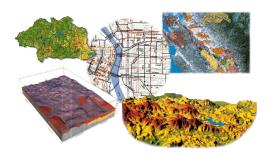
# INTRODUCTION TO SPATIAL DATA INFRASTRUCTURES IN EUROPE



Tomáš ŘEZNÍK

Fall 2022



## About the course

- Z8210 Introduction to spatial data infrastructures in Europe
- Language: English
- Extent and intensity: 2/0, 4 credits
- Type of Completion: k (colloquium)
  - an academic seminar
    - theory as well as practice
    - broad discussion
  - each student will present one topic (from the list advertised by the teacher) during the course



## About the course

- Assessment methods
  - assessment of student's presentation;
  - assessment of student's activity during discussion throughout the semester.



# **Syllabus**

- 1. Motivations and benefits of the European spatial data infrastructures (ESDI).
- 2. Metadata as the founding stone for linking between ESDI components.
- 3. Discovery processes, searching for spatial data and Web services.
- 4. View processes, preview of discovered spatial data.
- 5. Download processes, ordering and download of desired data.
- 6. Data models, understanding the UML diagrams and other formalised descriptions.
- 7. Map compositions on the Web, OGC Web Map Context.
- 8. Data sharing, use limitations and other licensing issues. Laboratory on Geoinformatics and Cartography



## Literature

## • required literature

- CRAGLIA, M. et al. 2012. Digital Earth 2020: towards the vision for the next decade. In International Journal of Digital Earth, Volume 5, Issue 1. 20 pages.
- <u>http://inspire.ec.europa.eu</u>
- NOGUERAS-ISO J., MURO-MEDRANO P.R., ZARAZAGA-SORIA F.J. Geographic information metadata for spatial data infrastructures :resources, interoperability and information retrieval. 1st ed. New York: Springer, 2005. xxi, 263 p. ISBN 3-540-24464-6.
- recommended literature
  - ANNONI A., CRAGLIA M., EHLERS M., GEORGIADOU Y., GIACOMELLI A., KONEČNÝ, M., OSTLAENDER N., REMETEY-FULOPP G., RHIND D., SMITS P., SCHADE S. A European perspective on Digital Earth. *International Journal of Digital Earth*, Abingdon, Oxon, UK: Taylor and Francis, 2011, July 2011, 4/4, p. 271-284. ISSN 1753-8947. doi:10.1080/17538947.2011.582888.
  - UML modeling languages and applications :UML 2004 Satellite Activities, Lisbon, Portugal, October 11-15, 2004 : revised selected papers. Edited by Nuno Jardim Nunes. 1st ed. New York, NY: Springer-Verlag Berlin Heidelberg, 2005. xiv, 294 s. ISBN 3-540-25081-6.
- KAMBA V. *Tvorba systémů a komponent podle specifikace UML*. Brno, 2002. 61 CD Laboratory on Geoinformatics and Cartography

# 1. MOTIVATIONS AND BENEFITS OF THE EUROPEAN SPATIAL DATA INFRASTRUCTURES

Spatial data infrastructure is like any other infrastructure (water, transport, electricity,...).

Decades of time, a lot of effort and money are needed. Users do not need to know how they work. **They just use it.** 



Image adopted from: https://www.123rf.com



Initiative/legislation/framework to **discover** available spatial data, to evaluate their suitability for the purpose and to know the conditions applicable to their use.

