



A vision for INSPIRE: from a traditional SDI to a self-sustainable data ecosystem

Marco Minghini, Jordi Escriu, Alexander Kotsev

European Commission, Joint Research Centre (JRC)

Florence, 25 August 2022



INSPIRE Directive

DIRECTIVE 2007/2/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 14 March 2007

establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

- Aims to create a **European SDI** to support EU environmental policies aligned with the current **green and digital** policy context.
- Provides a comprehensive framework for **interoperability of spatial data**:
 - **data sharing**
 - data & service discovery (**metadata**)
 - **network services**
- based on the SDIs established and operated by the EU Member States.

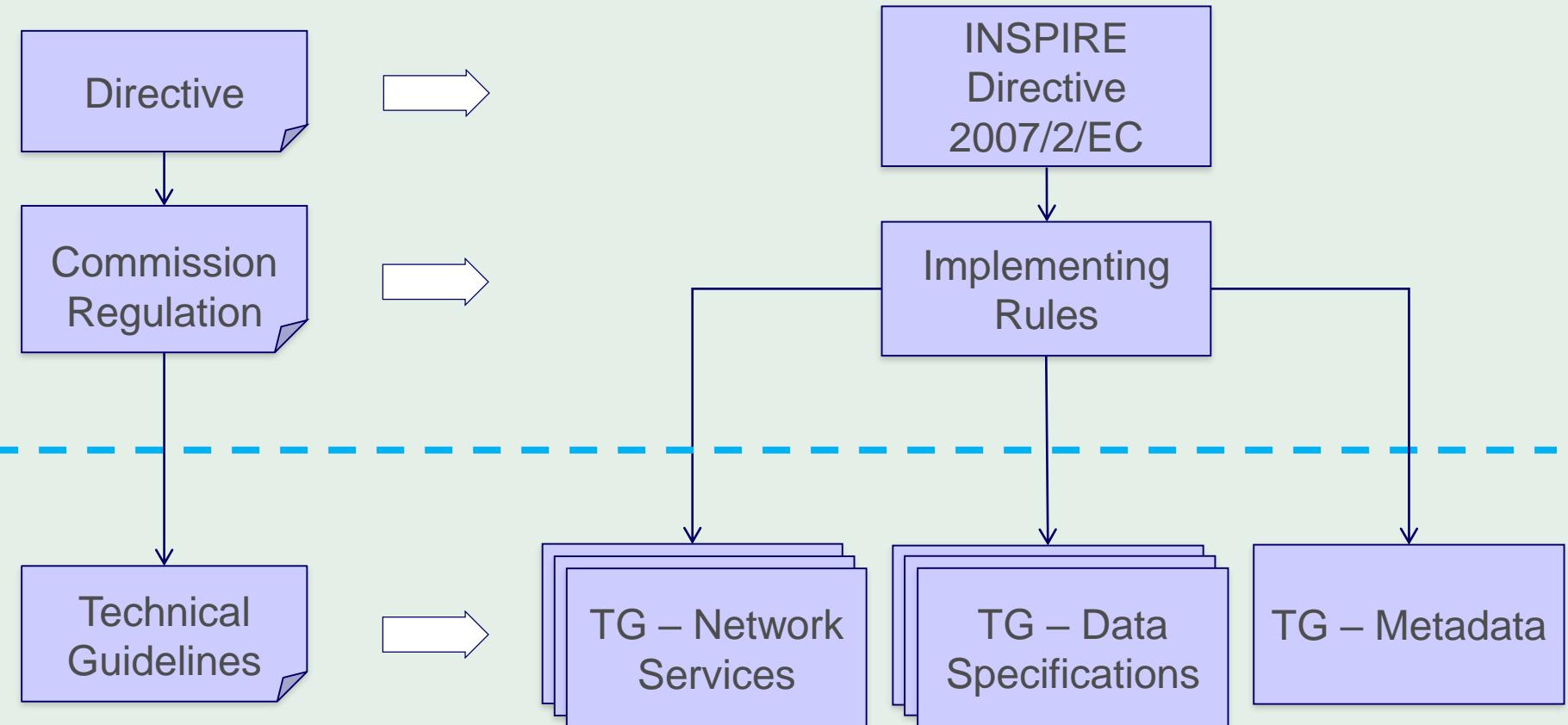
<https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32007L0002>



Implementing Rules & Technical Guidelines

“What Member States must implement”
(abstract specification)
legally binding

not legally binding
“How Member States might implement it”
(implementation specification)



Why are we here today?

- There are multiple reasons for analysing the future of INSPIRE:
 - end of the legally defined roadmap & upcoming revision
 - new EU political context around Green Deal
 - disruptive technological trends around (geo)data sharing
 - ...
- We provide our own (JRC) outlook on how to modernise INSPIRE from the organisational and technological perspectives, by:
 - reflecting on state of play & lessons learnt from 15 years of implementation
 - assessing the political and technological context
 - developing a vision for the future and actions to achieve it
- and the role open source software/OSGeo can play.

