TOPAGE DATABASE

HOW INSPIRE INFLUENCED THE CREATION OF THE FRENCH NATIONAL HYDROLOGICAL NETWORK DATABASE

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Summary

- The project
- BD Topage and INSPIRE general approach
- Discrepancies with INSPIRE
- INSPIRE adaptations
- Additions to INSPIRE
- Implementation
- Conclusion
THE PROJECT
Context

- Started in 2012
- Old product: CARTHAGE database
  - Rich semantic
  - Medium scale data (50k)
- New product: TOPAGE database
  - Rich semantic (mainly coming from BD Carthage)
  - Detailed geometry coming from large scale topographic data base (BD TOPO) (10k)
Goals

- INSPIRE compatible
- User needs
- Product Owner needs: To have a «flowing» network

INSPIRE models
DB Owner and User requirements (questionnaire)
Old Medium scale product
Large scale DB
Working group
Topage model
BD TOPAGE AND INSPIRE GENERAL APPROACH
Adaptation of INSPIRE model

- HydroNetwork and PhysicalWaters into the same model

- Less feature types (covered by other databases)
  - HydroPointOfInterest
  - Man-made Object

- Sandre specific attributes added to INSPIRE
Interpretation of INSPIRE model

- Combining hydro network and physical waters

INSPIRE

Topage
Shared principles with INSPIRE

- Covers almost all the INSPIRE HydroNetwork model

- Topage feature types
- Topage associations
- Croisement
- Tronçon hydro
- Element
- Cours d’eau
- Tr.Debut – Tr.Fin
- Nœud hydro
Shared principles with INSPIRE

- Topologic rules taken from INSPIRE data specifications on hydrography
  - Connectivity tolerance
    Taken from IR Requirement Annex II, Section 8.7.7 Theme-specific Requirements – Ensuring Network Connectivity
  - Fictitious links
    Taken from INSPIRE Recommandation n°49
DISCREPANCIES WITH INSPIRE
Discrepancies with INSPIRE

- Different modeling of surface water
  - In INSPIRE, watercourse can be GMSurface or curve
  - In Topage, watercourse is GMCurve
    => surface representation by another feature type
Discrepancies with INSPIRE

- In INSPIRE, direct link between basin and watercourse
Discrepancies with INSPIRE

- In BD TOPAGE, basins are linked with hydro nodes
  - Indirect link to the watercourse
  + Allows direct calculation of upstream / downstream basins

matching with INSPIRE will not be simple!
INSPIRE ADAPTATIONS
List of adaptations

- Language
- Flattening
- Code lists
- Specialization / generalization
- Multiplicity / Voidable
### The model is in French

### Mapping with INSPIRE attributes is documented

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<thead>
<tr>
<th>Attributs ETH2.0</th>
<th>Correspondance Inspire</th>
<th>Format</th>
<th>Card</th>
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<td>Caractère</td>
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</table>
Flattening: Case 1: no flattening

Ex: Inspire Identifier

The type Identifier has been kept

However only the local id is capture in production process. The other attributes are automatically derived during the transformation to INSPIRE.
Flattening: Case 2: full flattening

Ex: Hydro Order Code

All attributes of the dataType HydroOrderCode are associated to the watercourse
Flattening: Case 3: Flattening with simplifications

Ex: Toponym

Only one spelling has been kept
Attributes not necessary in Topage BD have been removed
Flattening: Case 3: Flattening with simplifications

Ex: Level of Detail (MD_Resolution from ISO 19115)

Only usefull information in Topage has been kept (equivalentScale)

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**Example**: [Diagram and code snippet related to INSPIRE standards and Topage]

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**INSPIRE**

**Topage**
Code lists: Case 1 more values than INSPIRE

- Hydro nodes category codeList extended (voidable)
  - INSPIRE
    - «codeList»
    - HydroNodeCategoryValue
      - + boundary
      - + flowConstriction
      - + flowRegulation
      - + junction
      - + outlet
      - + source
  - Topage
    - | Code de l'élément | Mnémonique de l'élément |
      |-------------------|------------------------|
      | 1                 | limite                  |
      | 2                 | influence flux réseau   |
      | 3                 | régule flux réseau      |
      | 4                 | embranchement           |
      | 5                 | exutoire                |
      | 6                 | source                  |
      | 7                 | difféquence             |
      | 8                 | perte/infiltration      |

- Origin of a hydro object divided
  - «enumeration...
    - OriginValue
      - natural
      - manMade
  - | Code de l'élément | Mnémonique de l'élément |
    |-------------------|------------------------|
    | 1                 | naturel aménagé        |
    | 2                 | naturel non aménagé    |
    | 3                 | artificiel             |
# Code lists: Case 2 less values

**Ex: Land-water boundary**

All values kept. Unused values in status “Frozen”

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<th>Mnémonique de l’élément</th>
<th>Statut de l’élément</th>
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<td>4</td>
<td>highestAstronomicalTide</td>
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<tr>
<td>28</td>
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</tbody>
</table>
Multiplicity

- Mandatory attributes in INSPIRE are mandatory in TOPAGE

- Voidable INSPIRE => multiplicity [0..1] or [0..*]

- Some voidable INSPIRE attributes are mandated in TOPAGE => multiplicity [1] or [1..*]
  Ex: persistance, level, widthRange…
ADDITIONS TO INSPIRE
Feature type additions

- Transition waters
  area between sea and river (delta, mangrove…)

- Watercourse surface
  surface representation of a watercourse
Relationship additions

- Lineage between hydro objects
Relationship additions

- Relationship with external databases

Source (hydro POI DB)  Hydro node (Topage DB)
Attribute additions

- Business attributes: Salinity, principal / secondary watercourse
- Metadata at feature level: Accuracy, capture method, dates
IMPLEMENTATION
Data production (IGN)

- Validation of the model
  - Too complex to identify gaps with user needs
  - Prototype on small areas and data submitted to users

- Production has begun
Publication

- Draft exchange model
  - Adapted from the conceptual one
    - Shortening of attribute names
    - Selection of attributes to be published
      - No lineage
      - No metadata information on names (language, source, …)
    - ...
  - Only instanciable feature types are described (with inherited attributes)

- Exchange format
  - Shp (ESRI)
  - MIF/MID (for Map Info)
  - Maybe WFS and GML
  - Will be accessible through Sandre catalogue [http://www.sandre.eaufrance.fr/]
CONCLUSION
Conclusion

- At first: the idea was to start from INSPIRE model
  - Modeling task was led by an INSPIRE champion

- In practice
  - Most concepts are from INSPIRE but with adaptation
  - Some additions and discrepancies were necessary

- Will be easier to transform into INSPIRE model and for reporting to Europe

Thank you!