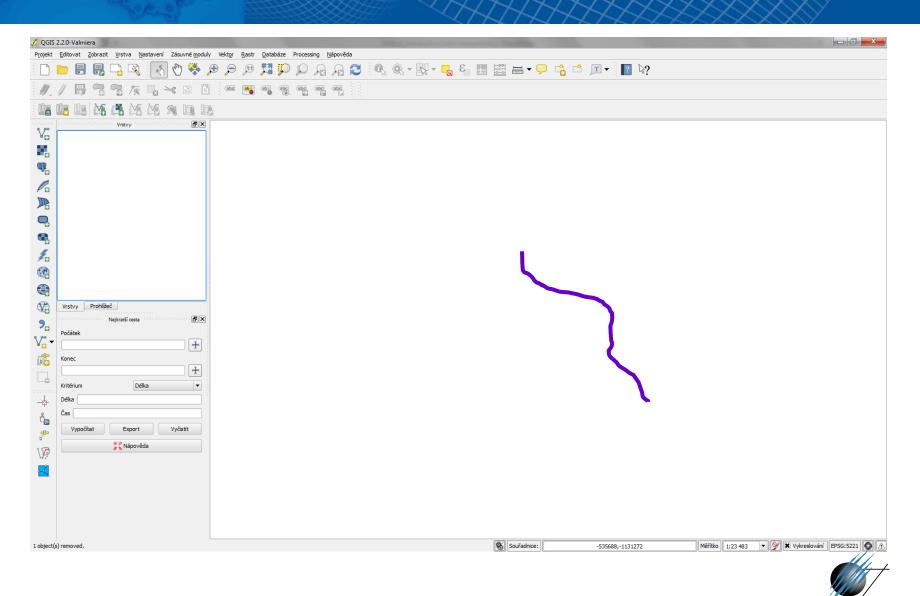


## Why such emphasis on discovery process?

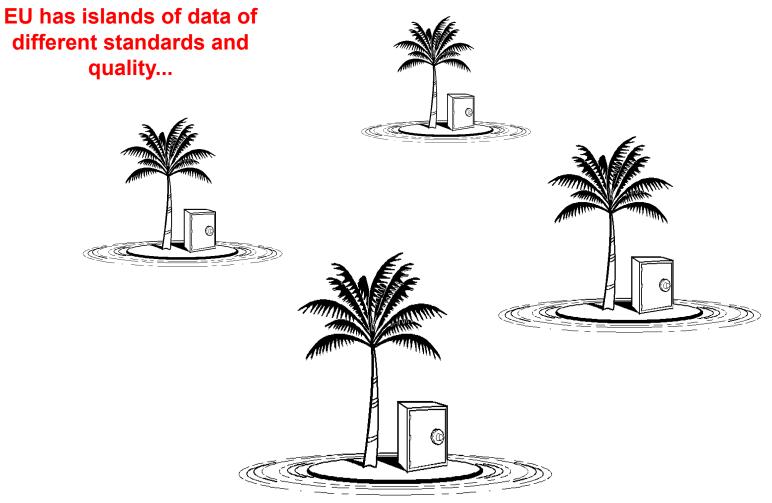
- Have you ever heard about the PSI directive?
  - DIRECTIVE 2003/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 November 2003 on the re-use of public sector information
- How could be any information re-used when we do not know that it exists?