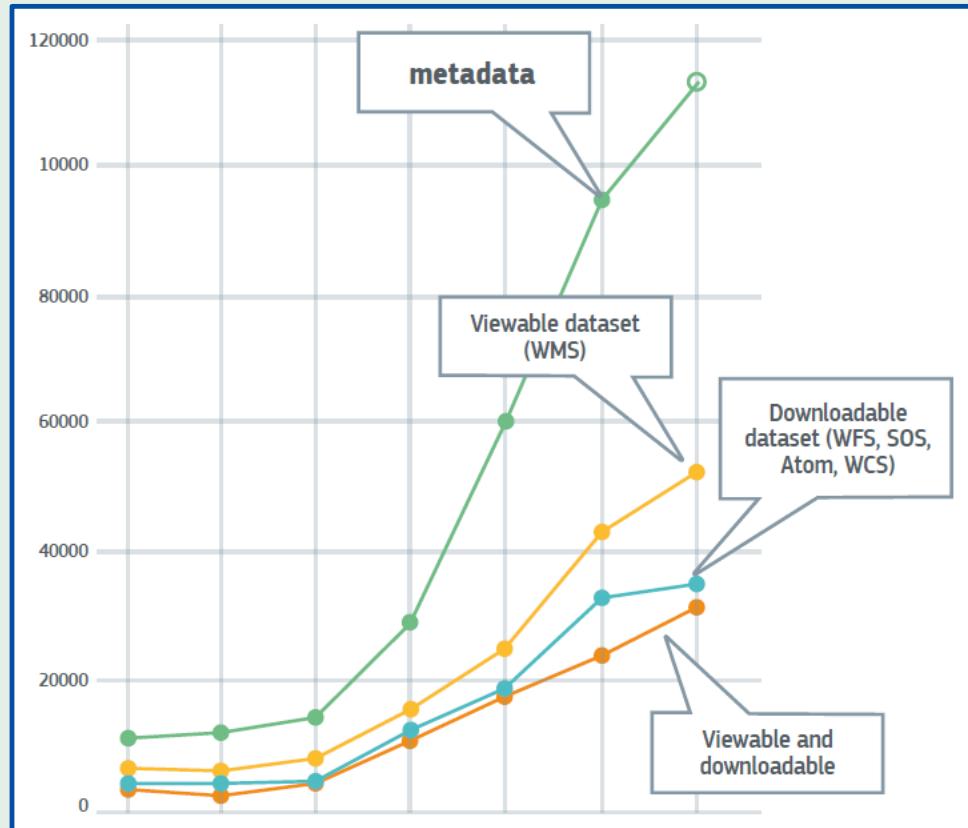


State of play & Lessons learnt

Data availability, accessibility & conformity



- INSPIRE implementation still heterogeneous across Member States
 - no single country has yet reached full implementation!
- The amount of datasets made available through INSPIRE is gradually growing

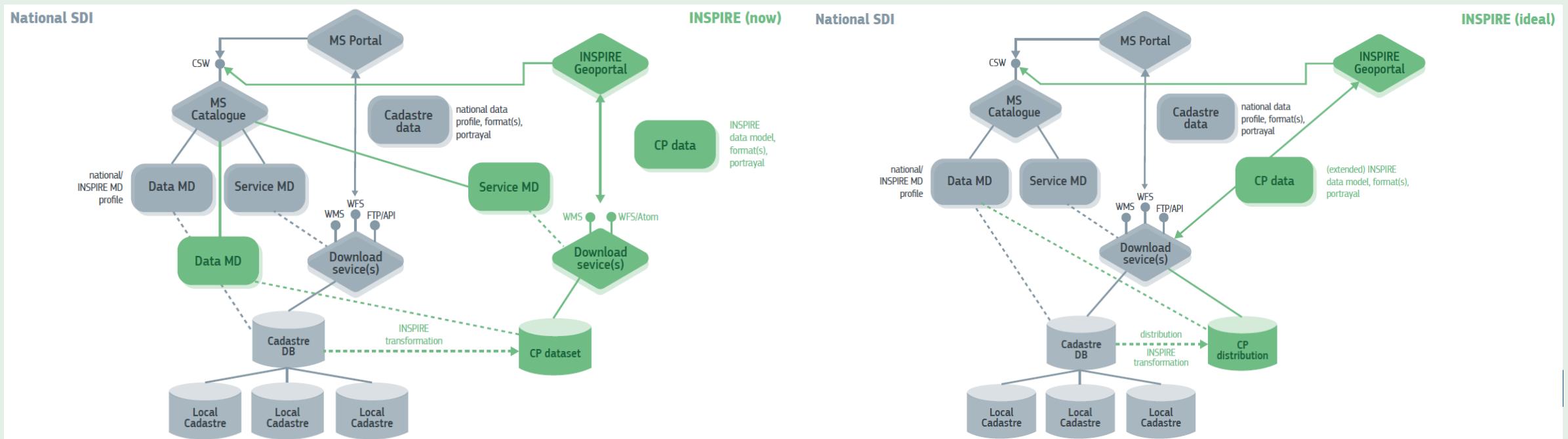


Improved data availability in the INSPIRE infrastructure between 2007 and 2018

Parallel implementations



- Many Member States share only a limited number of datasets within INSPIRE:
 - INSPIRE only marginally linked – instead of being built on top of national SDIs
 - **reasons:** INSPIRE requirements are different than national ones
 - **result:** available data (themes, spatial object types, scale, quality) is heterogeneous across Europe, usability is limited



