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

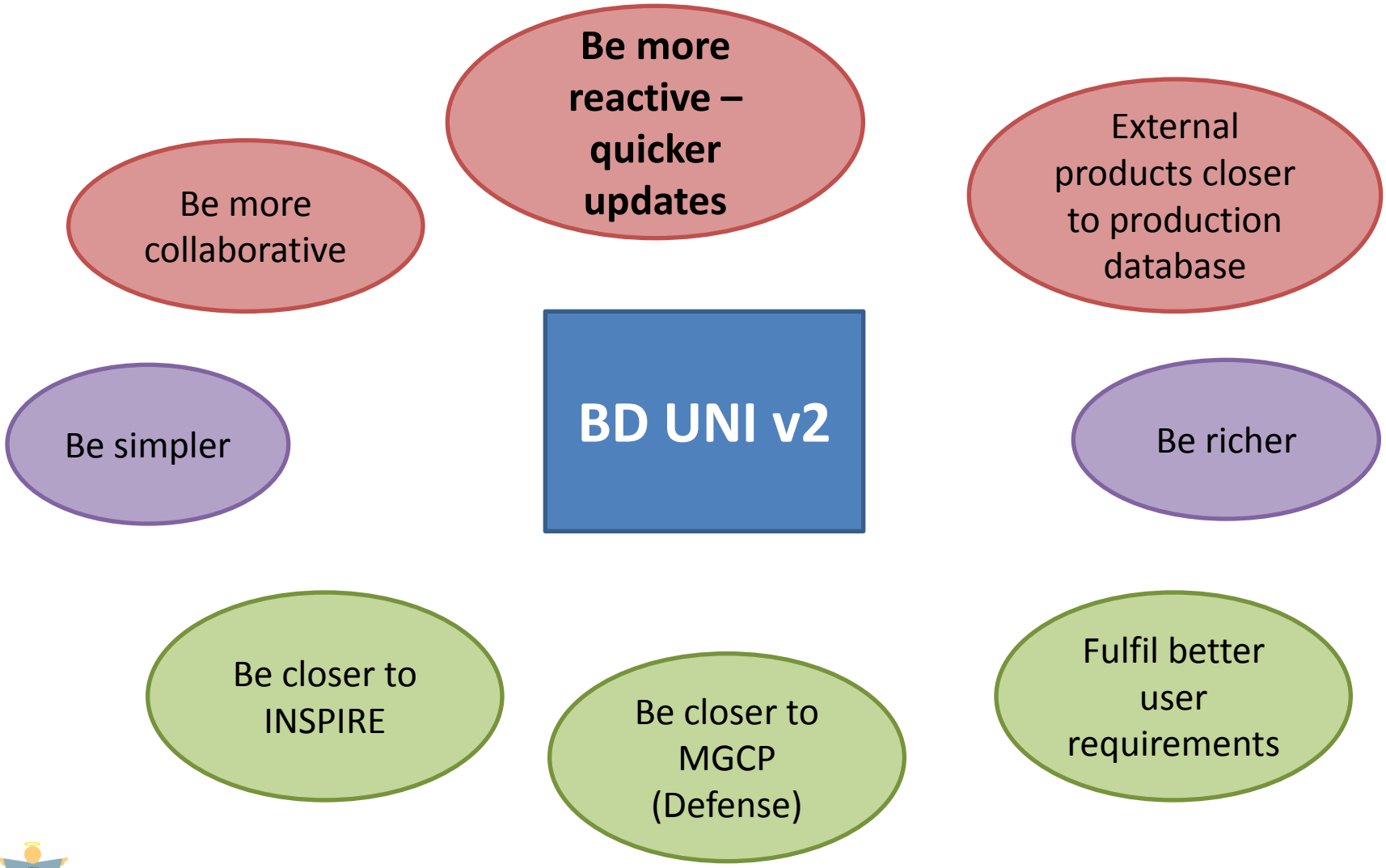
- Context
- INSPIRE influence
- Conclusions

