



INSTITUT NATIONAL
DE L'INFORMATION
GÉOGRAPHIQUE
ET FORESTIÈRE

How INSPIRE has influenced the redesign of the French topographic database

ISN 17.089



dominique.laurent@ign.fr

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Plan

- Context
- INSPIRE influence
- Conclusions



GENERAL CONTEXT



Context

■ BD UNI v1:

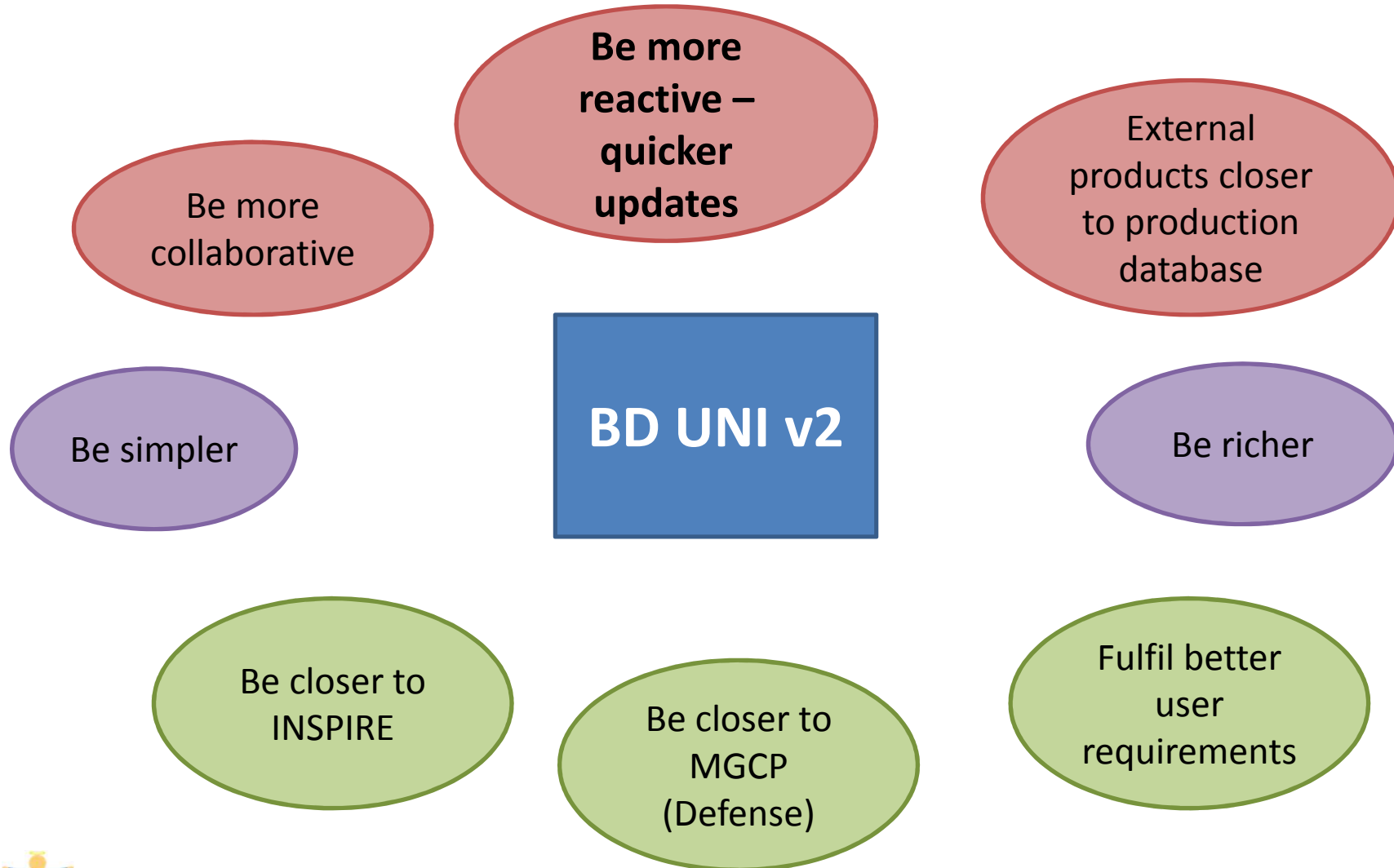
- Current (internal) production database
- Large scale topographic data base (around 10K)
- IGN main data

■ BD UNI v2 project:

