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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

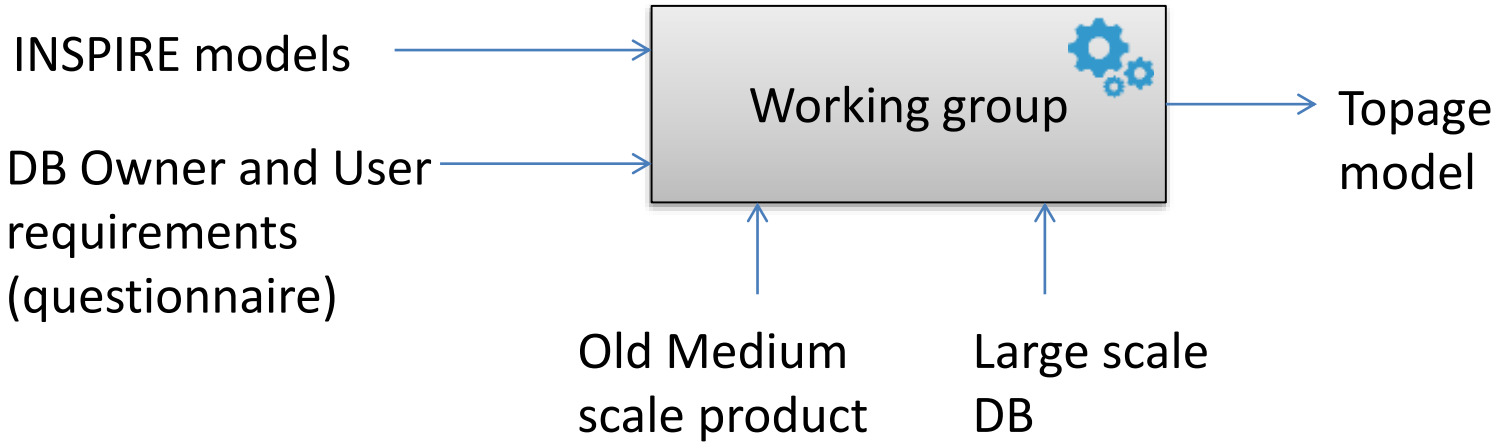
Context

- **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



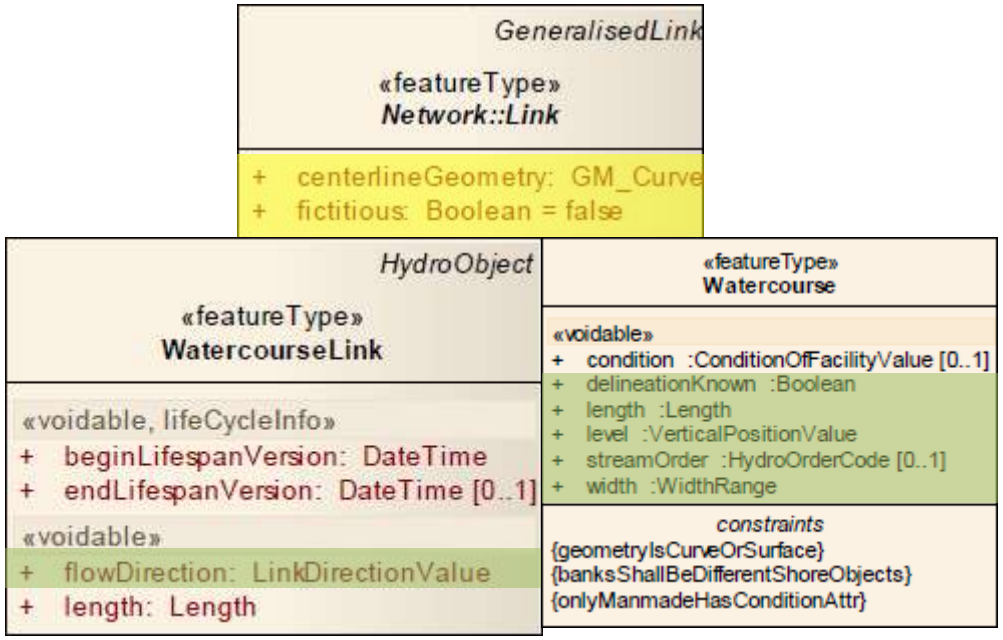
BD TOPAGE AND INSPIRE GENERAL APPROACH

Adaptation of INSPIRE model

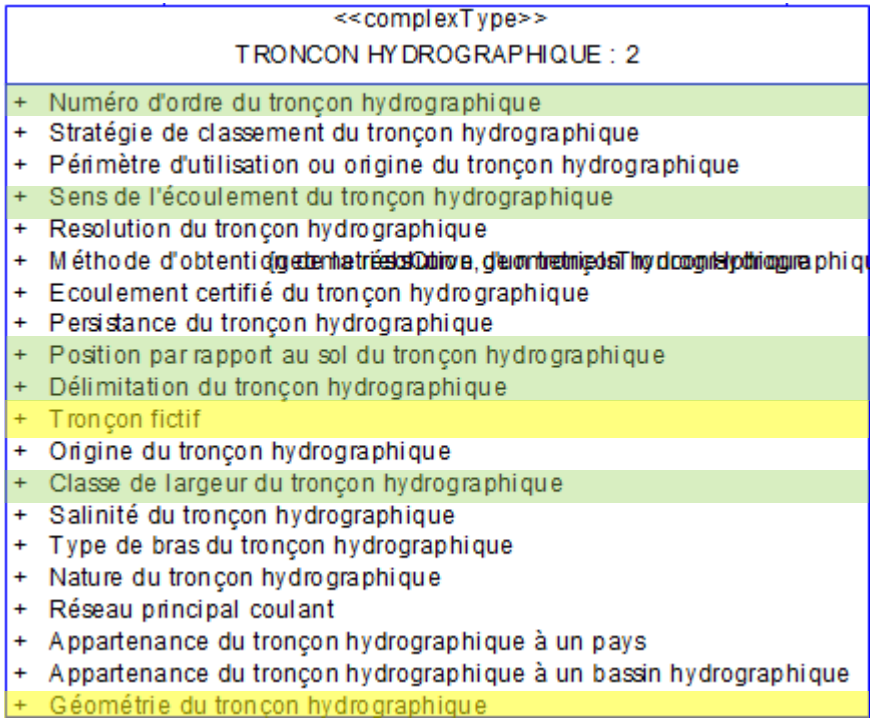
- HydroNetwork and PhysicalWaters into the same model
- Less feature types (covered by other databases)
  - HydroPointOfInterest
  - Man-made Object
- Sandre specific attributes added to INSPIRE