## "Spatial data islands"



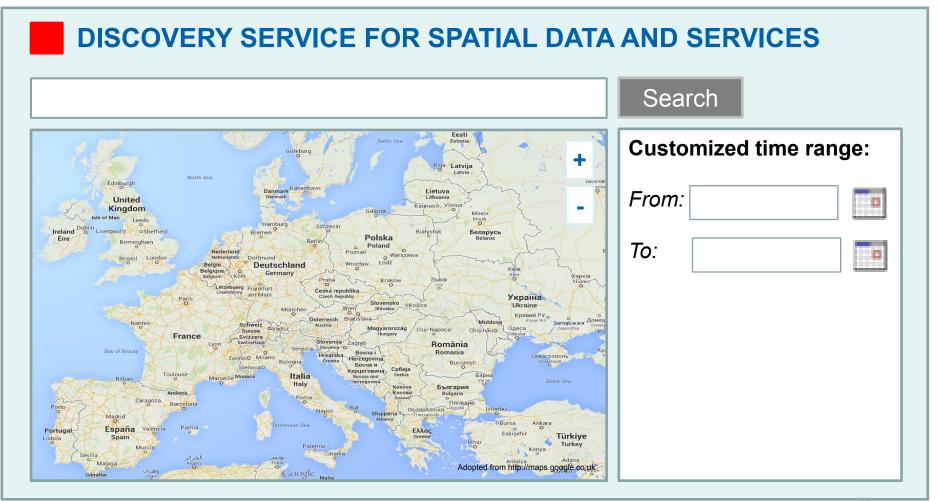




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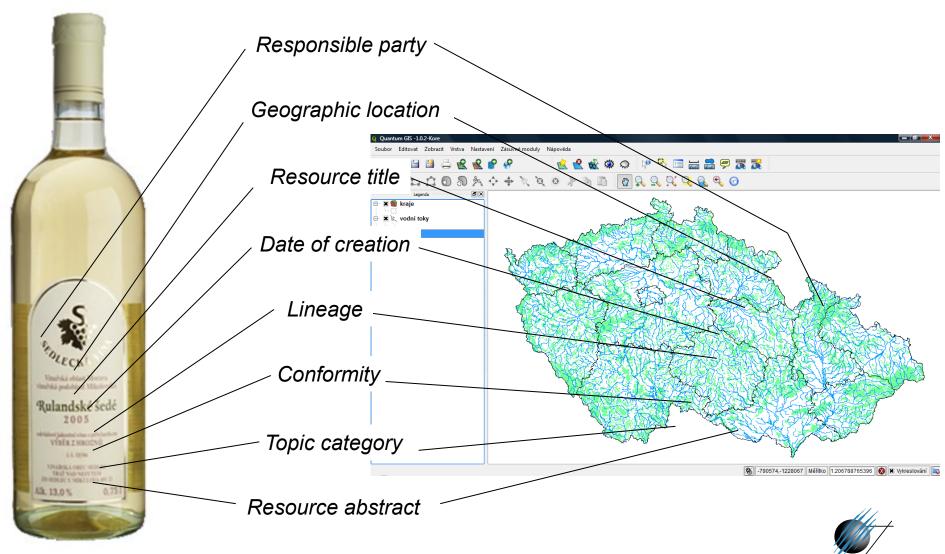
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## **INSPIRE metadata**



## A metadata editor?

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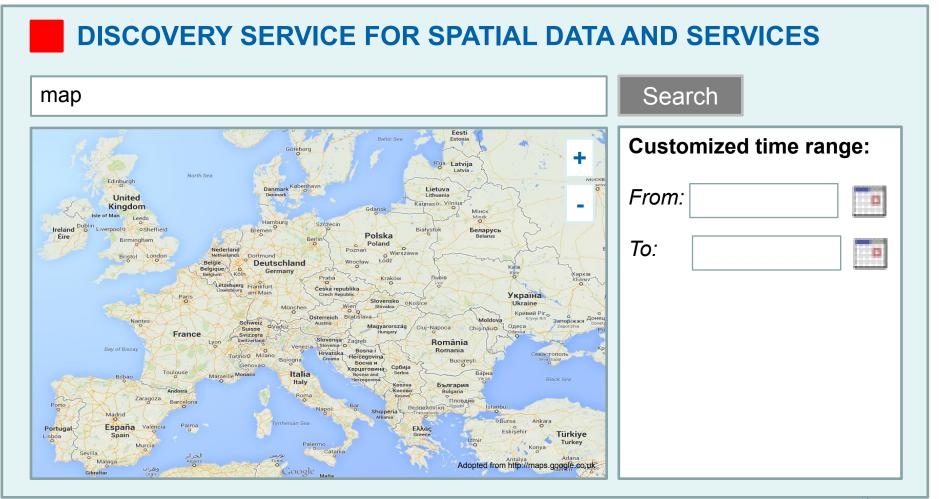


