INSPIRE development
Status and possible contributions to the exchange of road data

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Overview

• INSPIRE: General overview & status
• INSPIRE data interoperability
• INSPIRE data specification on Road Transport Networks
Overview

- **INSPIRE: General overview & status**
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INSPIRE Directive

25.4.2007

General rules to establish an infrastructure for spatial information in Europe

- Community environmental policies
  (Acts adopted under the EC Treaty/Euratom Treaty whose publication is obligatory)
- Policies or activities which impact on the environment

To be based on SDIs and LMOs established and operated by the Member States

Does not require collection of new spatial data

Scope:

- Spatial data held by or on behalf of a public authority
- 34 Spatial Data Themes laid down in 3 Annexes

Entry into force 15 May 2007
INSPIRE Thematic Scope

**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. Ortho-imagery
4. Geology

**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
11. Area management/restriction/regulation zones & 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 Components

• INSPIRE is a **Framework Directive**
• Detailed technical provisions will be laid down in **Implementing Rules** on
  – Metadata
  – Interoperability of spatial data sets and services
  – Network services (discovery, view, download, invoke)
  – Data and Service sharing (policy)
  – Coordination and measures for Monitoring & Reporting

• Once adopted, Implementing Rules become European **legislative acts** and national law in 27 Member States and in some EFTA countries
**INSPIRE Components**

**Metadata**
- Metadata Regulation published 4th December 2008
- 2 years for Member States to create metadata (5 years for Annex III)
- Metadata editor & validator publicly available as part of prototype INSPIRE geo-portal
INSPIRE Components

Network Services

- Discovery & View Service Regulation published 2009
- Amendment on Download & Transformation Service published 2010
- Member States to make services available in 2011/12
- Initial Operating Capability Task Force to support Member States in the implementation
**Data Interoperability**

- Regulation on data interoperability for Annex I data themes published in 2010
- Common UML data model for all themes
- 2-7 years (after adoption) for MS to make data compliant
- Annex II/III data themes ongoing (until 2012)
INSPIRE Components

INSPIRE GeoPortal

http://www.inspire-geoportal.eu/
INSPIRE Components

http://inspire-registry.jrc.ec.europa.eu/registers/FCD
Data and service sharing

• Art. 17 INSPIRE Directive (applicable since May 2009)
  – MS shall adopt measures to enable public authorities to gain access to spatial data sets and to exchange and use them for the purposes of public tasks that may have an impact on the environment
  – Public authorities can license data and/or require payment for them
    ▪ Charges must be kept to the minimum required to ensure the necessary quality and supply of spatial data sets and services together with a reasonable return on investment
    ▪ Data provided to EU as part of reporting obligation must be free of charge

• Regulation published March 2010
  – Access to spatial data sets and services of the Member States by Community institutions and bodies under harmonised conditions
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Data interoperability

The starting point ...

- Access to spatial data in various ways
- User has to deal with interpreting heterogeneous data in different formats, identify, extract and post-process the data he needs → lack of interoperability
Data interoperability

... and what INSPIRE is aiming at

- Provide access to spatial data via network services and according to a harmonised data specification to achieve interoperability of data

- Datasets used in Member States may stay as they are

- Data or service providers have to provide a transformation between their internal data model and the harmonised data specification
Data interoperability

... and what INSPIRE is aiming at

- Data providers may also choose to align their internal data model with the harmonised data specifications and extend these based on their requirements.
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Key design & modelling aspects

- Transport Networks is one of the largest INSPIRE theme
- Covers four major sub themes: Road, Rail, Air, Water & Cable Transport

- Given the wider scope of transport features it was decided that the INSPIRE scope should be restricted only to reference objects
- Any objects that are more limited in application would still be able to be added when the demand was sufficient and using the same model
Transport Networks Structure

INSPIRE Generic Conceptual Model

ISO Standards

Common Transport Elements

Road TN
Rail TN
Water TN
Air TN
Cableway TN

INSPIRE Transport Network Data Product Specification

Technical Guidance

INSPIRE Directive

Regulation on interoperability of spatial data sets and services
A Generic Network Model was developed in line with the Generic Conceptual Model.

This then was adapted to a Transport Network Model.

Three alternative kinds of representation can work together.

Allows using and exchanging information between different views as required.

Ideally all the representations will be harmonised.

Nodes (implied or explicit) should also be sufficiently coincident.
Reuse geometry by linking features

Individual links and link sequences form link set (e.g., motorway with exits)

Individual links are used to build link sequences (e.g., for linear referencing of transport properties)

Basic network of transport links and (optional) nodes

- Linear reference from start of link sequence
- Transport property on link sequence (e.g., speed limit)
- TransportLinkSet
- TransportLinkSequence
- TransportLink
- TransportNode

A1
Road Transport Networks Objects

Illustration – Example of use of elements forming the Road Transport Network

Figure 17 – Overview of the main Road Transport Networks objects
Road Transport Properties

**Common Transport Elements**
- TransportProperty
- AccessRestriction
- ConditionOfFacility
- MaintenanceAuthority
- OwnerAuthority
- RestrictionForVehicles
- TrafficFlowDirection
- VerticalPosition

**Road Transport Networks**
- FormOfWay
- FunctionalRoadClass
- NumberOfLanes
- RoadName
- RoadServiceType
- RoadSurfaceCategory
- RoadWidth
- SpeedLimit

http://inspire.jrc.ec.europa.eu/index.cfm/pageid/2/list/datamodels
Extensions by Member States or information communities

- INSPIRE data specifications are not intended to cover all kinds of data requirements
  - Legally Mandated Organisations in Member States will typically maintain more data than covered by INSPIRE data specifications
  - Focus is on the spatial aspects

- Member States and thematic communities are encouraged to re-use the INSPIRE data specifications for their own usage
  - Extend spatial object types and add new properties
  - Specify additional constraints applicable to the own data sets
  - Re-use of INSPIRE objects to spatially enable application data
Data scope: spatial & non-spatial

Organisational Business Data

In scope now or future

Spatial Objects

Report (PDF)
01001010
00100101
00010101
11101111
11100100
10110100

Weekly cases 1967 vs 2001 outbreaks

Timetable

Loose coupling – linkage

Application specific - referenced

Widely reused - widely referenced

Standards

Organisational Business Data

Not in scope
Guidelines for the encoding of spatial data

- The Generic Conceptual Model is independent of a particular implementation platform (SQL, GML, KML, Java, etc.)

- Technical arrangements on the implementation level are required for the communication between software systems

- The document specifies requirements and recommendations for the encoding of spatial objects

- Default: GML & ISO 19139 encoding rules (derived directly & automatically from UML model)
Thank you!

  - Data specifications
    - Data models
  - Network services
  - Metadata
  - Data and service sharing
    - INSPIRE Good practice in data and service sharing
    - Guidance on the Data and Service Sharing Regulation