounding conditions

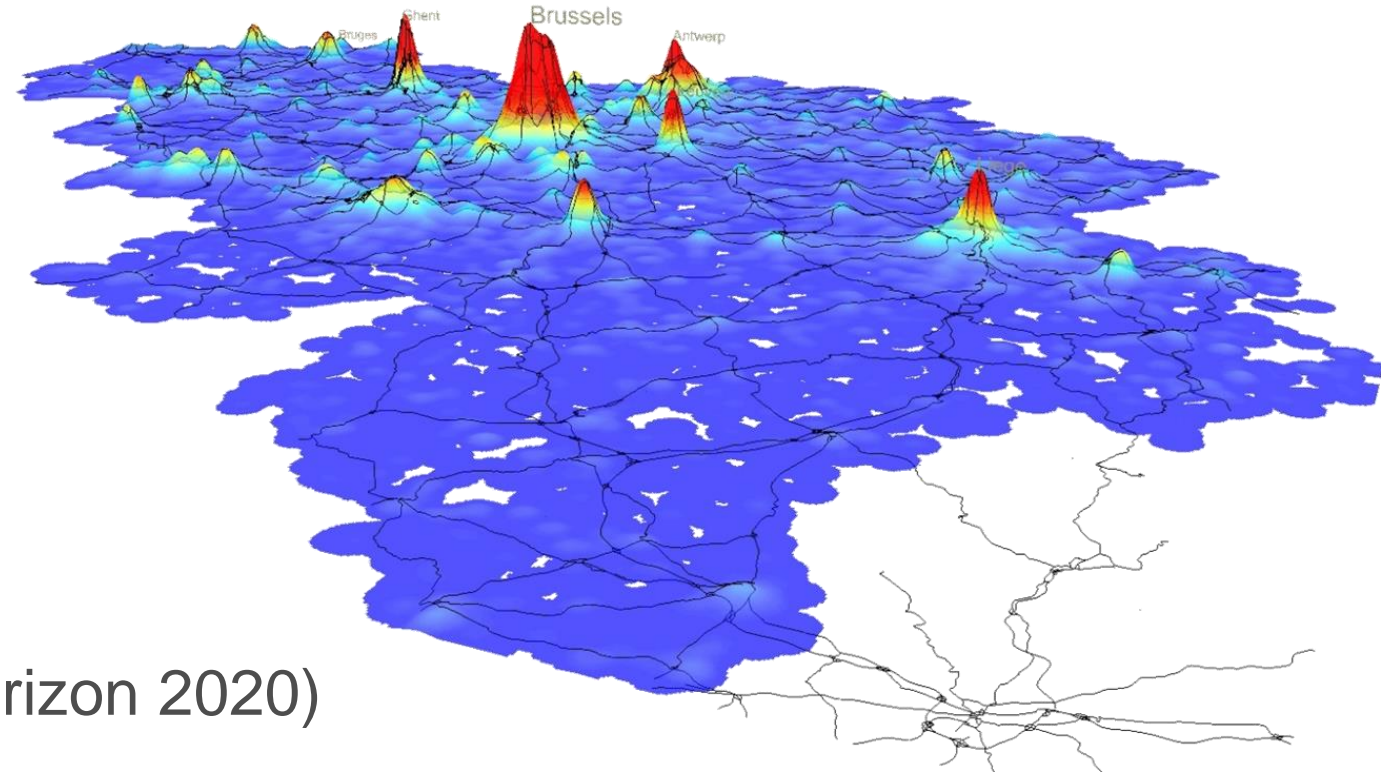


1. Technological perspective. Tools & architectures

- Mature ecosystem of tools
 - More ways of doing the same thing
 - Rich ecosystem of open and proprietary tools
- New approaches
 - Data handling at the edge/fog
 - Event-driven infrastructures (incl. streaming/asynchronous transactions)
 - Virtualisation and cloud computing
 - From data collection to data connection (APIs)

1. Technological perspective. Data availability

- More data available
 - Private sector data
 - Copernicus
 - IoT
 - Citizens (e.g. OpenStreetMap)
 - Open Research Data (FAIR in Horizon 2020)
- Role of the public sector?
 - Less data production
 - More data integration



2. Organisational perspective

1) Who does what in the European context?

- Distributed system
 - 7000+ INSPIRE data providers (tip of an iceberg)
 - Excellence on subnational level
- Emerging agile approaches at multiple levels
 - Hackathons, code sprints

2) Resources for SDI and sustainability of infrastructures

- Many developments are based on projects but projects do end

3) How to modernise/update existing infrastructures

- Technologies changes are fast but procurement and organisational changes are not

4) “Follow the user”

- Sure, but how?

3. Political perspective

- Europe Fit For the Digital Age priority
 - European Strategy for Data, COM(2020)66 final - 19/2/2020
 - Open Data Directive
 - High-Value Datasets
 - Made available through APIs
- European Green Deal priority
 - GreenData4all initiative
 - Destination Earth initiative



3. European Strategy for Data - Principles

Objective: Establish a pan-European single market for data

- Leverage on
 - Sector-specific data spaces that interoperate
 - High-Value Datasets (Open Data Directive)
 - IoT data and edge computing
 - Data on the edge (20 % → 80 %)
 - Reuse personal data (in accordance with GDPR)
 - Contribution of the different actors

3. European Strategy for Data - Principles

Rich pool of data
(varying degree of
accessibility)

Free flow of data
across sectors and
countries

Full respect of GDPR

Horizontal
framework for data
governance and data
access

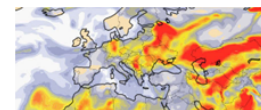


- Technical tools for data pooling and sharing
- Standards & interoperability (technical, semantic)
- Sectoral Data Governance (contracts, licenses, access rights, usage rights)
- IT capacity, including cloud storage, processing and services

Personal data spaces



High-value data sets from the public



sector
e.g. weather,
geospatial,
statistics.



