The challenge of creating an INSPIRE Transport Networks DB from existing data in the National Geographic Institute of Spain

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* Introduction: Why
* Geographic Reference Information of Transport Networks (IGNE_TN): data model definition
* Data production planning: How and When
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Introduction

why?
Introduction

IGN-Spain production:

...So far: production based on cartographic products (e.g. Topographic dataset at different scales, street map, etc.):
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...So far: production based on cartographic products (e.g. Topographic dataset at different scales, street map, etc.) which:

• have several themes in common (e.g. transports, hydrography, etc.)
• but with different spatial and temporal update schedules:

- update planning: more focus on the geographical areas than on geographical objects

Consequence:

* It is difficult to provide one unique thematic layer (e.g. transport) containing the most complete, accurate and update data
How has IGN-Spain worked to provide INSPIRE compliant Transport Network data?

- Identifying the IGN datasets containing the most representative Transport Network data
- Comparing and mapping those datasets data model with INSPIRE data model
  - Any national dataset isolated is not as complete as TN INSPIRE data model
  - Some national datasets contain more information than INSPIRE data model in specific topics
- Providing **only the mapped data** according to INSPIRE schema by means of:
  - Download services WFS
  - Visualizing services WMS, WMTS
Introduction

How has IGN-Spain worked to provide INSPIRE compliant Transport Network data?

- WMS_INSPIRE services:
  - One service with both portrayals

✓ WMS-INSPIRE 1.3.0:  [http://www.ign.es/wms-inspire/ign-base](http://www.ign.es/wms-inspire/ign-base)

  → Layers:  
  - TN.CommonTransportElements.TransportNode
  - TN.RailTransportNetwork.RailwayLink
  - TN.RoadTransportNetwork.RoadLink

IGN-Spain portrayal  
INSPIRE portrayal
Introduction

User requirements on TN are not been fully satisfied

March 2014: New IGN production strategy

* Design and creation of the **Geographic Reference Information DB on TN**:
  * INSPIRE compliant
  * Considering the national datasets requirements regarding TN -> any TN data contained in these products must be derived from the TN reference BD
  * It should be as much accurate and update as it is feasible
Geographic Reference Information on Transport Network (IGNE_TN):

Data model definition
1st PHASE: Analysis of the IGN datasets requirements and their data models:

* Main products with TN data
  * CartoCiudad (street map)
  * BTN25 (Topographic D 1:25,000)
  * BTN100 (Topographic D 1:100,000)
  * SIGNA (National GIS)

* Exchange Data Model of Topographic data between IGN and the Spanish Regions Cartographic Agencies

* Official Data Providers Data models:
  Roads Ministry, Traffic Department, Railway Manager, etc.

->1st result:

- Identification of the features, attributes, values and relationships required by the IGN datasets and needed to make easier the data flow with the official data providers
2nd PHASE: INSPIRE compliant data model

Main INSPIRE requirements:
* Network data model
* 5 transports networks
  * Road TN
  * Railway TN
  * Water TN
  * Air TN
  * Cable TN
* Transport Infrastructures
* Intermodal connections

IGN datasets requirements:
Features, attributes, values and relationships identified in National Products

-> 2nd result: Mapping tables between INSPIRE and National requirements

Starting point to define the IGNE_TN conceptual model
**IGNE_TN: Data model definition**

**3rd PHASE: Create an application schema INSPIRE compliant:**

**IGNE_Transport Network**

* From “INSPIRE Application Schema” of Transport Network

http://inspire.ec.europa.eu/index.cfm/pageid/2/list/datamodels

* .eap files imported in the Enterprise Architect software
IGNE_TN: Data model definition
* **Application schema: IGNE_Transport Network**

* Composed of 6 schemas: one for the common elements and one per each transport mode:
  - ApplicationSchema IGNE_Common Transport Network:
  - ApplicationSchema IGNE_Air Transport Network
  - ApplicationSchema IGNE_Cable Transport Network
  - ApplicationSchema IGNE_Railway Transport Network
  - ApplicationSchema IGNE_Road Transport Network
  - ApplicationSchema IGNE_Water Transport Network

* The initial application schema has been extended adding some feature types and codelists values
* Application schema: IGNE_Transport Network

* It is documented in the IGNE_TN specifications and described by means of **UML diagrams**, similar to the INSPIRE specification:
  * Every TN mode, according to its characteristics, is represented with the following UML diagrams:
    * Network diagram
    * Properties associated to the transportlink features diagram
    * Properties associated to the transportlinkset features diagram
    * Infrastructures properties diagram

Example: UML diagram to represent the Road TN application schema
**IGNE_TN: Data model definition**

* Application schema: IGNE_Transport Network

* In the UML diagrams:
  * Distinguishing the 3 levels: network, common elements, specific TN model
  * Data model extentions: orange-coloured classes
  * Applicable INSPIRE values applicable: pointed out in comments

Example: Part of the IGNE_Road Transport Network UML diagram
**IGNE_TN: Data model definition**

* 4rd PHASE: To document **IGNE_Transport Network (RT):**
  * **RT Specifications** compliant with ISO 19131
    * [www.ign.es\resources\IGR\Transporte\20160316_Espec_RT_V0.5.pdf](http://www.ign.es\resources\IGR\Transporte\20160316_Espec_RT_V0.5.pdf)
  * Application Schema documented by:
    * UML Diagrams
    * Feature catalogue
  * **Annex:**
    * [www.ign.es\resources\IGR\Transporte\20160316_ModFisico_RT_V0.2.pdf](http://www.ign.es\resources\IGR\Transporte\20160316_ModFisico_RT_V0.2.pdf)
    * DB implementation: tables of physical datamodel
    * Mapping tables with INSPIRE
Data Production Planning: How and When
Data production: How and When

* Geographic Reference Information production planning: 2 PHASES
  * 1st: The DB first version is populated from existing data
Data production: How and When

Geographic Reference Information of TN production: 2 PHASES

1\textsuperscript{st}: The DB first version is populated from existing data

2\textsuperscript{nd}: The DB second version: data are updated and improved in accuracy and it feeds the national datasets TN layers
IGNE_Transport Network: DB First Version
• Integration of the existing data according to IGNE_Transport Network requirements:
  o New features types, attributes and relationships: e.g. intermodal connexions

• Challenge: to produce TN data for the whole Spain territory
  o Currently: the production phase is finished and data are being checked with the quality controls -> data available in the first mid of 2017

• Other actions on going: the implementation of WMS and WFS INSPIRE services
IGNE_TN V 0.1: Result of the data integration
To be INSPIRE compliant does not imply a new production data but it should be considered as a promoter to rethink about the traditional production methodologies of G.R.I.:

- To be more efficient -> do not duplicate data capture
  - reuse data

- To provide the data and services that users required currently: continuous, accurate and update transport network data
Thank you very much questions?

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