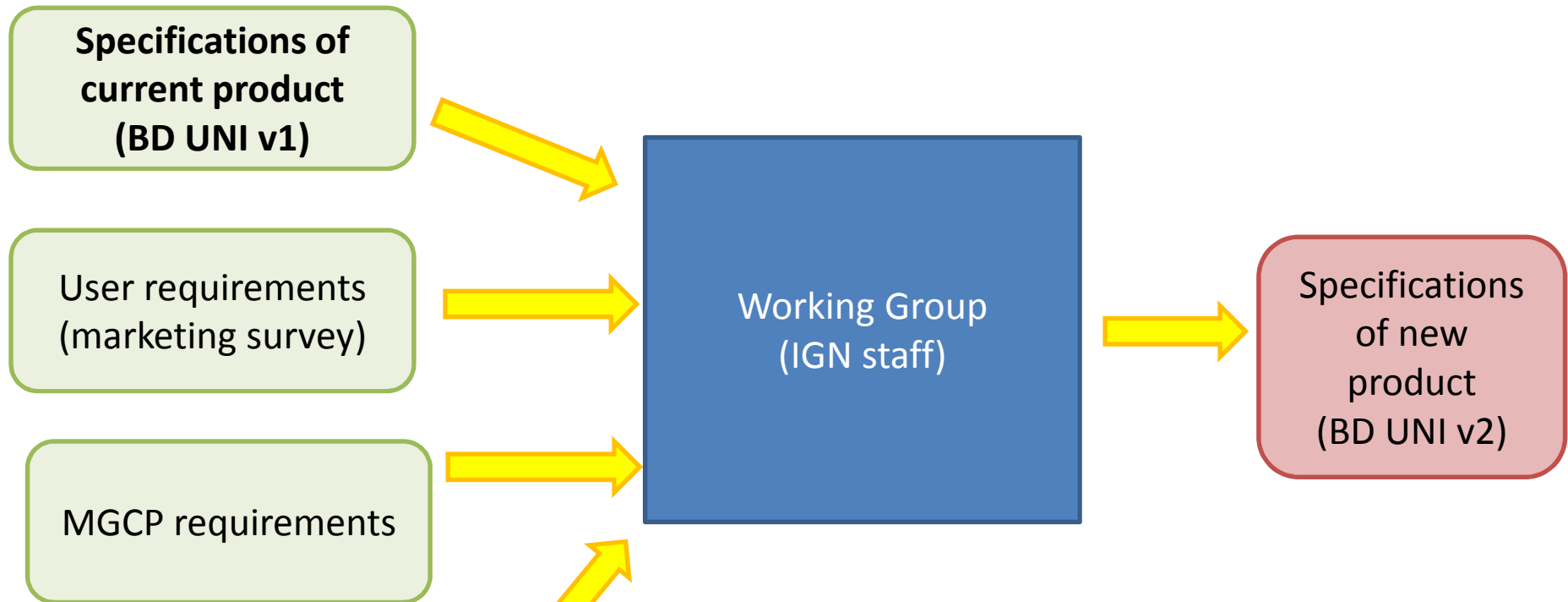
- Redesign of **data specification** and of **data production process**
 - For various reasons
- Specification work took place in 2016



Objectives



Methodology



The purpose was to make transformations to INSPIRE easier and of better quality.



Concerned INSPIRE themes

- **Considered for BD UNI v2: AU, GN, TN, BU**
- **Themes AD, LC and HY have been considered**
 - in other dedicated products
 - with external stakeholders
 - with different methodologies
- **Theme US poorly considered for INSPIRE**
 - IGN not referent data producer for electric lines
 - No big issues regarding governmental services