## **INSPIRE-compliant metadata**

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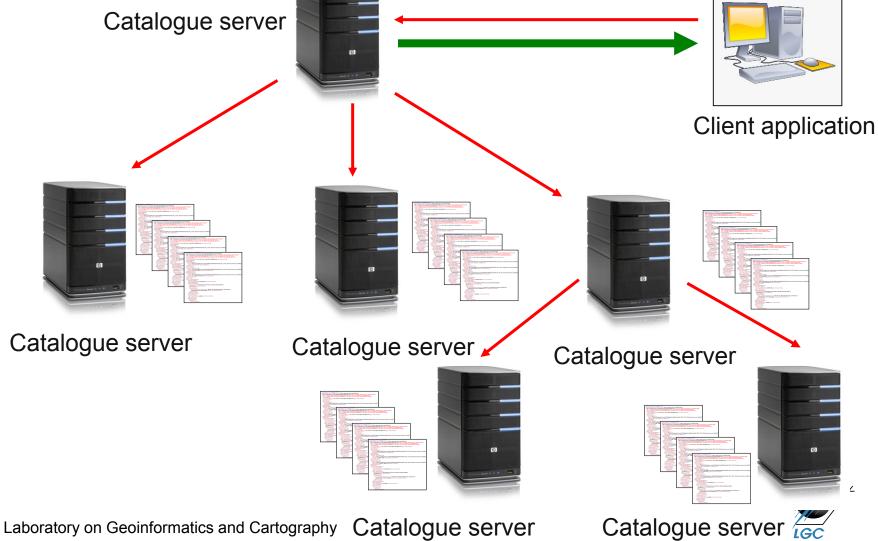
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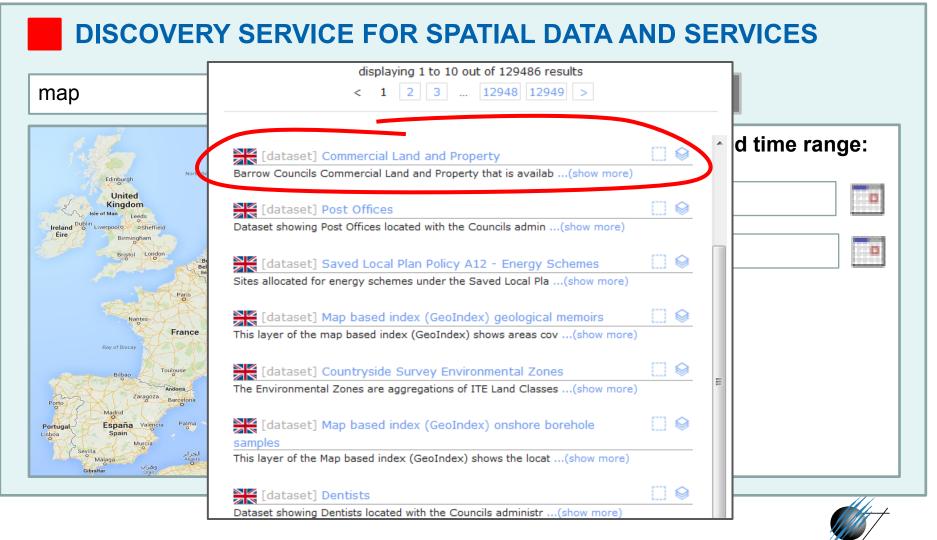