3. European Strategy for Data - Principles

- No rigid ex-ante specifications
- Emphasis on what works well
 - Regulatory sandboxing
 - agile approaches
- All actors collaborate together
 - Different incentives
 - Building trust between actors
- Prominent role of a data steward/integrator

Future outlook



INSPIRE Vision 2030

- Vision: SDIs should become part of data spaces and leverage to a maximum extent on mainstream ICT developments.
- To remain fit for purpose, INSPIRE should support data-driven decision making and innovation to help tackle our societal and environmental challenges, while also contributing to the data economy

INSPIRE Vision 2030

- To ensure compatibility and long-term sustainability, INSPIRE should ideally ‘blend in’ with the broader ecosystem of spatial and non-spatial data, infrastructures, technologies and policies
- Data space
 - *‘A seamless digital area with the scale that will enable the development of new products and services based on data’.* Source: European Commission

Making the vision a reality

1. Technological

- Continue to improve the discoverability and accessibility of data
- Ensure neutrality and embrace well-adopted standards and technologies
- Avoid custom extensions
- Embrace well-documented, standard-based APIs
- Optimise data for search engines
- Leverage on the developments of federated European cloud infrastructures
- Deprecate obsolete technologies and standards

Making the vision a reality

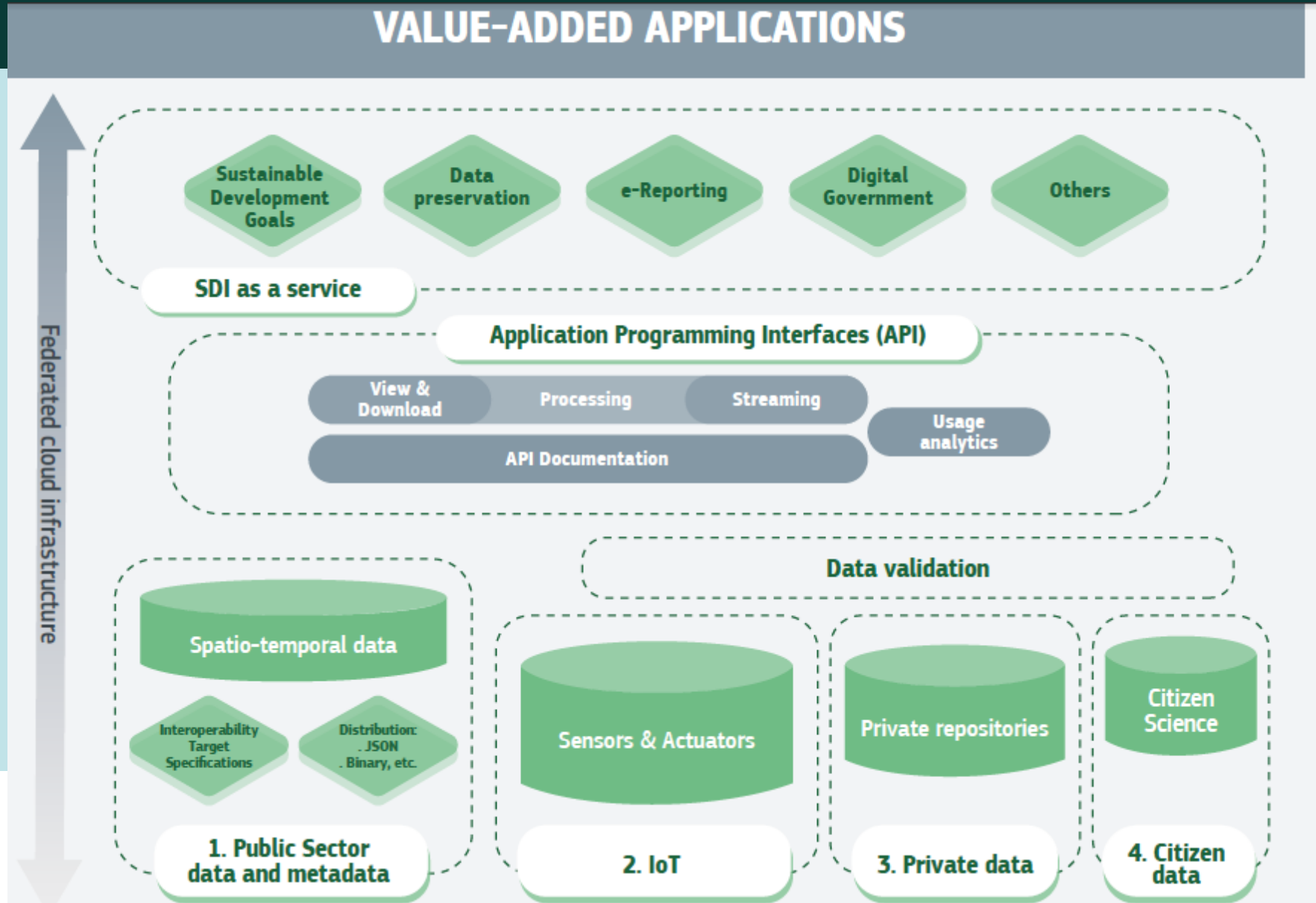
2. Organisational

- Embrace co-design by default
- Rethink the existing INSPIRE governance structures
- Adopt an ecosystem approach

3. Legal

- Avoid overspecification in legislation
- Use a simple licensing framework

INSPIRE 2030





Thank you



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