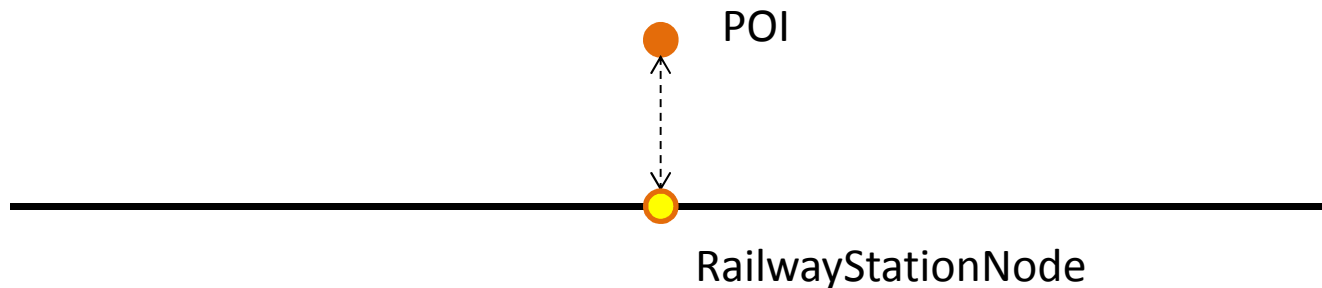
INSPIRE INFLUENCE



Avoid wrong transformations

■ Railway Station example

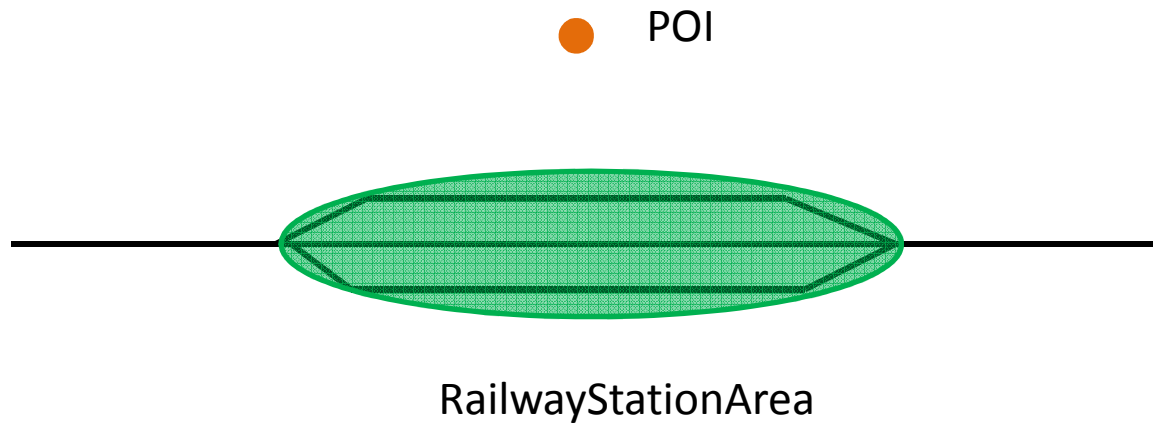
- In BD UNI v1, a **point** of interest (outside the network)
- In INSPIRE, it may be a RailwayStationArea or a RailwayStation**Node**
- Matching table:
 - Correspondence between our POI and INSPIRE nodes
 - Key feature type in railway network
 - But does not fit with the INSPIRE definition



Avoid wrong transformations

- Railway Station example

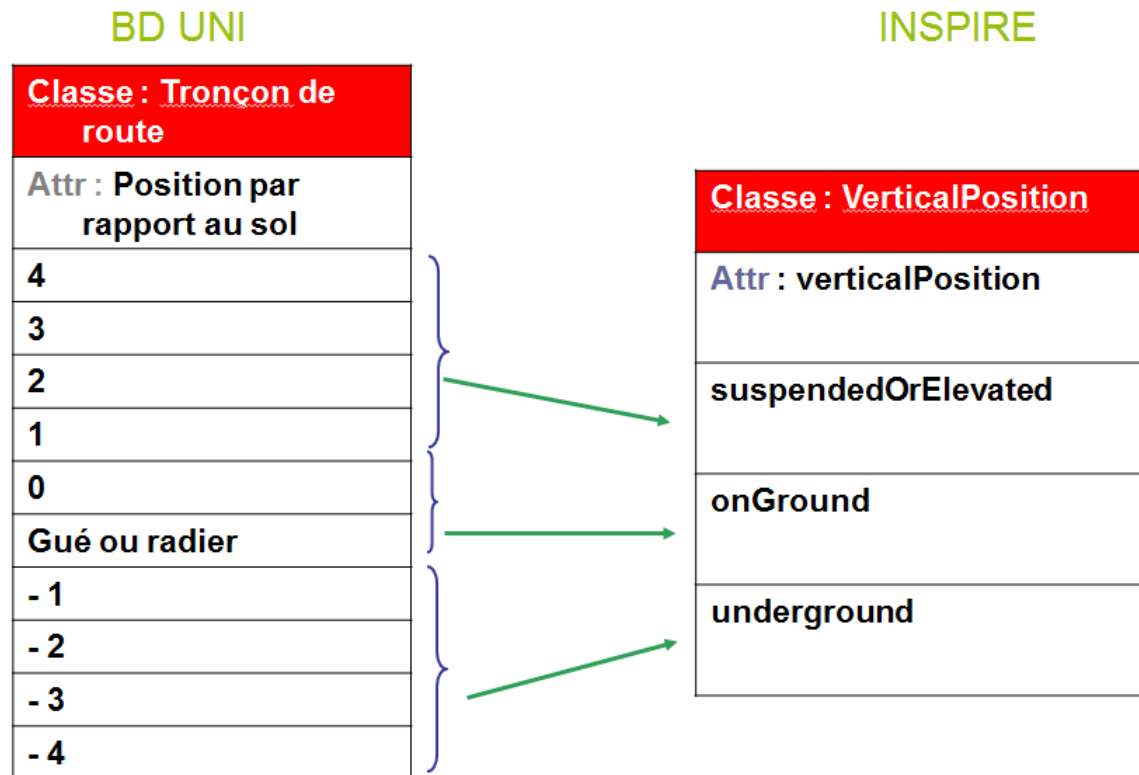
- In BD UNI v2, decision to capture railway stations as areas
- => correct matching with INSPIRE RailwayStationArea