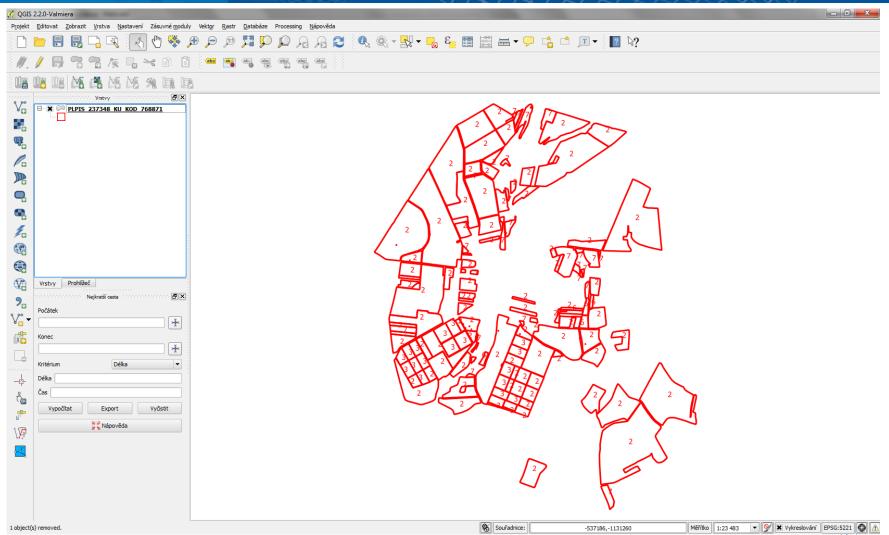


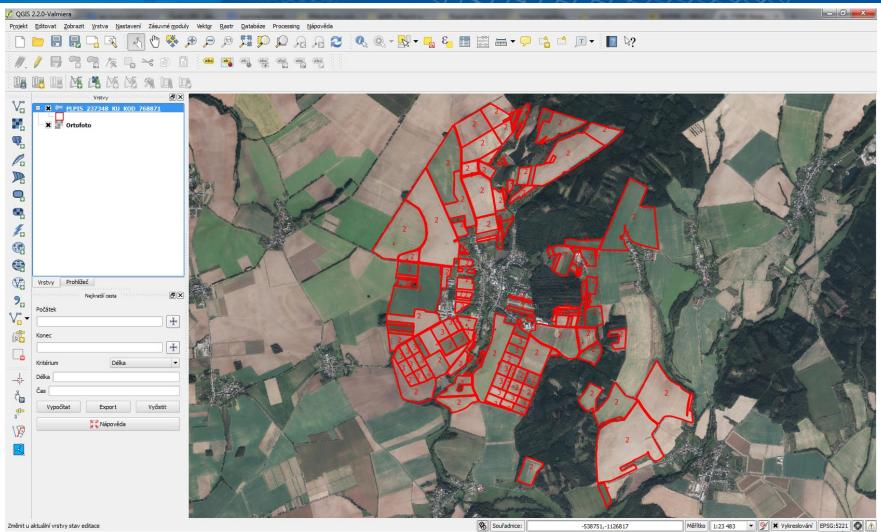




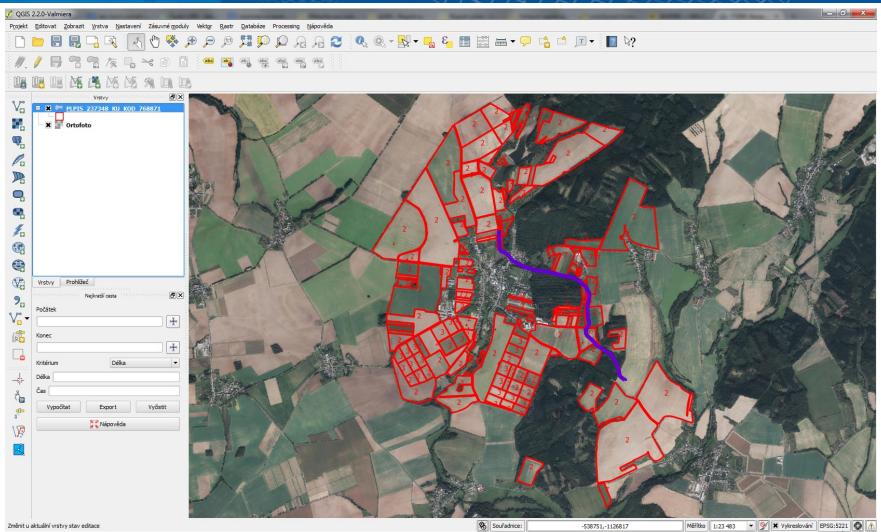


| Barrow Councils Commercial Land and Property that is available for rent. Areas shown as a mixture of both polygon and point. Upon accessing this<br>Licensed Data you will be deemed to have accepted the terms of the Public Sector End User Licence -INSPIRE<br>Původ<br>The data shows polygons and points that were created over Ordnance Survey MasterMap base data.   |  |   |   | Soubor prostorových dat  |
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|   | Barrow Co<br>Licensed I<br>ůvod  | ouncils Commerce<br>Data you will be d  | leemed to have accepted the ter   | rms of the Public Sector End User Licence -INSPIRE   |
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## For which themes may I search?