Interpretation of INSPIRE model

- Combining hydro network and physical waters



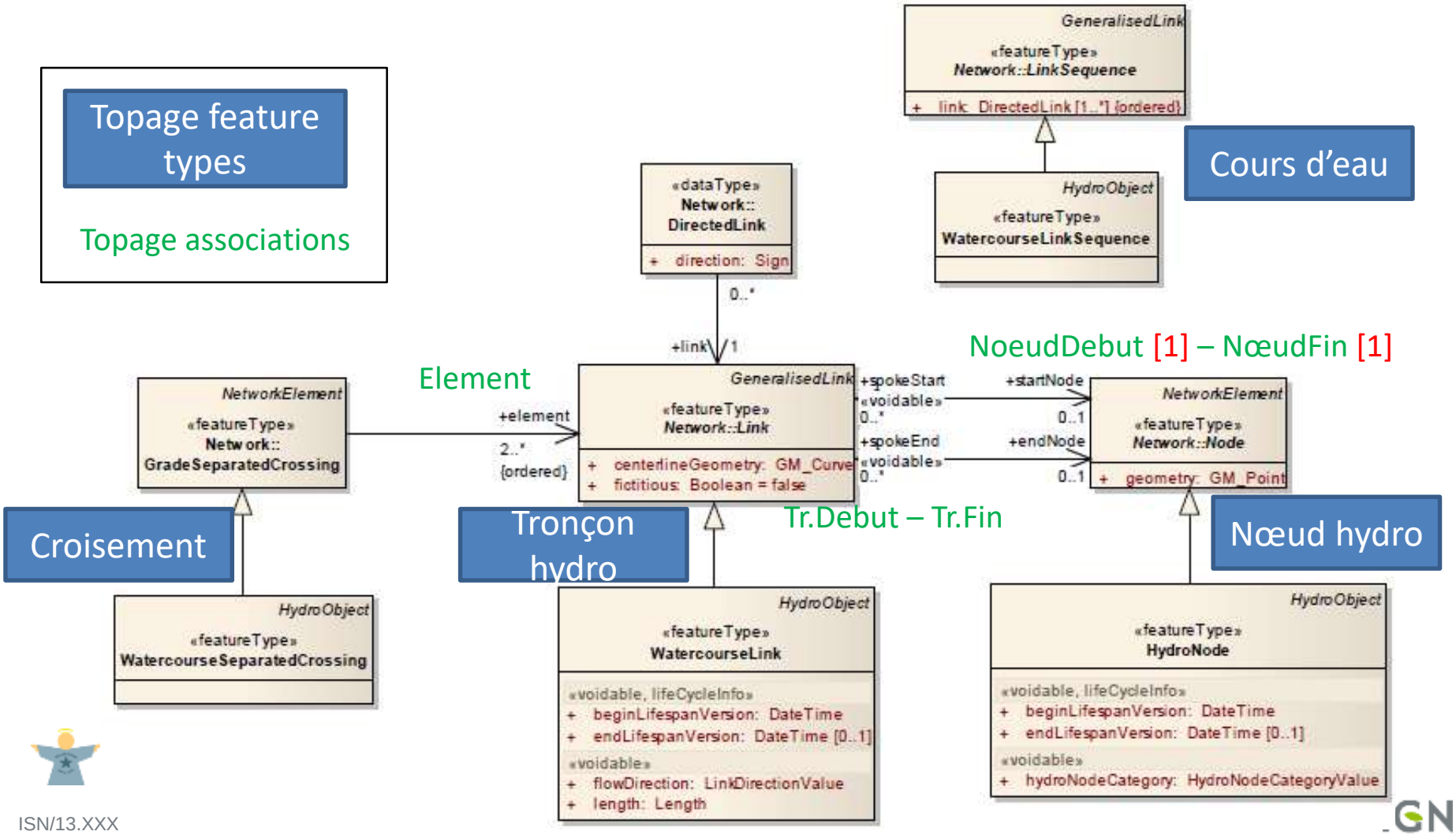
INSPIRE



Topage

Shared principles with INSPIRE

- Covers almost all the INSPIRE HydroNetwork model

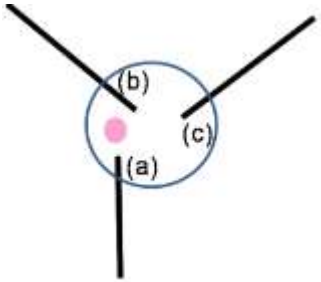


Shared principles with INSPIRE

- **Topologic rules taken from INSPIRE data specifications on hydrography**

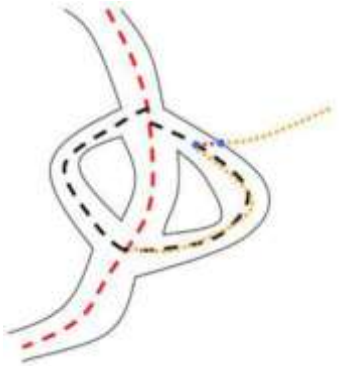
  - Connectivity tolerence

  Taken from IR Requirement Annex II, Section 8.7.7 Theme-specific Requirements – Ensuring Network Connectivity



  - Fictitious links

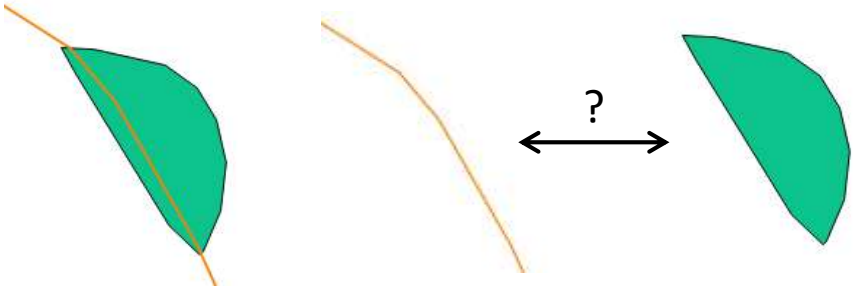
  Taken from INSPIRE Recommandation n°49



DISCREPANCIES WITH INSPIRE

Discrepancies with INSPIRE

- **Different modeling of surface water**
  - In INSPIRE, watercourse can be GMSurface or curve