Avoid loss of information

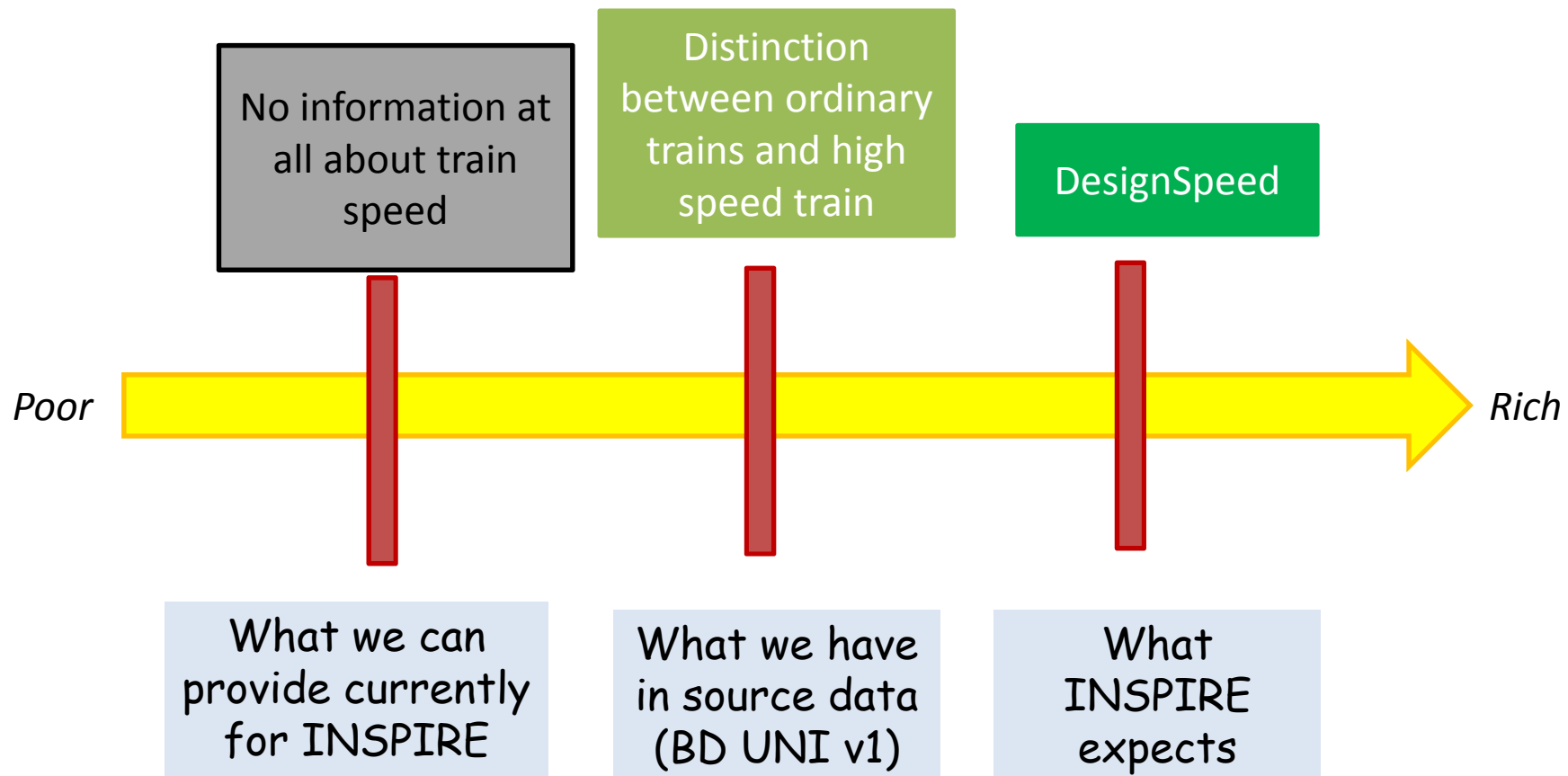
■ Case 1: VerticalPosition

- BD UNI richer than INSPIRE
- But we have what INSPIRE expects
- Not an issue
- No change