Flexible governance approaches

- Inclusive and open governance approach since the beginning:
 - broad spectrum of users & implementers
- INSPIRE MIG for organisational, legal and technical matters – but:
 - exclusively represented by data providers
 - not always flexible and fast in accommodating novelties

Flexible governance approaches



- More agile governance approaches would help:
 - community-driven
 - based on online collaborative platforms
- INSPIRE Good Practices
 - a mechanism to introduce new approaches (standards, technologies, etc.) in INSPIRE



Good Practice Library

Good Practice documents

Candidate

[Building one access point to dispersed data sources](#)

[Making spatial data downloadable via WMS services](#)

[GeoPackage encoding of INSPIRE datasets](#)

[Data-Service Linking Simplification](#)

Endorsed

[GeoDCAT-AP](#)

[SDMX for Human Health and Population Distribution](#)

[OGC API – Features as an INSPIRE download service](#)

[OGC SensorThings API as an INSPIRE download service](#)

[OGC compliant INSPIRE Coverage data and service implementation](#)



<https://inspire.ec.europa.eu/portfolio/good-practice-library>



Flexible governance approaches



- More agile governance approaches would help:
 - community-driven
 - based on online collaborative platforms
- INSPIRE Good Practices
 - a mechanism to introduce new approaches (standards, technologies, etc.) in INSPIRE
- Governance of INSPIRE artefacts
 - a governance process to manage changes/updates to INSPIRE TGs, schemas and UML models



uml-models Public
Community for the discussion of change proposals to the INSPIRE UML models.
HTML ⭐ 0 📂 1 ○ 1 🔍 0 Updated 5 days ago

technical-guidelines Public
Community for the discussion of change proposals to the INSPIRE Technical Guidance documents.
HTML ⭐ 3 📂 11 ○ 13 🔍 1 Updated 5 days ago

application-schemas Public
Community for the discussion of change proposals to the INSPIRE XML schemas.
⭐ 6 📂 8 ○ 9 🔍 2 Updated 14 days ago



<https://github.com/INSPIRE-MIF>



Technological stack



- INSPIRE (legal framework) as a catalyst for technological innovation:
 - central components based on reusable, open source software solutions


European Commission
EU English

European Commission > INSPIRE > INSPIRE Geoportal > HOME

ENHANCING ACCESS TO EUROPEAN SPATIAL DATA

INSPIRE GEOPORTAL

Home High-Value Datasets Thematic Data Harvesting status Find out more about

INSPIRE Datasets - EU & EFTA Country overview



Hover over a country

Leaflet | Credits: © OpenStreetMap contributors | EC-GISCO, © EuroGeographics for the administrative boundaries (disclaimer) | [View full map](#)

INSPIRE Geoportal Dataset Statistics

- 91533 Metadata records
- 44778 Downloadable Datasets
- 46446 Viewable Datasets

Spatial scope coverage: National Regional International

Country	Dataset Count
Austria	631
Belgium	684
Bulgaria	243
Croatia	140
Cyprus	42
Czech Republic	105
Danmark	207
Estonia	87
Finland	626
France	219
Greece	59
Hungary	121
Iceland	147
Italy	18544
Lithuania	76
Luxembourg	305
Moldova	19
Norway	76
Poland	103
Portugal	622
Romania	103
Slovakia	339
Slovenia	81
Spain	246
Sweden	244
Switzerland	218
Ukraine	166
United Kingdom	405
Uzbekistan	100
Vietnam	10
Yemen	12
Zambia	12
Lebanon	100
Liechtenstein	89
Lithuania	132
Malta	149
Netherlands	121
Norway	71
Poland	111
Portugal	496
Romania	92
Slovenia	38
Spain	174
Sweden	216
Switzerland	212
Ukraine	99
Yemen	28
Zambia	132

Select a COUNTRY

Select the whole EUROPE

Download stats

INSPIRE Geoportal, based on GeoNetwork opensource

 European Commission

EN English

Search

European Commission > INSPIRE > Validator > Test selection

INSPIRE Validator - Test selection

Home Test selection Test reports Get support More on the INSPIRE Reference Validator

Configure your test

Select the INSPIRE resource you would like to test

- Metadata
- View Service
- Download Service
- Discovery Service
- Data set

Select the Technical Guidelines version

- Version 1.3 - DEPRECATED
- Version 2.0

Select the type of metadata record(s) to be tested

- Data sets and data set series
- Network Service
- Spatial Data Service

[Advanced options ▾](#)

Provide the resource to test

Select the input type and upload or link the resource

Select one or multiple XML/GML files or ZIP files containing XML/GML files. The Maximum size of each uploaded file is 50 MB. The upload starts immediately after selecting the files. The 'Start' button is unlocked when the upload has been successfully completed.

File upload

Upload file*

Maximum size is 50 MB.

Encrypted documents and those containing macros are not accepted.

Provide a label for your test report (optional)

Your test report will appear with the label below, edit the text if you wish to change it.