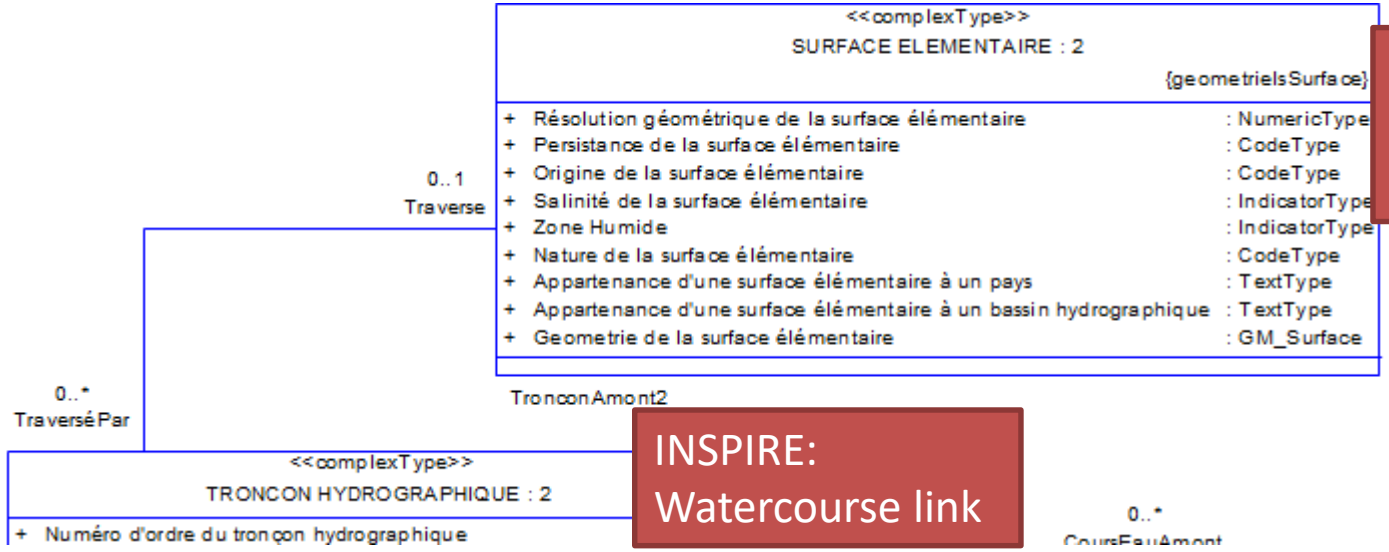
«featureType»
Watercourse

«voidable»
+ condition :ConditionOfFacilityValue [0..1]
+ delineationKnown :Boolean
+ length :Length
+ level :VerticalPositionValue
+ streamOrder :HydroOrderCode [0..1]
+ width :WidthRange

constraints
{geometryIsCurveOrSurface}
{banksShallBeDifferentShoreObjects}
{onlyManmadeHasConditionAttr}