Avoid loss of information

- Case 2: DesignSpeed



Avoid loss of information

- **Case 2: DesignSpeed**

- BD UNI : we make distinction between

- Train

- High speed train

- INSPIRE : DesignSpeed

- IGN decision:

- No matching => lost of valuable information

- We have included the DesignSpeed information in specification of new product
BD UNI v2

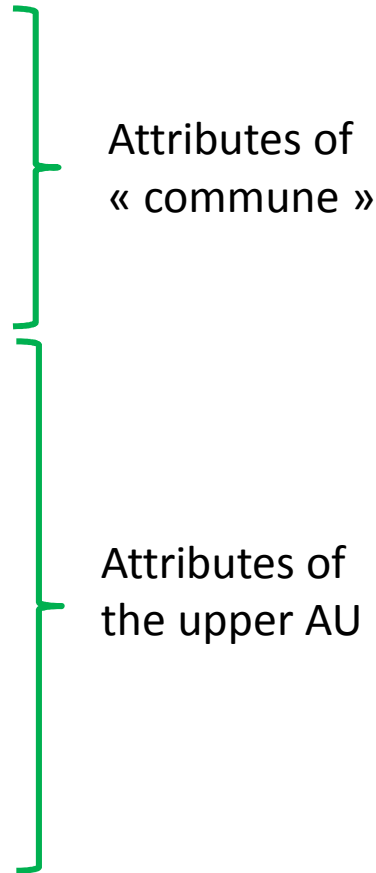
- We expect potential partnership to get this information



Make transformations easier

- Example: administrative hierarchy

Commune
géometrie
nom
code
...
Code canton
Code arrondissement
Nom arrondissement
Code arrondissement
Nom arrondissement
Code région
Nom région



- In existing data, IGN provides level 5 (commune) and attributes of upper levels are carried by “commune” => it is up to user to build upper levels

In source data, a key feature « Commune » - municipality

Make transformations easier

- **Example: administrative hierarchy**
 - INSPIRE requires a feature type for each level of AU
 - Current matching rules:
 - **Create new features** for upper level AU
 - Get their geometry by merging the geometries of lower level
 - **Provide unique and persistent identifiers**



Make transformations easier

- Example: administrative hierarchy

IGN has external identifiers for “Commune” ... but not for the upper levels

Decision was to use **thematic identifier** based on SHN (from EuroBoundaryMap) for all levels of AU => complex transformation because of some specificities (e.g. over-sea territories)

AdministrativeUnits			Transformation	BDUniGE
Element	Attribut Lien	Type		Classe
identifiant	localld	string	<pre> case 1 : ARRONDIS : "FR"+ "93" + "13" + "3" + ExtractString(NUMINSEE,3,3) where NUMINSEE like "13%" "FR"+ "11" + "75" + "1" + ExtractString(NUMINSEE,3,3) where NUMINSEE like "75%" "FR"+ "82" + "69" + "1" + ExtractString(NUMINSEE,3,3) where NUMINSEE like "69%" Case 2 : COMMUNE if (dataset name contains "FR" or dataset name contains "20"), "FR"+ INSEEREG + INSEEDEP + INSEEARD + ExtractString(NUMINSEE,3,3) if not (dataset name contains "FR" or dataset name contains "20"), "FR"+ INSEEREG + INSEEDEP + INSEEARD + ExtractString(NUMINSEE,4,2) Case 3 : ARRONDISSEMENT if (dataset name contains "FR" or dataset name contains "20"), "FR"+ INSEEREG + INSEEDEP + INSEEARD + "000" if not (dataset name contains "FR" or dataset name contains "20"), "FR"+ INSEEREG + INSEEDEP + INSEEARD + "00" Case 4 : DEPARTEMENT if (dataset name contains "FR" or dataset name contains "20"), "FR"+ INSEEREG + INSEEDEP + "0000" if not (dataset name contains "FR" or dataset name contains "20"), "FR"+ INSEEREG + INSEEDEP + "000" Case 5 : REGION "FR"+ INSEEREG + "000000" Case 6 : ETAT "FR" + "00000000" </pre>	Arrondissement municipal/Commune/Arrondissement/ Département/Région/Etat