Test run on 09-13 - 15-04-2021 with test suite Common conformance classes

INSPIRE Reference Validator, based on the ETF testing framework

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English (en)

INSPIRE Registry

European Commission > INSPIRE > INSPIRE registry

INSPIRE registry

[Help us improving the Re3gistry software!](#) Please fill our quick survey at <http://europa.eu/!Bn84Ct>

ID: <http://inspire.ec.europa.eu/registry>

Label: **INSPIRE registry**

Content Summary: The INSPIRE infrastructure involves a number of items, which require clear descriptions and the possibility to be referenced through unique identifiers. Examples for such items include INSPIRE themes, code lists, application schemas or discovery services. Registers provide a means to assign identifiers to items and their labels, definitions and descriptions (in different languages). The INSPIRE registry provides a central access point to a number of centrally managed INSPIRE registers. The content of these registers are based on the INSPIRE Directive, Implementing Rules and Technical Guidelines.

Registry manager: European Commission, Joint Research Centre

Other formats: [XML Registry](#) [XML ISO 19135](#)

Registers

Filter Label

Label
INSPIRE application schema register
INSPIRE code list register
INSPIRE enumeration register
INSPIRE feature concept dictionary
INSPIRE glossary
INSPIRE layer register
INSPIRE media-types register
INSPIRE metadata code list register
INSPIRE reference document register
INSPIRE theme register

Items per page: 50 Showing 1 to 10 of 10 entries

INSPIRE Registry, based on the Re3gistry



Technological stack



- INSPIRE (legal framework) as a catalyst for technological innovation:
 - central components based on reusable, open source software solutions

Revamped INSPIRE Geoportal - Cooking the next generation of spatial data catalogues

25/8, 11:30 am - Auditorium

INSPIRE Geoportal, based on GeoNetwork opensource

ETF testing framework: past, present and future

26/8, 11:30 am - Room Onice

INSPIRE Reference Validator, based on the ETF Testing Framework

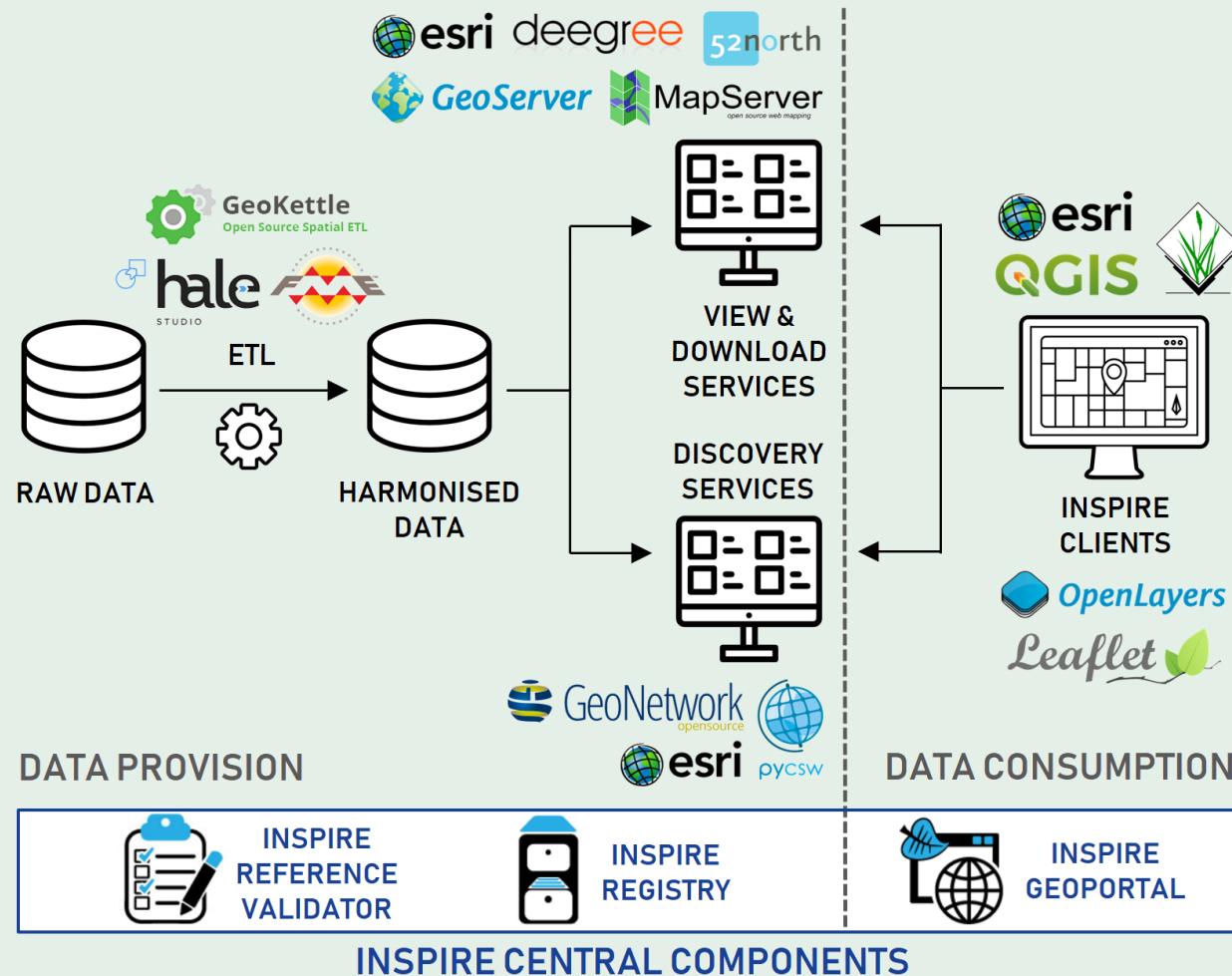
Re3gistry: Your interoperable open source tool for managing and sharing reference codes

26/8, 12:00 am - Room Onice

INSPIRE Registry, based on the Re3gistry

Technological stack

- INSPIRE-related software for data provision and consumption



Impact of standardisation



Open
Geospatial
Consortium.