## Annex I

- 1. Coordinate reference systems
- 2. Geographical grid systems
- 3. Geographical names
- 4. Administrative units
- 5. Addresses
- 6. Cadastral parcels
- 7. Transport networks
- 8. Hydrography
- 9. Protected sites

## Annex II

- 1. Elevation
- 2. Land cover
- 3. Orthoimagery
- 4. Geology



# For which themes may I search?

## Annex III

- 1. Statistical units
- 2. Buildings
- 3. Soil
- 4. Land use
- 5. Human health and safety
- 6. Utility and governmental services
- 7. Environmental monitoring facilities
- 8. Production and industrial facilities
- 9. Agricultural and aquaculture facilities
- 10. Population distribution demography

11. Area

management/restriction/regulati on zones and reporting units

- 12. Natural risk zones
- 13. Atmospheric conditions
- 14. Meteorological geographical features
- 15. Oceanographic geographical features
- 16. Sea regions
- 17. Bio-geographical regions
- 18. Habitats and biotopes
- 19. Species distribution
- 20. Energy resources
- 21. Mineral resources



## **INSPIRE spatial data themes**

• Exactly those themes that any student should choose and present its content to the audience.



# Building blocks of any spatial data infrastructure

Monitoring and reporting

**Data sharing** 

**Network services** 

Metadata

Data

# Who is obliged to create such SDI building blocks in the European Member States?

- So-called Legally Mandated Organisations (LMOs)
- Generally defined by the European directive 2007/2/EC
  - English version: <u>http://eur-lex.europa.eu/legal-</u> <u>content/EN/TXT/HTML/?uri=CELEX:32007L0002&fro</u> <u>m=EN</u>
  - Versions for all 24 official European languages: <u>http://eur-lex.europa.eu/legal-</u> <u>content/EN/ALL/?uri=CELEX:32007L0002</u>
- In detail written in the appropriate legislation of each Member State, such as Zákon č. 123/1998 Sb. (CZ) or Zákon č. 3/2010 Z.z.(SK)



# Which data shall be published under INSPIRE?

- Fulfilling the following conditions (see Article 4)
  - they relate to an area where a Member State has and/or exercises jurisdictional rights;
  - they are in electronic format;
  - they are held by or on behalf of any of the following:
    - (i) a public authority, having been produced or received by a public authority, or being managed or updated by that authority and falling within the scope of its public tasks;
    - (ii)a third party to whom the network has been made available in accordance with Article 12;

- they relate to one or more of the themes listed in Annex I, II or III. Laboratory on Geoinformatics and Cartography



## Deadlines

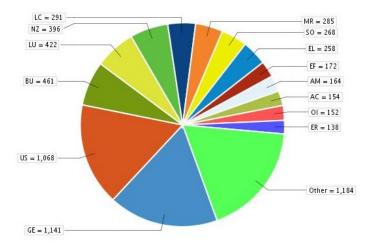
## See also <a href="http://inspire.ec.europa.eu/index.cfm/pageid/44">http://inspire.ec.europa.eu/index.cfm/pageid/44</a>