Make transformations easier

- **Example: administrative hierarchy**
 - Current situation:
 - Complex transformation
 - Confusion between external identifier (inspireId) and thematic identifier
 - Decision for new product:
 - Create a feature type for each level of AU
 - Manage in production database a unique and persistent identifier for each feature



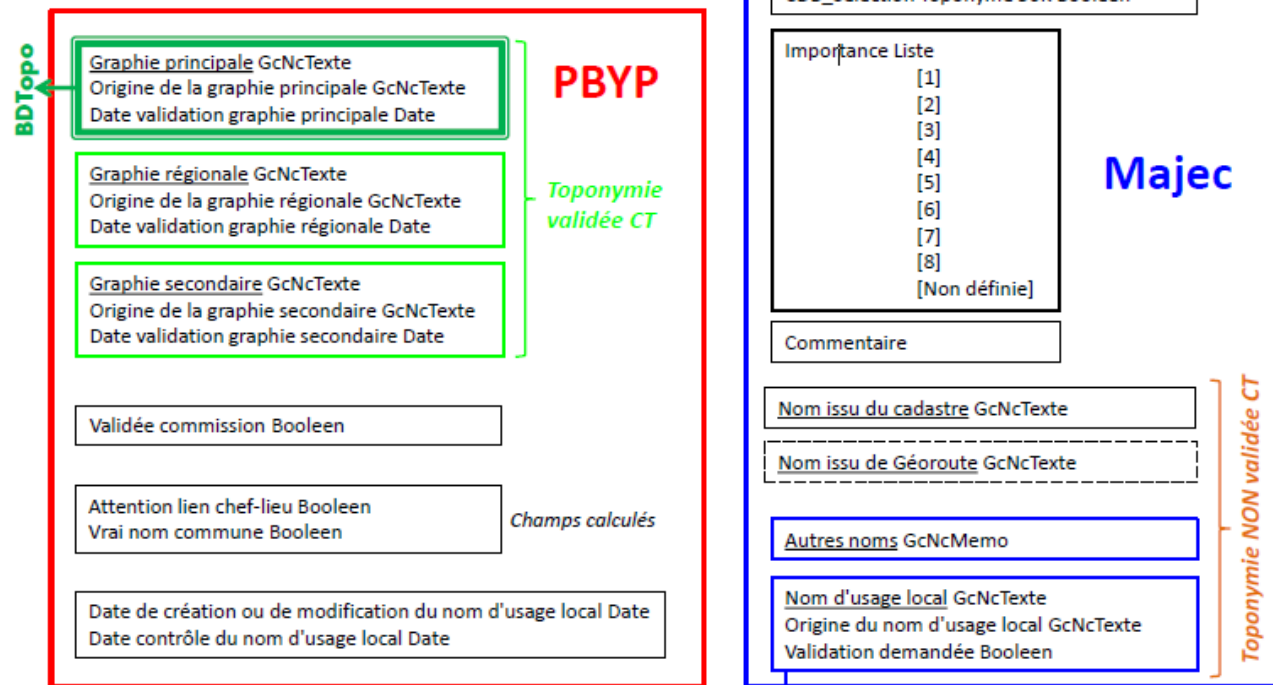
Pumping up our data model

- Case of geographical names

- Lot of information related to geographical name(s) in source data

A feature may have several names in source data

Structure des toponymes dans la BDUi actuelle :



Pumping up our data model

- Case of geographical names

- Current situation:

- Lot of information related to geographical name(s) in source data
 - Our old product is in traditional database
 - Fixed multiplicity for attribute values
 - Example:
 - name-1, name-1.status, ...
 - name-2, name-2.status,
 - Named places are grouped in a theme “Points of Interest”
 - Advantage:
 - the complex set of attributes applies only to places having a name
 - Easy to manage (on production side)
 - Drawback:
 - The name is carried by a POI and not by the “true” feature
 - **Not user-friendly**, not in line with INSPIRE