GENERAL CONTEXT

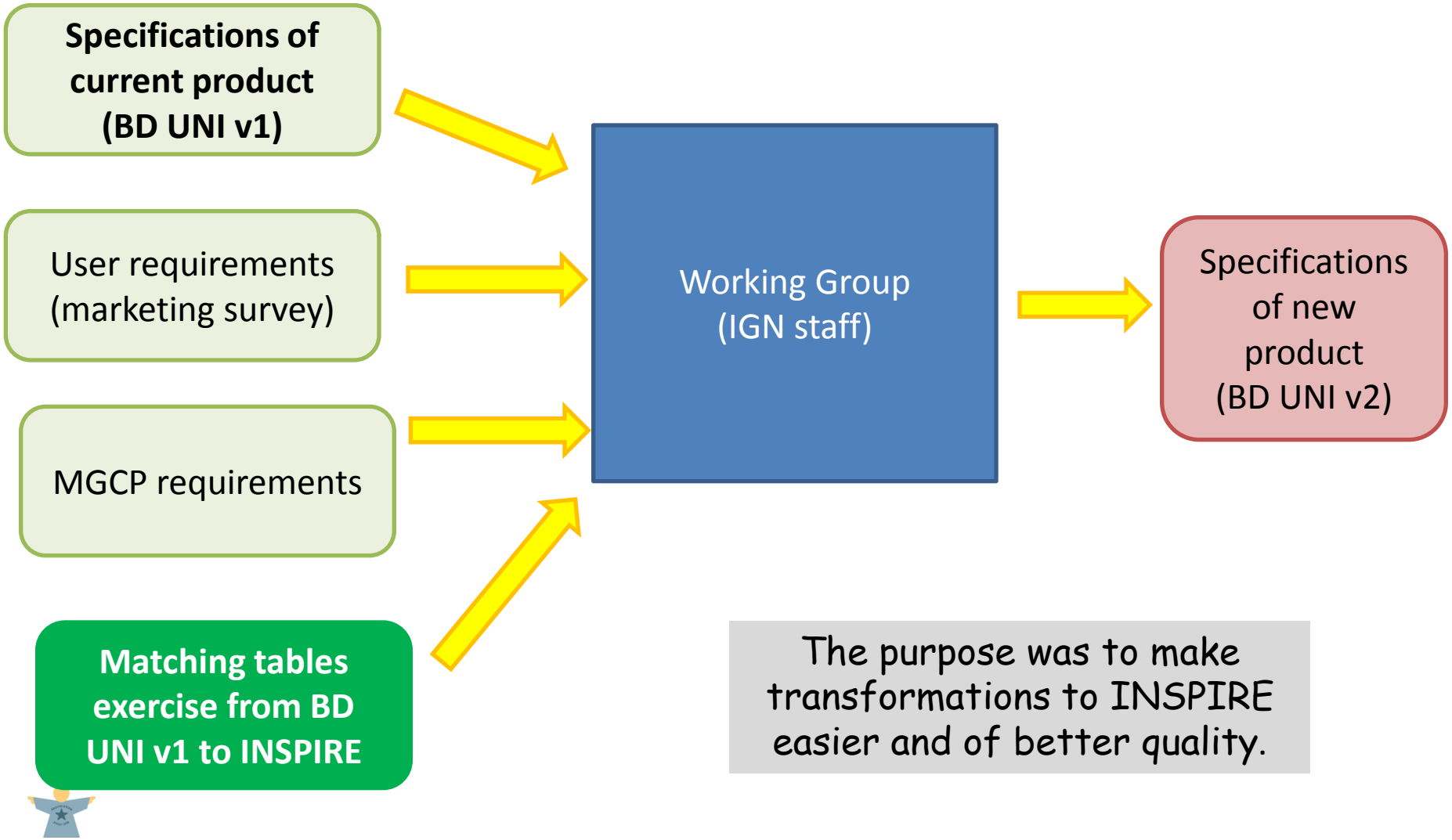
Context

- **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


Be more reactive – quicker updates
Be more collaborative
External products closer to production database
BD UNI v2
Be simpler
Be richer
Be closer to INSPIRE
Be closer to MGCP (Defense)
Fulfil better user requirements