ISO W3C®



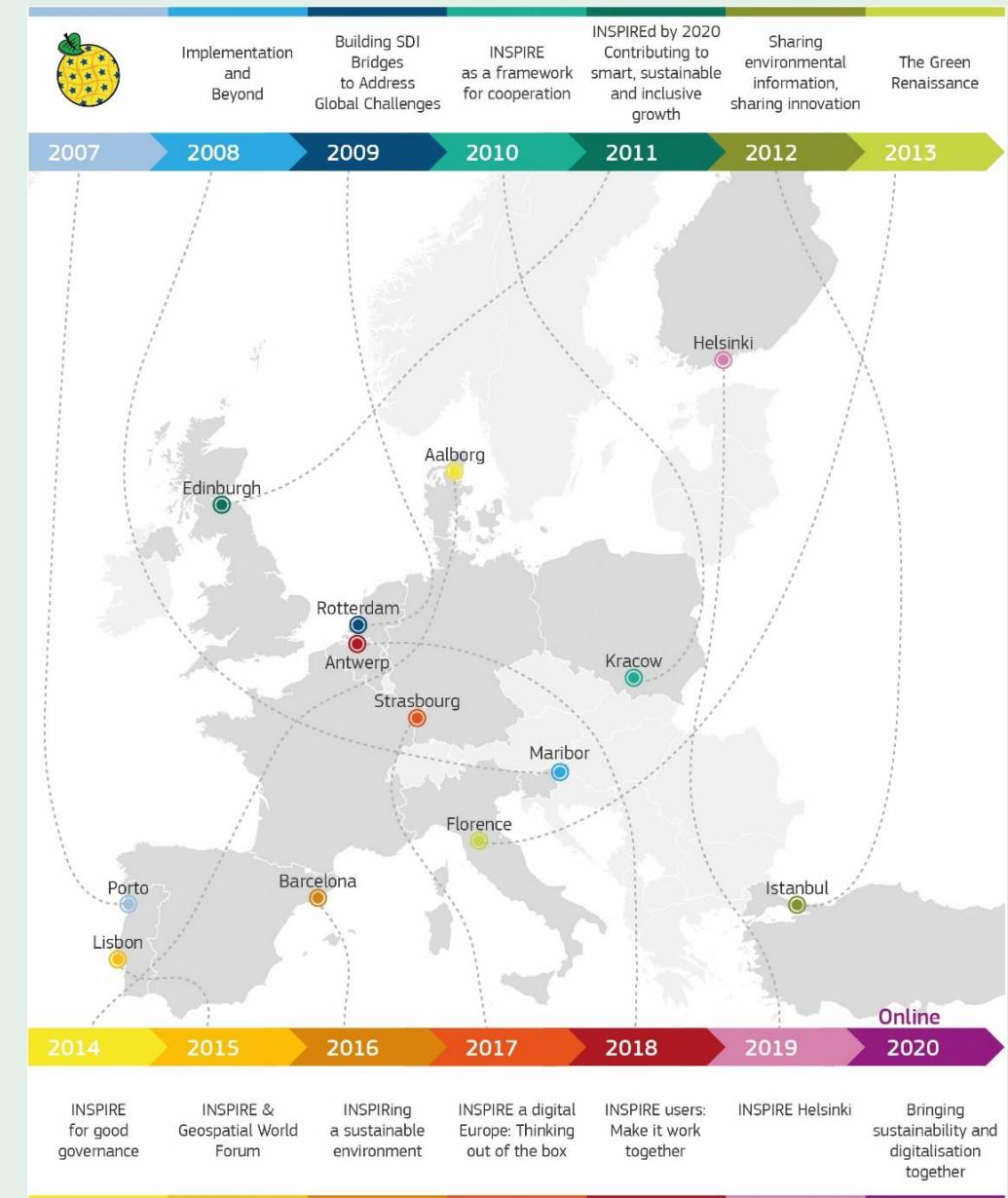
- INSPIRE is by nature based on **open standards** – probably the largest uptake of OGC standards worldwide!
 - **benefits** for all players: data providers, users & standardisation bodies
 - **problems** of slowing down the implementation process
- Only mature and **well-supported standards** should be **considered** for INSPIRE technical provisions:
 - selected standards should not only satisfy the legal requirements, but also simplify the lives of providers/users!



Community



“A technical infrastructure is only as good as the social infrastructure underpinning it”



Custom extensions are problematic!



- Wrong assumption that INSPIRE requirements would automatically lead to the evolution of software tools, such as:
 - support for **GML encoding** of INSPIRE data in mainstream GIS software
 - support for **extended capabilities** of INSPIRE network services
- Technical requirements should be aligned to **functionalities already supported** by existing tools.