  - In Topage, watercourse is GMCurve

    => surface representation by an other feature type

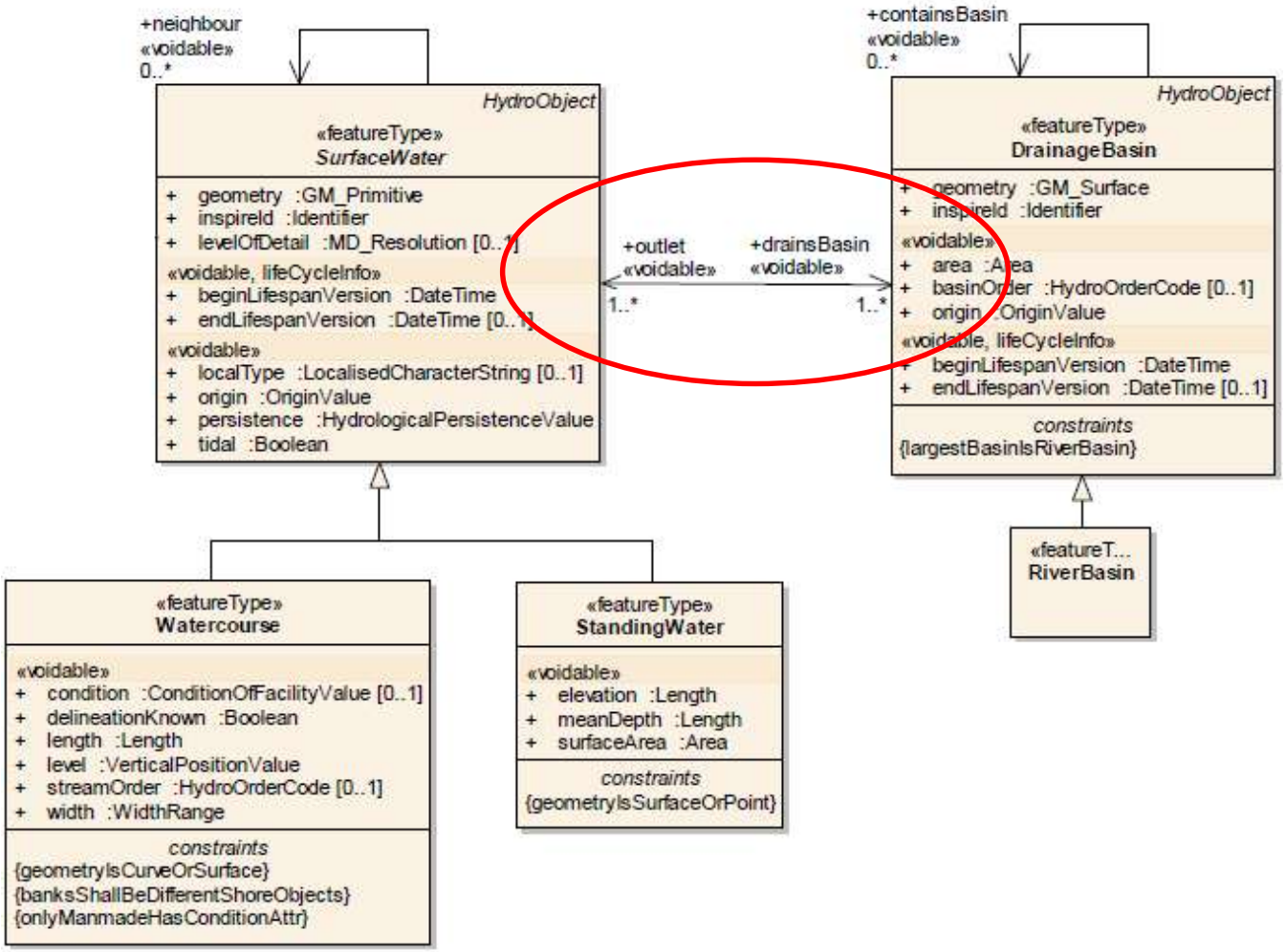


INSPIRE: Watercourse surface

INSPIRE: Watercourse link

Discrepancies with INSPIRE

- In INSPIRE, direct link between basin and watercourse

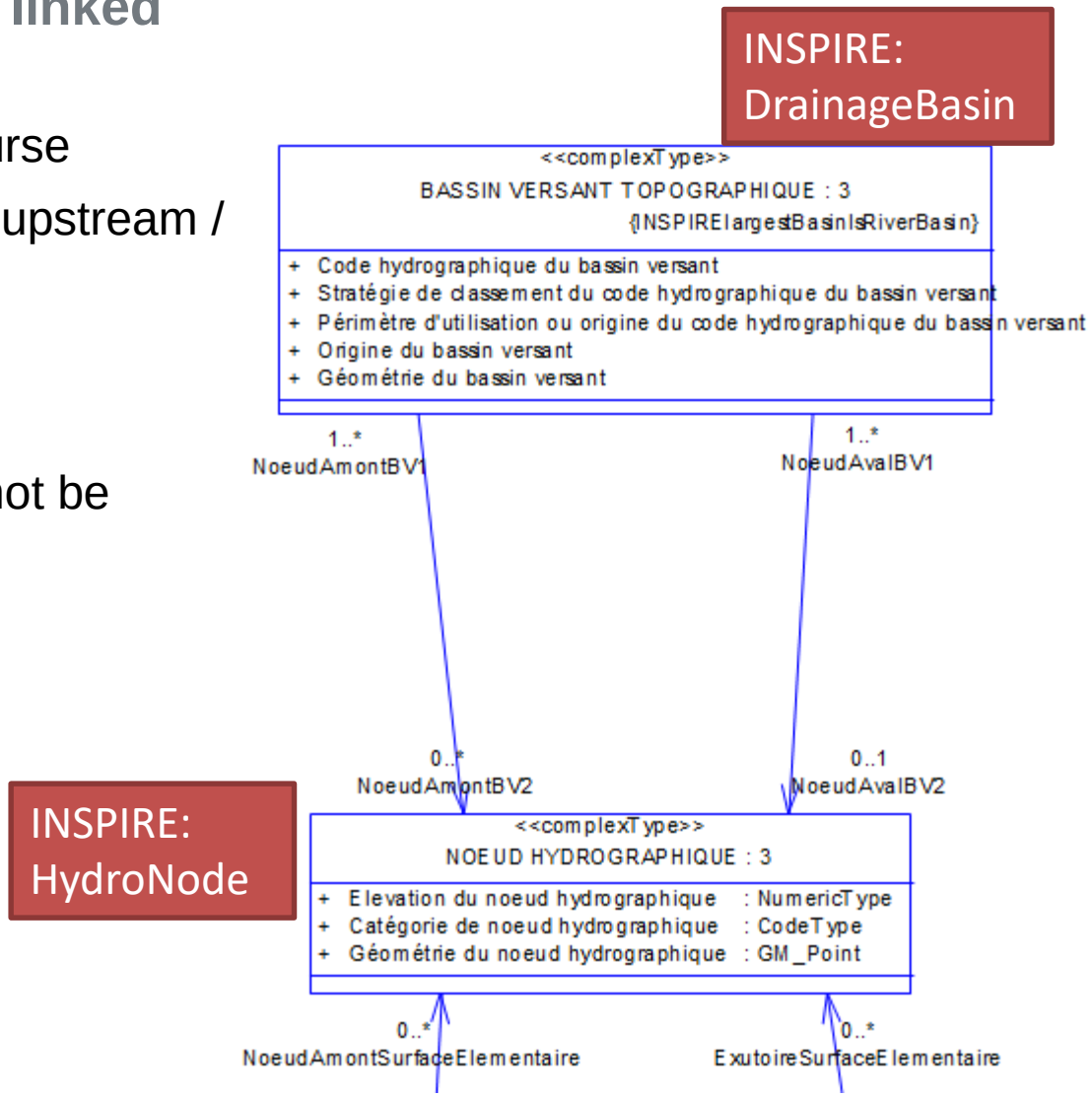


Discrepancies with INSPIRE

- **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

Language

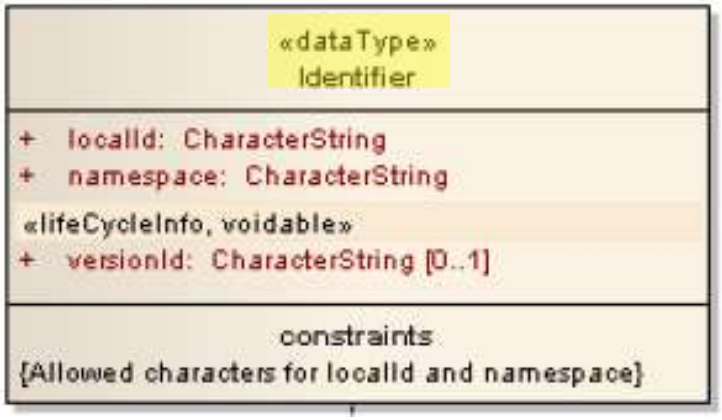
- The model is in French
- Mapping with INSPIRE attributes is documented

Attributs ETH2.0		Correspondance Inspire	Format	Card
IdentifiantOH	Identifiant de l'objet hydrographique	localId de l'inspireId (Identifier)	Caractère	1
NomOH	Nom de l'objet hydrographique	attribut text du datatype SpellingO	Caractère	0..*
LangueNomOH	Langue du nom de l'objet hydrographique	attribut language de geographicalN	Caractère	0..*
StatutNomOH	Statut du nom de l'objet hydrographique	attribut nameStatus de geographic	Caractère	0..*
SourceNomOH	Source du nom de l'objet hydrographique	attribut sourceOfName de geograp	Caractère	0..*
TypeToponymeOH	Type de toponyme de l'objet hydrographique	-	Caractère	
DateCreationOH	Date de création de l'objet hydrographique	beginLifespanVersion	Date	1
DateMajOH	Date de dernière mise à jour de l'objet hydro	endLifespanVersion	Date	1
StatutOH	Statut de l'objet hydrographique		Caractère	1
PrecAltiOH	Précision altimétrique de la donnée utilisée	-	Caractère	0..1
MethAltiOH	Méthode d'acquisition de la précision altimé	-	Caractère	0..1
PrecPlaniOH	Précision planimétrique de la donnée utilisé	-	Caractère	0..1
MethPlaniOH	Méthode d'acquisition de la précision planim	-	Caractère	0..1
CommentaireOH	Commentaires sur l'objet hydrographique	-	Caractère	0..1