Pumping up our data model

- Case of geographical names

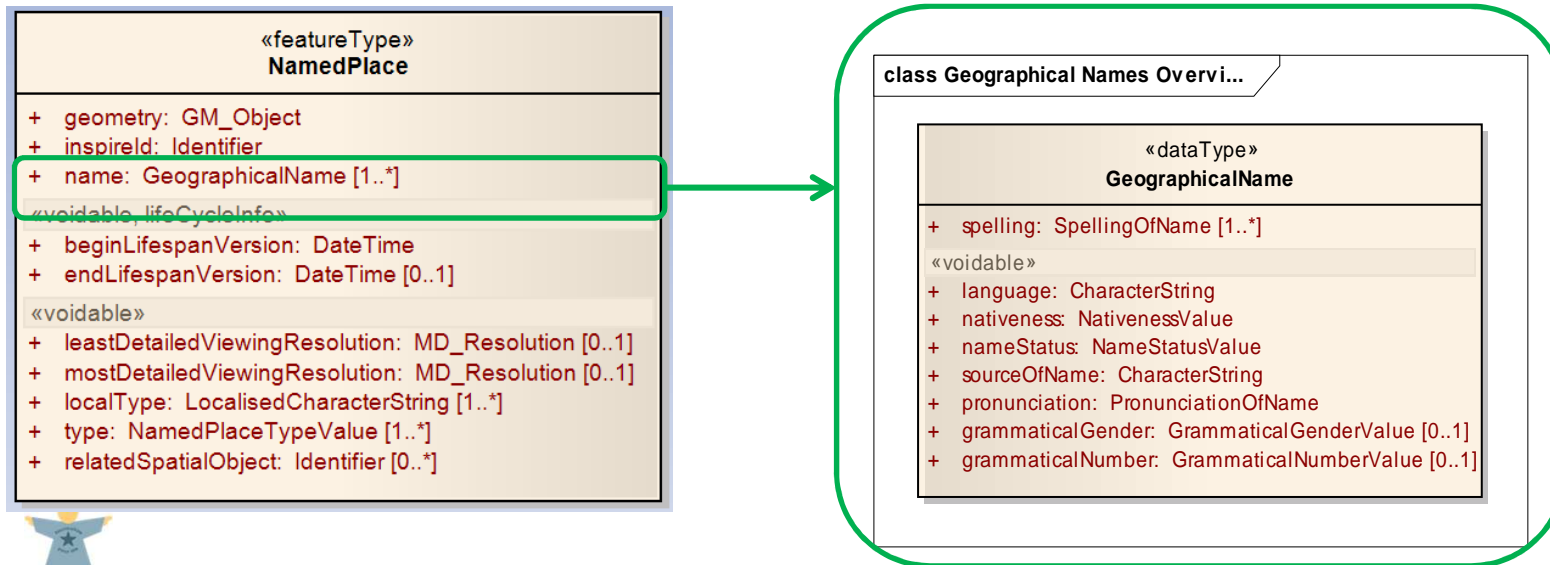
- Decision for new product:

- Model close to INSPIRE

- Named place

- Carrying unlimited number of names

- Names described by their spelling and by “metadata” attributes : language, source, status, ...



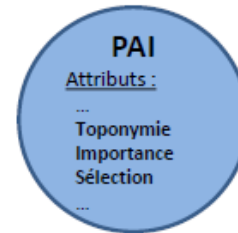
Pumping up our data model

Plusieurs solutions de modélisation dans la BDUi v2 : 2) Créer un champ unique 'JSON'

Champ JSON : champ de type clé-valeur avec saisie d'un nombre de toponymes illimité

Graphie	Origine	Date de validation	Statut	...
le vieil armand	BDTopo	31/07/1994	Classique	
hartmannswillerkopf	BDTopo	31/07/1994	Régional	
Hartmannswillerkopf (le vieil armand)	BDTopo	31/07/1994	Cartographique	
au vieil armand	EJN		Cadastral	
le vieil armand ou hartmannswillerkopf	SDIS		Partenarial	
...				

Ajouter la 'Sélection', ... ?



Use of JSON attributes
New tools to be developed to capture and manage this kind of attributes

POI { Importance : 8,
CDB_Sélection : GE,
Commentaire : Blabla,
Toponymie : [{ Statut : Validé,
Graphie : mon lieu-dit,
Source : BDTopo,
Date : 26/05/2010,
Validation demandée : - ,
Id_partenaire : ... },
{ Statut : Collecté,
Graphie : cet endroit,
Source : Mairie,
Date : 26/05/2010,
Validation demandée : oui,
Id_partenaire : ... }, ...]

STATUT
Validé
Collecté
Partenarial
Régional
Autre
(BAN ?)

```
{...
...
...
...
... } , ... ]}
```

Hierarchic structure in our new product!