Heterogeneity in licensing



- Heterogeneous licensing approaches are a **barrier to data usage**:
 - licensing information not available at all
 - use of custom licenses (often in country-specific languages)
- Need for a **common European approach** for the licensing of the data:
 - Open Data Directive & high-value datasets
 - reuse of existing licensing frameworks, e.g. Creative Commons

Context



Policy context

Brussels, 19.2.2020
COM(2020) 66 final

Overview of data actions

[D] What data are we talking about? [H] Who holds such data? [A] What policy intervention?

Good governance of data cannot wait

[D] Data voluntarily made available by data holders [H] Public sector, business, individuals, researchers [A] Make such data easier to share in a controlled manner (technical, legal and with organisational support); Build trust in data sharing; Ensure data interoperability access sectors

Data: a key element of Big Tech's market power

[D] Data held by online platforms originating from the users (both businesses and individuals) [H] Online platforms [A] Among other policy options, identify appropriate data access and data portability remedies

High quality government data for SMEs & innovation

[D] 'High value' Open Government Data (core reference data) [H] Public sector [A] Make such data available for re-use free of charge

Better access to and control over data for a fair data economy

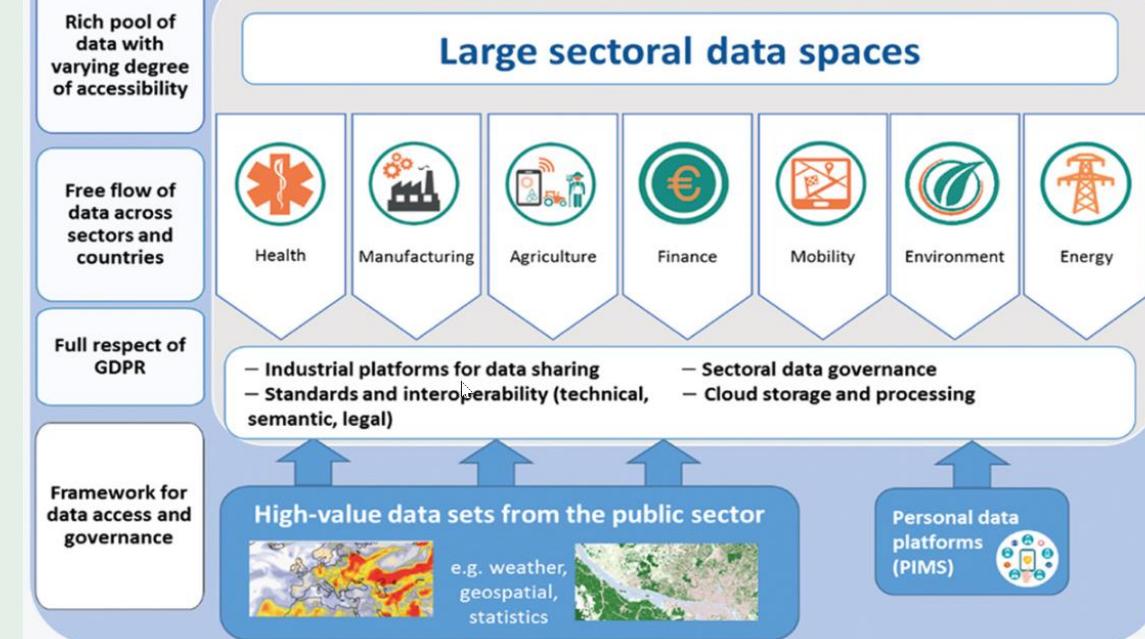
[D] Co-generated, IoT data from industry and individuals, Big Data sources held by business [H] Business [A] Ensure flexible use of Big Data sources by government for the common good; Establish fairness in use of co-generated, IoT data; Make sure that Europeans stay in control over their data vis-à-vis third country jurisdictions; Examine IPR legislation for possible obstacles



COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

A European strategy for data

Common European Data Space

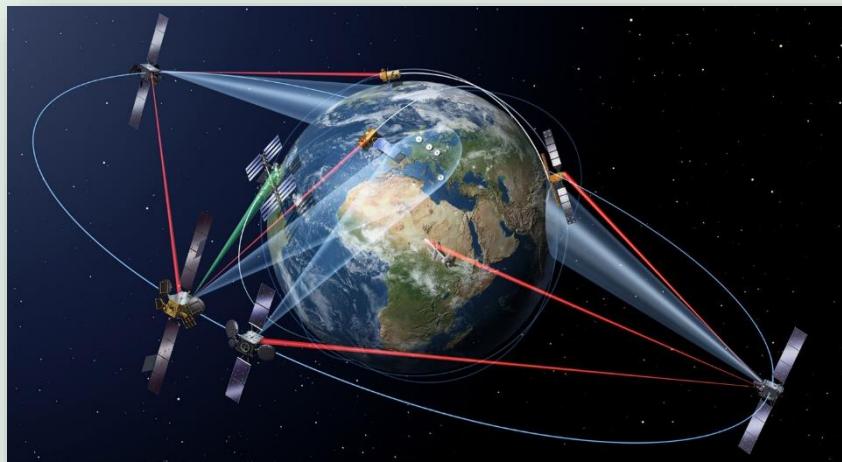


Technology trends – new data sources

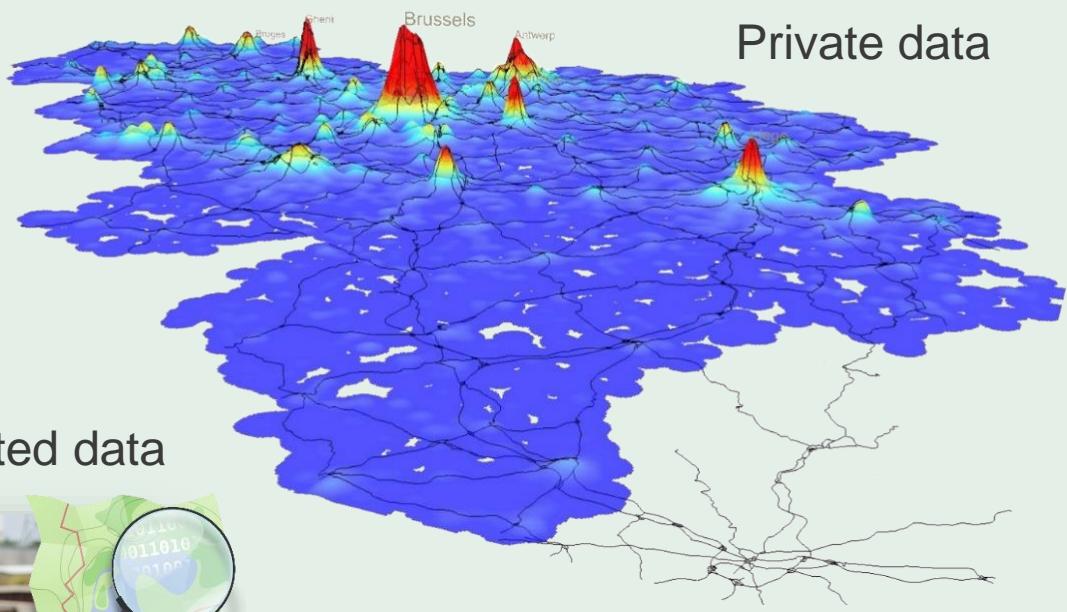
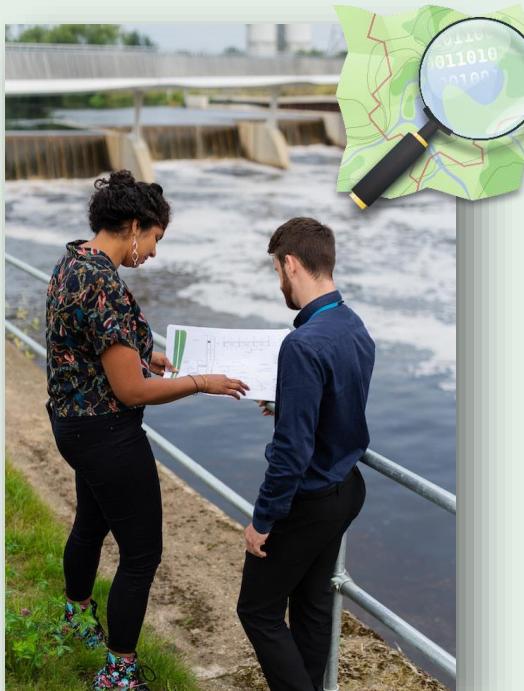
Internet of Things



Copernicus

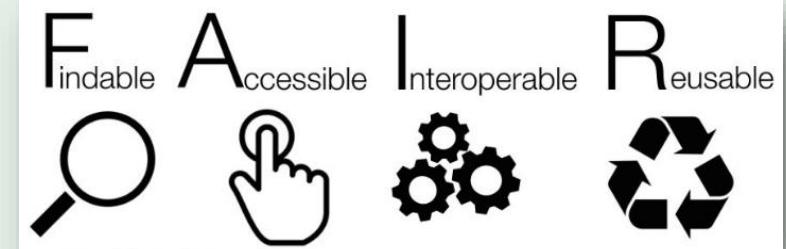


Citizen-generated data



Private data

Open research data



Technology trends

- From data collection to **data connection**:
 - APIs, APIs, APIs
- Agile standards
- Mature tools:
 - multiple approaches for using & serving data
 - powerful **ETL** instruments
- Novel **architectures**:
 - federated cloud
 - edge/fog
 - Solid