| Implementation |           |  |
|----------------|-----------|--|
| Milestone date | Article   | Description  |
| 15-May-2010    | 21§1 21§2 | Implementation of provisions for monitoring and reporting  |
| 03-Dec-2010    | 6(a)      | Metadata available for spatial data sets and services corresponding to Annex I and II  |
| 09-May-2011    | 16        | Member States shall provide the Discovery and View Services with initial operating capability  |
| 30-Jun-2011    | 15        | The EC establishes and runs a geo-portal at Community level  |
| 19-Oct-2011    | 17(8)     | Implementation of Regulation as regards the access to spatial data sets and services of the Member States by<br>Community institutions and bodies under harmonised conditions for new arrangements   |
| 09-Nov-2011    | 16        | Discovery and view services operational  |
| 28-Jun-2012    | 16        | Member States shall provide the Download Services with initial operating capability  |
| 28-Jun-2012    | 16        | Member States shall provide the Transformation Services with initial operating capability  |
| 23-Nov-2012    | 7§3, 9(a) | Implementation of Commission Regulation (EU) No 1089/2010 of 23 November 2010 implementing Directive<br>2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and service:<br>for Newly collected and extensively restructured Annex I spatial data sets available                              |
| 28-Dec-2012    | 16        | Download services operational  |
| 28-Dec-2012    | 16        | Transformation services operational  |
| 04-Feb-2013    | 7§3, 9(a) | Implementation of Commission Regulation (EU) No 102/2011 of 4 February 2011 amending Regulation (EU) No<br>1089/2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards<br>interoperability of spatial data sets and services for newly collected and extensively restructured Annex I spatial data<br>sets |
| 19-Oct-2013    | 17(8)     | Implementation of Regulation as regards the access to spatial data sets and services of the Member States by<br>Community institutions and bodies under harmonised conditions for existing arrangements  |
| 03-Dec-2013    | 6(b)      | Metadata available for spatial data sets and services corresponding to Annex III   |
| 21-Oct-2015    | 7§3, 9(b) | Newly collected and extensively restructured Annex II and III spatial data sets available  |
| 23-Nov-2017    | 7§3, 9(a) | Implementation of Commission Regulation (EU) No 1089/2010 of 23 November 2010 implementing Directive<br>2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and service<br>for other Annex I spatial data sets still in use at the date of adoption   |
| 04-Feb-2018    | 7§3, 9(a) | Implementation of Commission Regulation (EU) No 102/2011 of 4 February 2011 amending Regulation (EU) No<br>1089/2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards<br>interoperability of spatial data sets and services for other Annex I spatial data sets still in use at the date of adoption      |
| 21-Oct-2020    | 7§3, 9(b) | Other Annex II and III spatial data sets available in accordance with IRs for Annex II and III   |



## **Feedback from the Member States**

- Public consultations and testing
- 6554 comments related to the data specifications in 2011
  - Each comment has to be answered and if appropriate, then also addressed



| Theme          | Issues | ^ % |
|----------------|--------|-----|
| GN             | 1      | 0   |
| CS             | 2      | 0   |
| GS             | 2      | 0   |
| AD             | 3      | 0   |
| HY             | 7      | 0   |
| PS             | 7      | 0   |
| None           | 13     | 0   |
| O&M            | 25     | 0   |
| AF             | 47     | 0   |
| BR             | 56     | 0   |
| MF             | 63     | 0   |
| SR             | 68     | 1   |
| GCM & encoding | 71     | 1   |
| PF             | 80     | 1   |
| SU             | 86     | 1   |
| PD             | 96     | 1   |
| OF             | 100    | 1   |
| SD             | 100    | 1   |
| HH             | 106    | 1   |
| all            | 122    | 1   |
| HB             | 129    | 1   |
| ER             | 138    | 2   |
| 01             | 152    | 2   |
| AC             | 154    | 2   |
| AM             | 164    | 2   |
| EF             | 172    | 2   |
| EL             | 258    | 3   |
| so             | 268    | 4   |
| MR             | 285    | 4   |
| LC             | 291    | 4   |
| NZ             | 396    | 6   |
| LU             | 422    | 6   |
| BU             | 461    | 7   |
| US             | 1068   | 16  |
| GE             | 1141   | 17  |



## At the end there is more than 6'000 pages...

## INSPIRE directive (2007/2/EC) Commission Commission Commission **Regulation No. Regulation No. Regulation No.** 1205/2008 (metadata) 1089/2010 (data) 976/2009 (services) . . . Technical Guidelines Data Specifications **Technical Guidelines** (34)for Network Services for Metadata (1) (4) . . .



Laboratory on Geoinformatics and Cartography

Legally binding

# INSPIRE objectives (purpose of all the 6'000 pages...)

Make relevant, harmonised spatial data <u>available</u> for Community Environmental Policy (formulation, implementation, monitoring and evaluation) and for the citizen ...