Flattening: Case 1: no flattening

Ex: Inspire Identifier

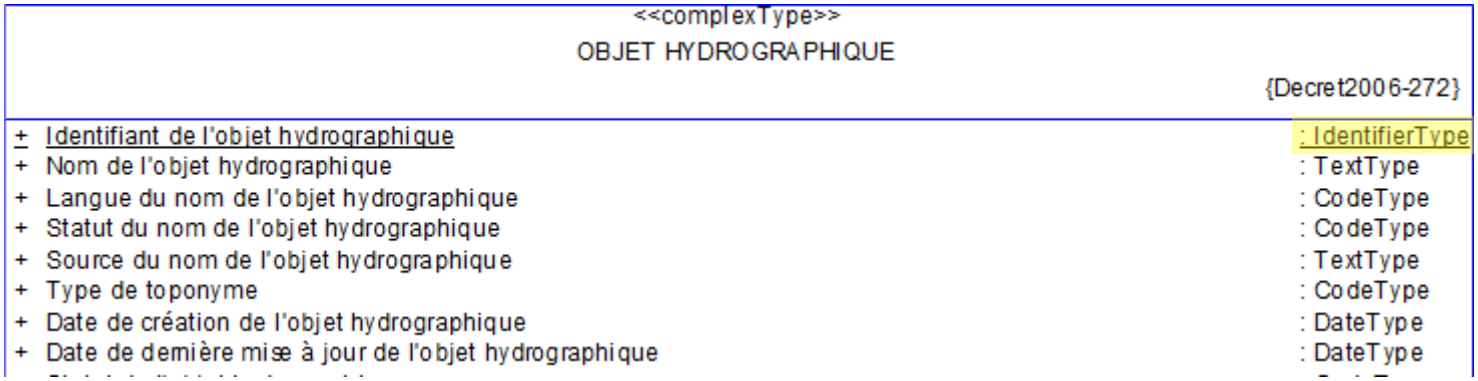
INSPIRE



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

Topage

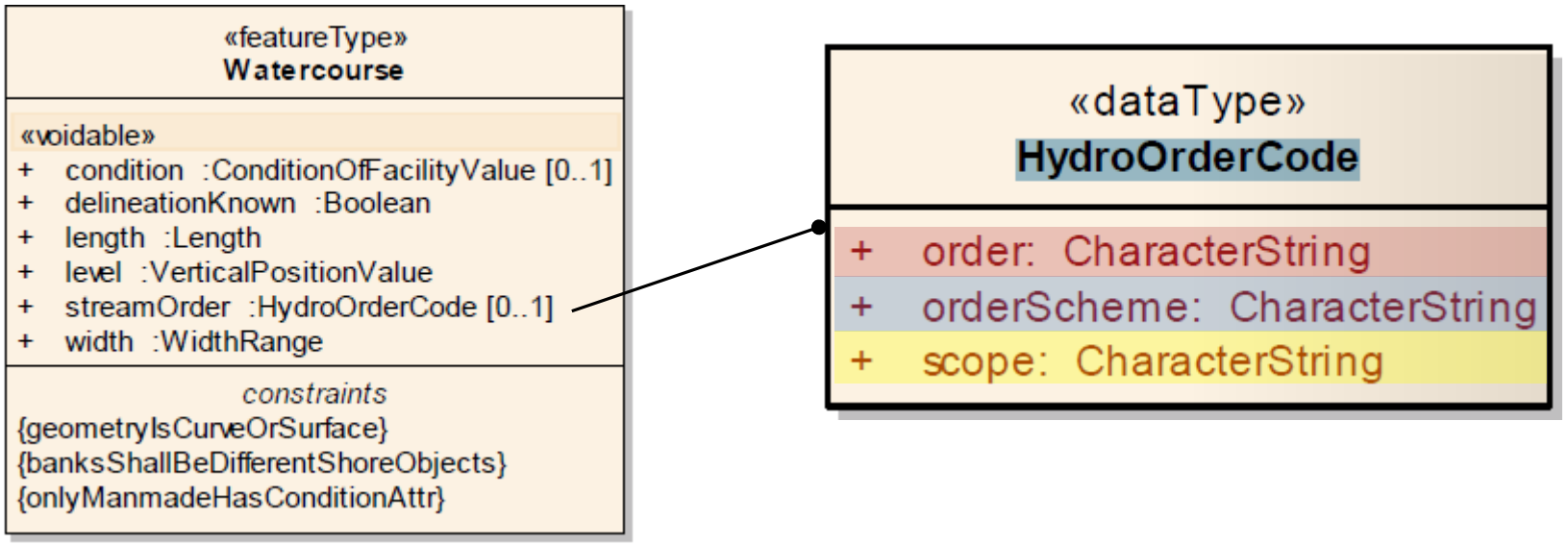


Flattening: Case 2: full flattening

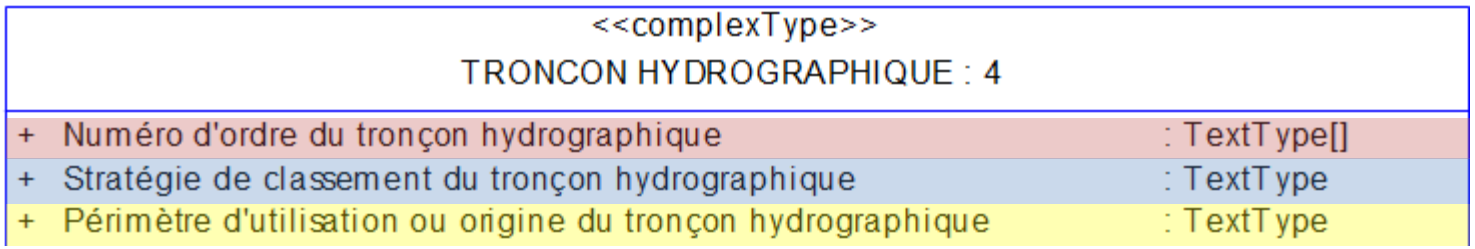
Ex: Hydro Order Code

All attributes of the dataType HydroOrderCode are associated to the watercourse

INSPIRE



Topage

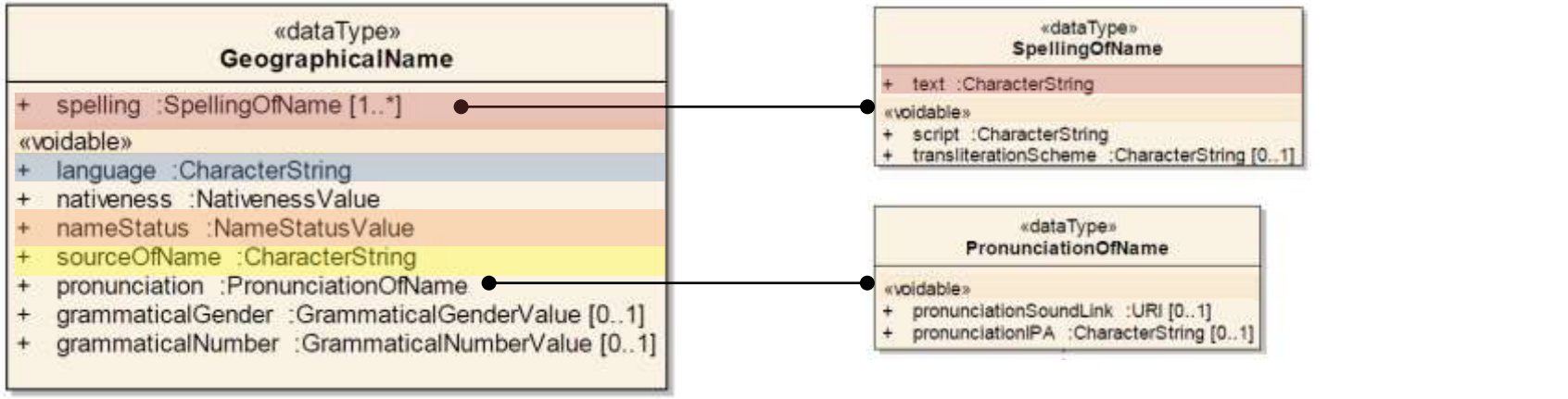


Flattening: Case 3: Flattening with simplifications

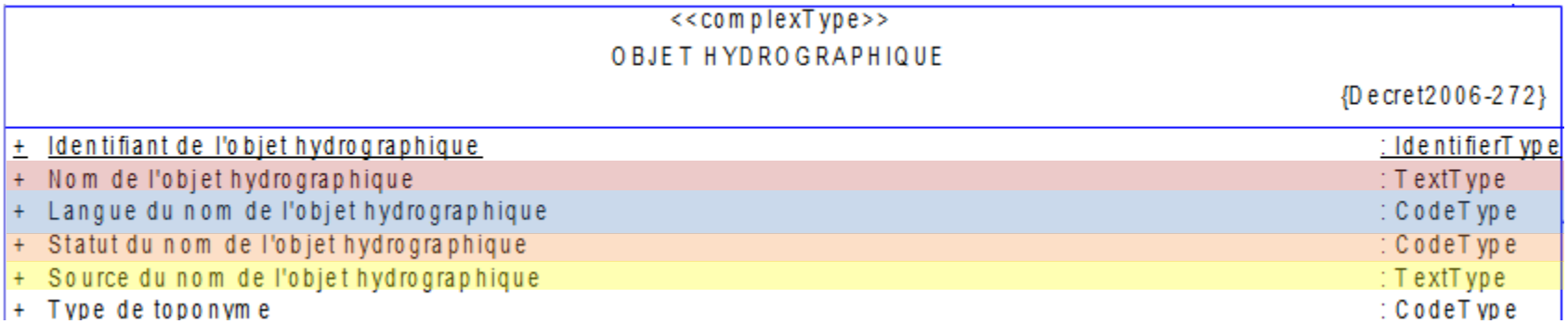
Ex: Toponym

Only one spelling has been kept
Attributes not necessary in Topage BD have been removed

INSPIRE



Topage

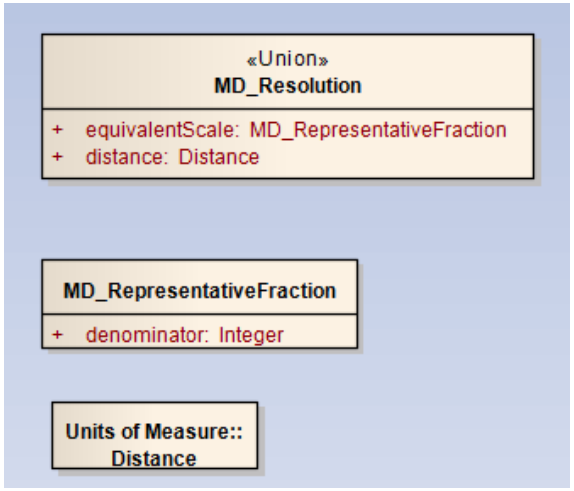


Flattening: Case 3: Flattening with simplifications

Ex: Level of Detail (MD_Resolution from ISO 19115)

Only usefull information in Topage has been kept (equivalentScale)

INSPIRE



Topage

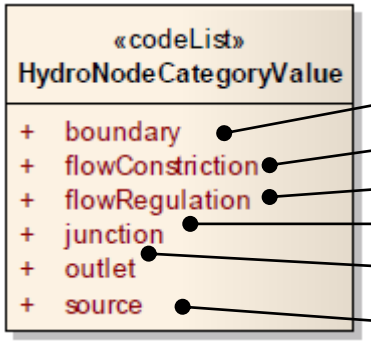
<<complexType>>
ENTITE HYDROGRAPHIQUE : 2