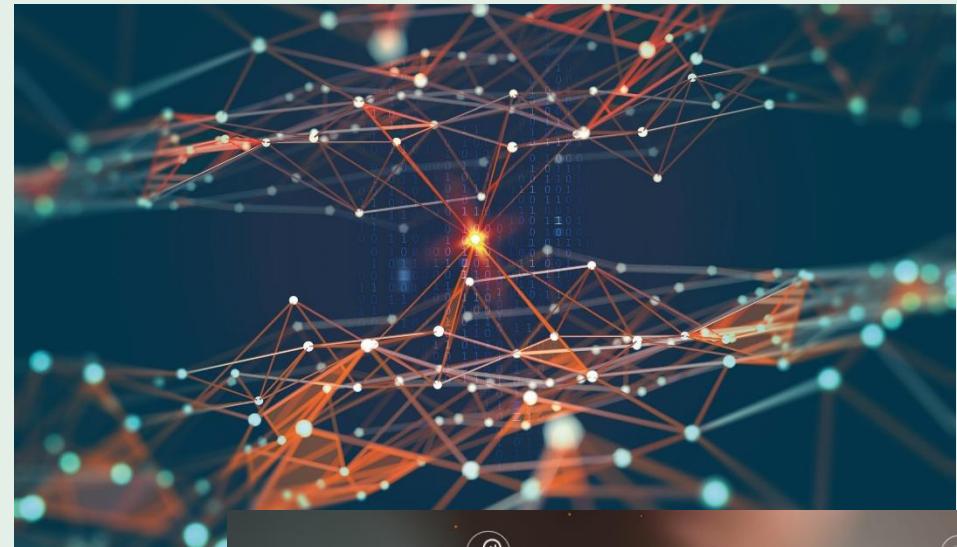


photo by Looker Studio, image #315352794. Source: stock.adobe.com

Vision



The possible future of INSPIRE

- Data sharing is **not a goal in itself**. To remain fit for purpose, INSPIRE should support data-driven decision-making and innovation.
- To be sustainable, INSPIRE should ‘**blend in**’ with the broader ecosystem of spatial and non-spatial data, infrastructures, technologies and policies.
- This will mean **opening up to a broader community** of implementers and users and to a wider range of applications and use cases.
- Making the INSPIRE framework more **flexible and agile** will significantly lower the entry level to the sharing and utilisation of data.
- Technical approaches need to be simplified by reusing well-adopted standards and technologies.

Actions

- Legal:
 1. Avoid overspecification in legislation
 2. Use a simple licensing framework



Actions

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 1. Avoid **overspecification** in legislation
 2. Use a **simple licensing framework**
- Organisational:  **OSGeo**
 1. Embrace **co-design** by default
 2. Rethink the existing **governance** structures
 3. Adopt an **ecosystem** approach



Actions

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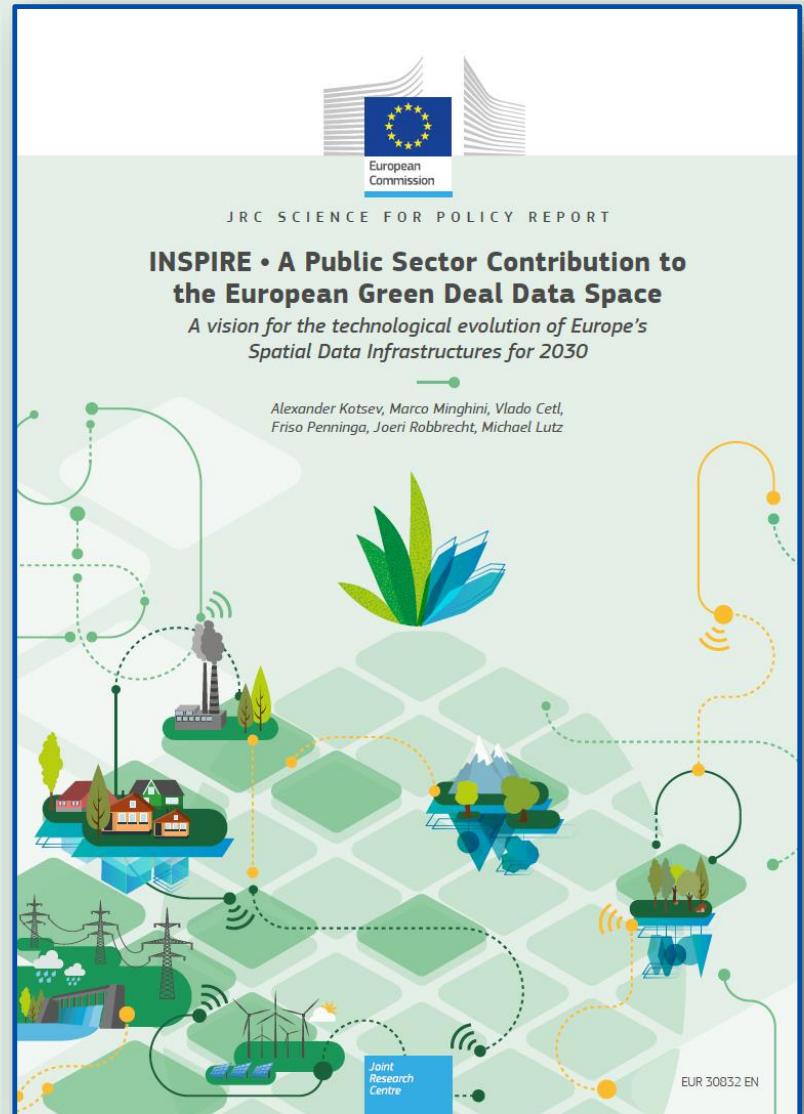
- Technological:
 1. Continue to improve the **discoverability** and **accessibility** of data
 2. Ensure **neutrality** and embrace well-adopted standards and technologies
 3. Avoid **custom extensions**
 4. Embrace well-documented, **standard-based APIs**
 5. Optimise data for **search engines**
 6. Leverage on the developments of **federated European cloud infrastructure**

New JRC Science for Policy Report

- Title: INSPIRE – A Public Sector Contribution to the European Green Deal Data Space
- Authors from the European Commission (DG JRC and DG ENV) & Geonovum



<https://publications.jrc.ec.europa.eu/repository/handle/JRC126319>



Thank you!



marco.minghini@ec.europa.eu



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