Enrich our data model

- **Example: Buildings**

- Current situation:

- INSPIRE requires

- current use - number of dwellings -....
 - date of construction - material of roof
 - number of floors - material of structure

- This information is also required by our users
 - But is not or poorly available in our current product



Enrich our data model

- Example: Buildings

- Decision for new product

- These attributes are considered as core information

- Include these attributes in data model

- Struggle to get source information

- Data available in land registry (Cadastre)

- Integration test was performed

- technical difficulties to match IGN buildings with land registry ones

- privacy issues



LEARNINGS AND CONCLUSIONS



Modelling approach

- Data model prepared by Excel tables

Bâti		Besoin(s)	Valeurs de la 'Désignation'
	Etat de l'objet Liste	Inspire / MGCP	
	[En projet]	<sans valeur> réellement	
	[En construction]	idem BDUi	
	[En service]	idem BDUi	
	[En ruines] ???	remplace <sans valeur>	
	Méta-données Unification GcNcTexte	Inspire + MGCP (abandonné, détruit, démantelé, endommagé)... MAIS pas si facile...	
	Date de construction Texte	Métadonnées d'appariement concaténées : TA, TX, TY, Id Parcelle, Type BDP, Anc. SG2D, Anc. CLEABS	
	Bâtiment MultiPolygone Dim3	Année de la source de la donnée : pertinent pour les nouvelles données.	
	Nature Liste	Valeurs de 'Nature' Inspire supplémentaires :	
	[Arc de triomphe]	[Auvent]	
	[Arène ou théâtre antique]	[Hangar]	
	[Chapelle]	[Mosquée] >> PAI BDUi	
	[Château]	[Synagogue] >> PAI BDUi	
	[Eglise]	[Temple] >> PAI BDUi	
	[Fort, blockhaus, casemate]	[Habitation troglodytique] >> PAI BDUi	
	[Indifférenciée]		
	[Industriel, agricole ou commercial]		
	[Monument]		
	[Serre]		
	[Silo]		
	[Tour, donjon, moulin]		
	[Tour, donjon]	Inspire : Valeur scindée en deux autres valeurs	
	[Moulin à vent]		
	[Tribune]		



Modelling approach

- Why no UML model ?
 - Not in the missions of the Working Group
 - Mission was to decide on content
 - Not (yet) in the IGN culture
 - UML is not a “reflex” among IGN staff
 - UML model not seen as useful
 - New product in simple structure
 - No inheritance
 - Few associations
 - => graphical representation not so useful
 - May come in future

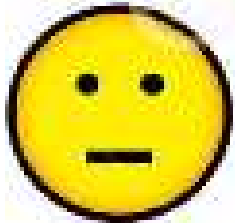



Flexibility regarding INSPIRE

- INSPIRE has significantly influenced the design of our new product
- But there will remain many differences or even discrepancies between BD UNI v2 and INSPIRE
 - Repartition in themes is not the same
 - Example: Ferry crossings are
 - in Water Transport Network in INSPIRE
 - In Road Transport Network in BD UNI v2
 - Missing attributes, additional ones
 -



Why adopting INSPIRE (sometimes)

Reason	Examples	Result
Avoid « wrong » transformations. Ensure minimum quality of INSPIRE data. INSPIRE as reasonable constraint	Railway station captured as area (instead of POI)	
INSPIRE helps us to « push » user requirements. INSPIRE as an opportunity.	Enrichment of theme Buildings Processing of Geographical Names	



Why not (always) adopting INSPIRE

- INSPIRE not the main driver;
 - Main driver: user requirements
 - Starting point was specification of old product and not the INSPIRE data models
- No need to adopt INSPIRE “natively” in production if transformations don’t raise issues
- INSPIRE not always seen as good practice
 - Example: Transport Network
 - in INSPIRE, transport properties are feature types attached by linear referencing to the transport objects
 - In our source data, transport properties are attributes directly carried by the transport objects
 - Easier to manage in production and to use by GIS
 - => INSPIRE modelling approach was not adopted



Why not (always) adopting INSPIRE

- Take into account production constraints:

- INSPIRE does not mandate capture of new data
- But INSPIRE pushed us to enrich our new product (e.g. BU)
- Enrichments limited to
 - What is considered as useful
 - What is considered as (more or less) feasible, e.g. more collaborative capture or search for new partnership
- More flexible specifications
 - Core content: with some quality measure and guarantee
 - Extended content: included in the model but no guarantee



Next steps

- **Validation:**

- Production of test data on a sample of territory
- To be submitted to users
- Data specifications to be revised if necessary

- **Work on external products**

- **Transformation to INSPIRE**

- New matching tables
- Run again transformation process

 Check if no remaining (or new) significant issue