+ Code hydrographique de l'entité hydrographique	: TextType
+ Stratégie de classement du code hydrographique de l'entité hydrographique	: TextType
+ Périmètre d'utilisation ou origine du code hydrographique de l'entité hydrographique	: TextType
+ Résolution de l'entité hydrographique	: NumericType
+ Méthode d'obtention de la résolution d'une entité hydrographique	: TextType
+ Influence de la marée	: IndicatorType
+ Appartenance de l'entité hydrographique à un pays	: TextType
+ Appartenance de l'entité hydrographique à un bassin hydrographique	: TextType
+ Géométrie de l'entité hydrographique	: GM_Primitive

Code lists: Case 1 more values than INSPIRE

- Hydro nodes category codeList extended (voidable)

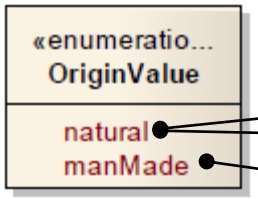
INSPIRE



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	diffluence
8	perte/infiltration

- Origin of a hydro object divided



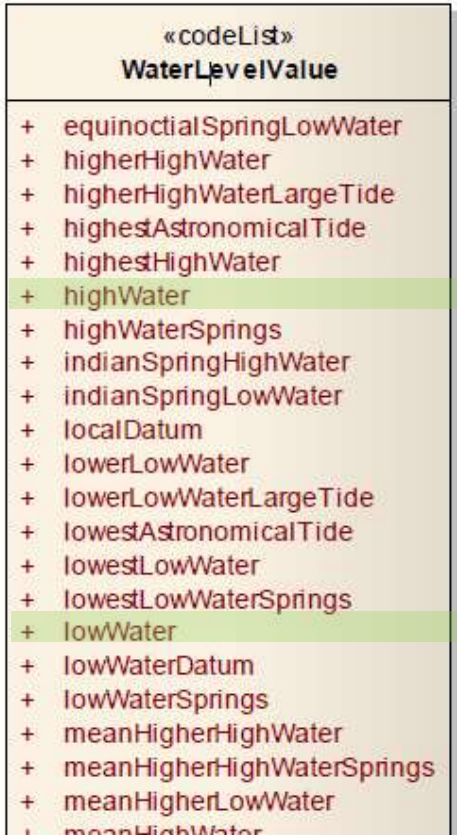
Code de l'élément	Mnémonique de l'élément
1	naturel aménagé
2	naturel non aménagé
3	artificiel