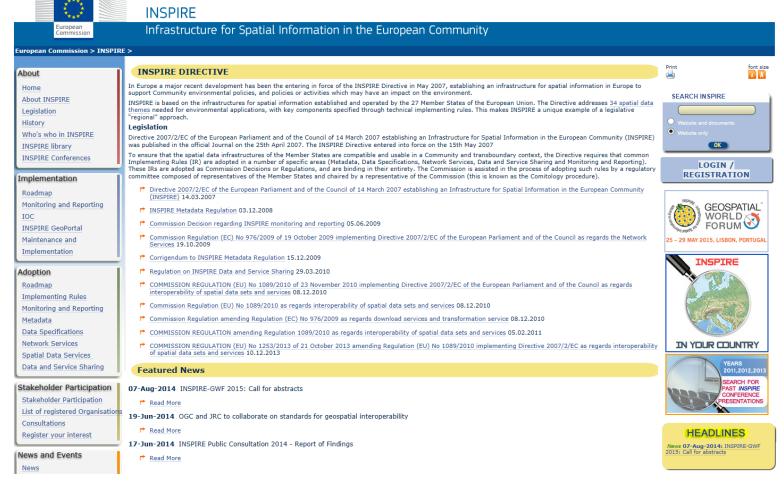
... through the establishment of integrated spatial information services, based upon a distributed network of databases, linked by common standards and protocols to ensure compatibility.



## **INSPIRE document repository**

<u>http://inspire.ec.europa.eu</u>

Contact | Search | Legal notice | Privacy statement | English (en) V



## **INSPIRE Geoportal**

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





# **Czech national INSPIRE geoportal**







Tematické mapy (dle směrnice INSPIRE)

I.2 - Zeměpisné soustavy

souřadnicových sítí

II.4 - Geologi

1085

I.3 - Zeměpisné názvy

III.1 - Statistické jednotky

### Vítejte na stránkách Národního geoportálu INSPIRE

#### Seminář autorské právo & Open data 09.09.2014

V úterý 9. 9. 2014 se pod záštitou projektu Zvýšení efektivity ochrany autorských práv v kartografil a geoinformatice a ve spolupráci s Českou asociací pro geoinformace uskuteční seminář Autorské právo & open data. Místo konání Novotného lávka 5, Praha 1, sál č. 217. Seminář je v rámci podpory projektu zdarma, je však nutné se předem zaregistrovat. Více detailů o... (<u>pokračování</u>).

#### Náhrada geologické mapy 08.07.2014

HORSKÁ

**KVILDA** 

I.4 - Správní jednotky

III.3 - Půda

Z WMS służby Geologická a geomorfologická mapa ČR (CENIA/cenia\_geolog\_geomorf) provazované CENIA byla odstraněna geologická mapa 1:500 000, Nové provazovaná služba obsahuje pouze geomorfologické denění ČR a je dostupná na adrese http://geoportal.gov.cz/ArcGIS/services/CENIA/cenia\_geomorfologie/MapServer/WMSServer, Připojení Geologické mapy ČR 1:500 000 je i nadále možné prostřednictvím WMS... (<u>pokratován</u>).

## Strategie pro implementaci INSPIRE v České republice

Pro účelnou implementaci INSPIRE v České republice je od začátku r. 2014 vytvářená národní strategie implementace INSPIRE. Tato strategie je v rámci České republiky základním dokumentem pro realizaci požadavků vyplývajících ze Směrnice INSPIRE. Cilem implementace je vytvořit, udržovat a rozvíjet infrastrukturu pro prostorové informace INSPIRE. Hlavním důvodem pro tvorbu Strategie je... (<u>gokračován</u>).

Přihlásit odběr novinek 1 (10) Novinky v katalogu metadat



I.7 - Dopravní sítě

TTL5 - Lidské zdraví a

bezpečnost

I.5 - Adresv

III.4 - Využití úzo



ZÁKLADNÍ ŠKOLA

III.6 - Veřejné služby a

služby veřejné správy



III.7 - Zařízení pro

sledování životního

prostředí





II.2 - Krajinný pokryv







Smen 2014 -

11 12 13 14 15 16 17

18 19 20 21 22 23 24

25 26 27 28 29 30 31

Dnes

1 2 3 4 5 6

30

4 5 6 7

2 3

1

8 9 10

I.3 - Ortofotosnímky



III.10 - Rozložení obyvatelstva - demografie