Code lists: Case 2 less values

Ex: Land-water boundary

All values kept. Unused values in status “Frozen”

Code de l'élément	Mnémonique de l'élément	Statut de l'élément
1	equinoctialSpringLowWater	Gelé
2	higherHighWater	Gelé
3	higherHighWaterLargeTide	Gelé
4	highestAstronomicalTide	Gelé
5	plus hautes eaux	Validé
6	highWater	Gelé
7	highWaterSprings	Gelé
8	indianSpringHighWater	Gelé
9	indianSpringLowWater	Gelé
10	localDatum	Gelé
11	lowerLowWater	Gelé
12	lowerLowWaterLargeTide	Gelé
13	lowestAstronomicalTide	Gelé
14	plusbasseseaux	Validé
15	lowestLowWaterSprings	Gelé
16	lowWater	Gelé
17	lowWaterDatum	Gelé
18	lowWaterSprings	Gelé
19	meanHigherHighWater	Gelé
20	meanHigherHighWaterSpring	Gelé
21	meanHigherLowWater	Gelé
22	meanHighWater	Gelé
23	meanHighWaterNeaps	Gelé
24	meanHighWaterSprings	Gelé
25	meanLowerHighWater	Gelé
26	meanLowerLowWater	Gelé
27	meanLowerLowWaterSprings	Gelé
28	meanLowWater	Gelé



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**

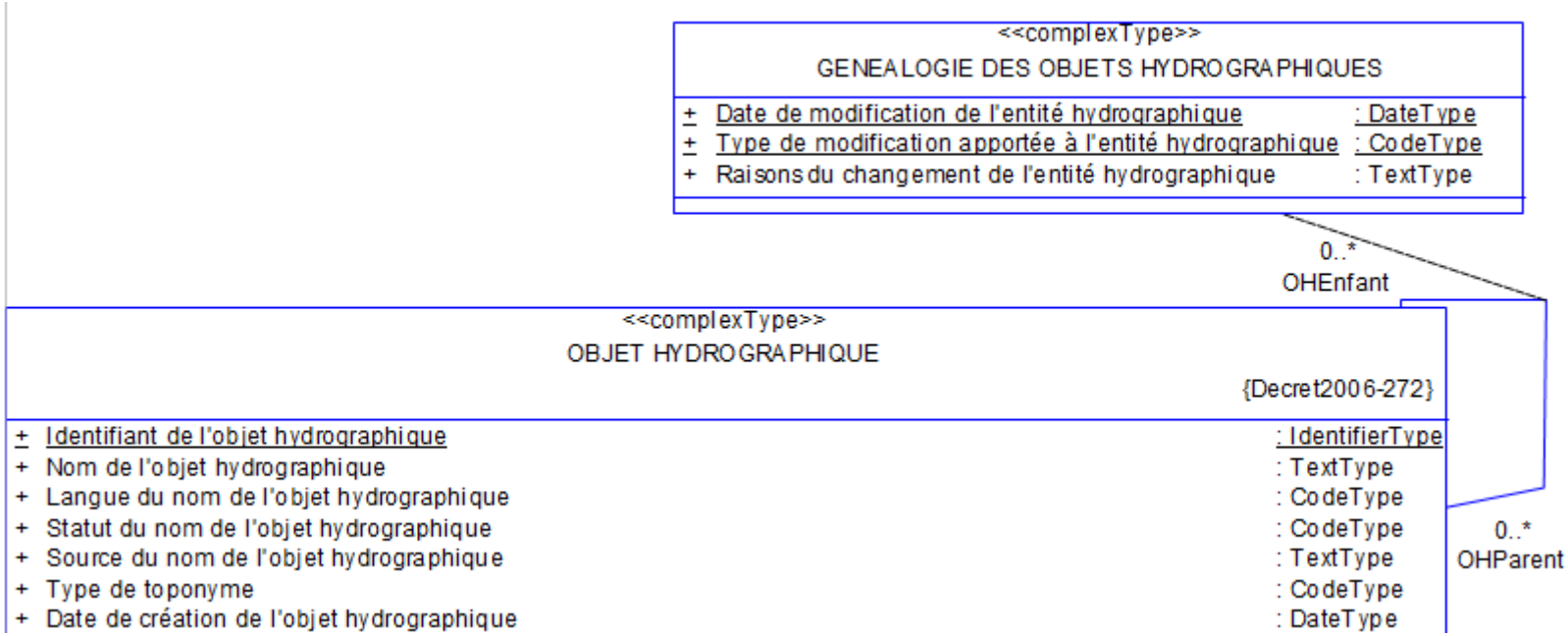
  area between sea and river (delta, mangrove…)

- **Watercourse surface**

  surface representation of a watercourse

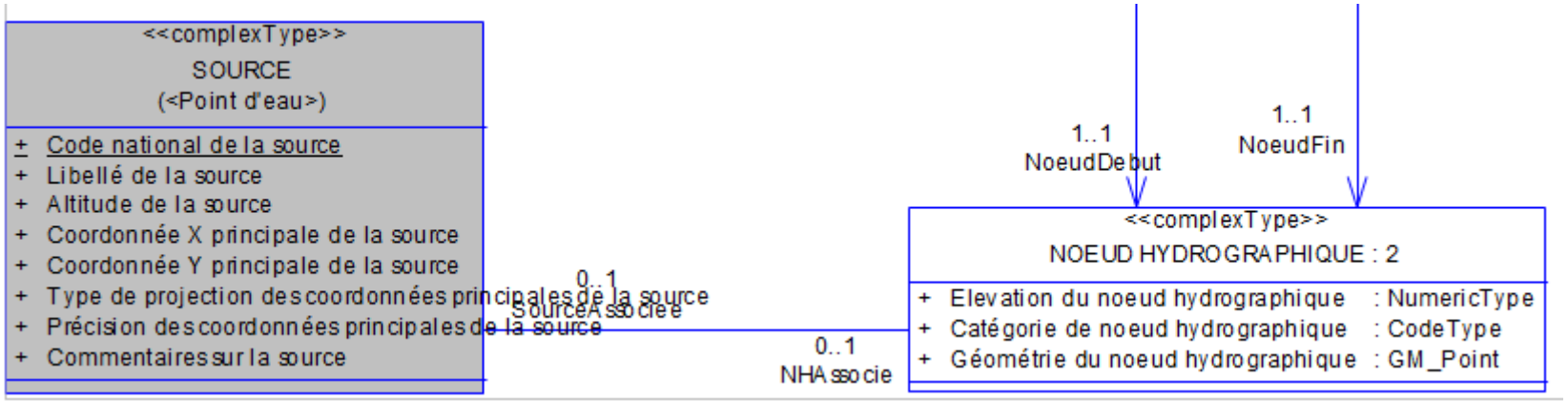
Relationship additions

- Lineage between hydro objects



Relationship additions

- Relationship with external databases

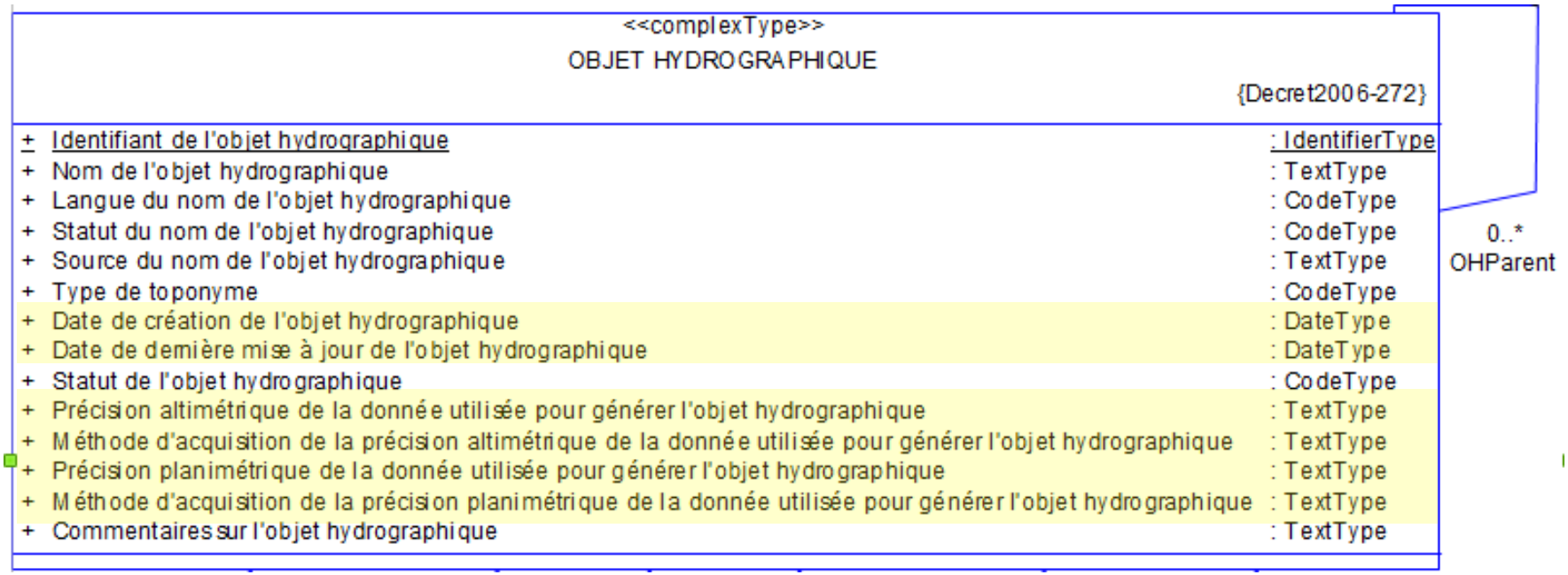


Source (hydro POI DB)

Hydro node (Topage DB)

Attribute additions

- Business attributes: Salinity, principal / secondary watercourse
- Metadata at feature level: Accuracy, capture method, dates

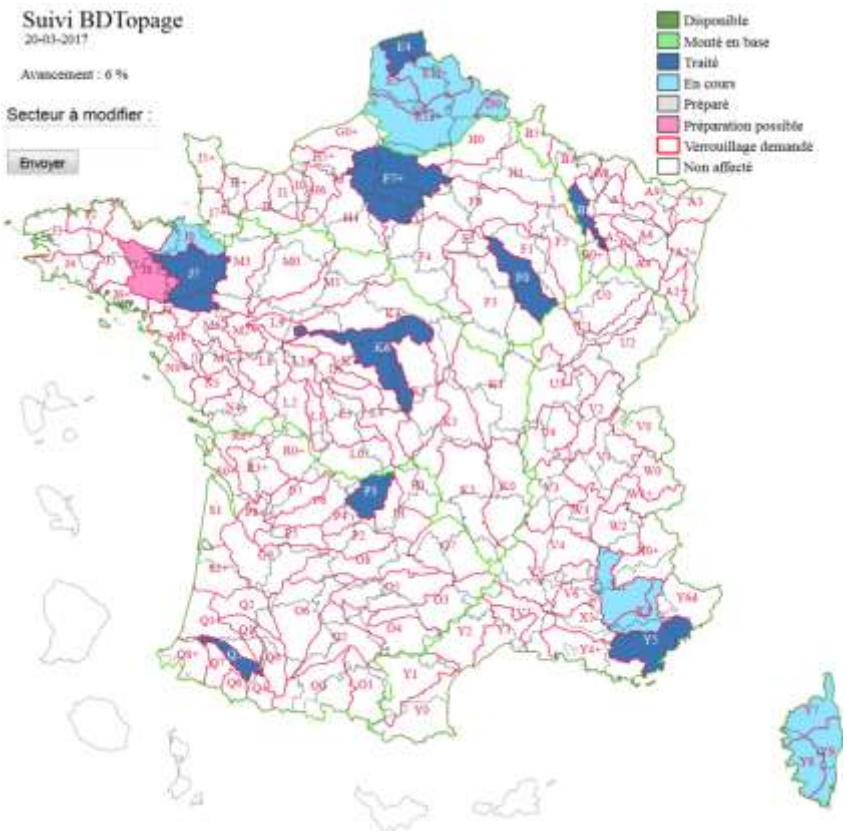


IMPLEMENTATION

Data production (IGN)

- **Validation of the model**
  - Too complex to identify gaps with user needs
  - Prototype on small areas and data submited 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 discrepencies were necessary
- **Will be easier to transform into INSPIRE model and for reporting to Europe**

Thank you !