Methodology



Concerned INSPIRE themes

- **Considered for BD UNI v2: AU, GN, TN, BU**

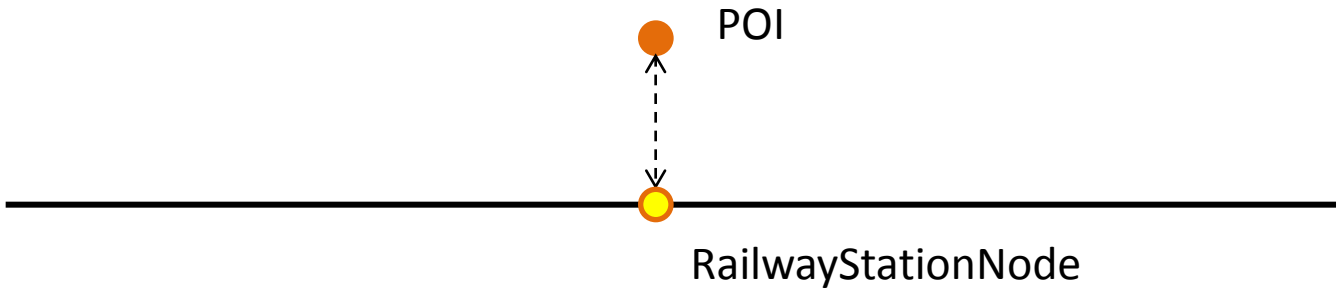
- **Themes AD, LC and HY have been considered**
  - in other dedicated products
  - with external stakeholders
  - with different methodologies

- **Theme US poorly considered for INSPIRE**
  - IGN not referent data producer for electric lines
  - No big issues regarding governmental services

INSPIRE INFLUENCE

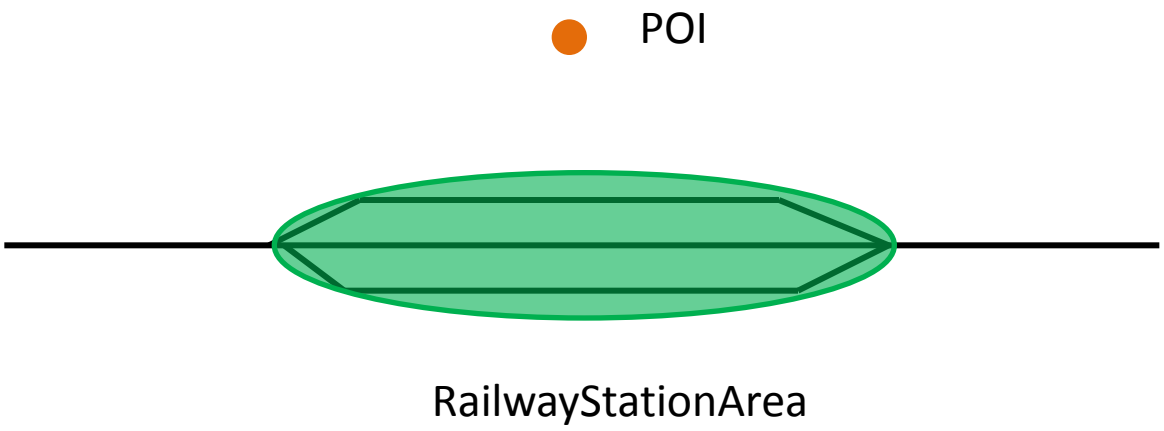
Avoid wrong transformations

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



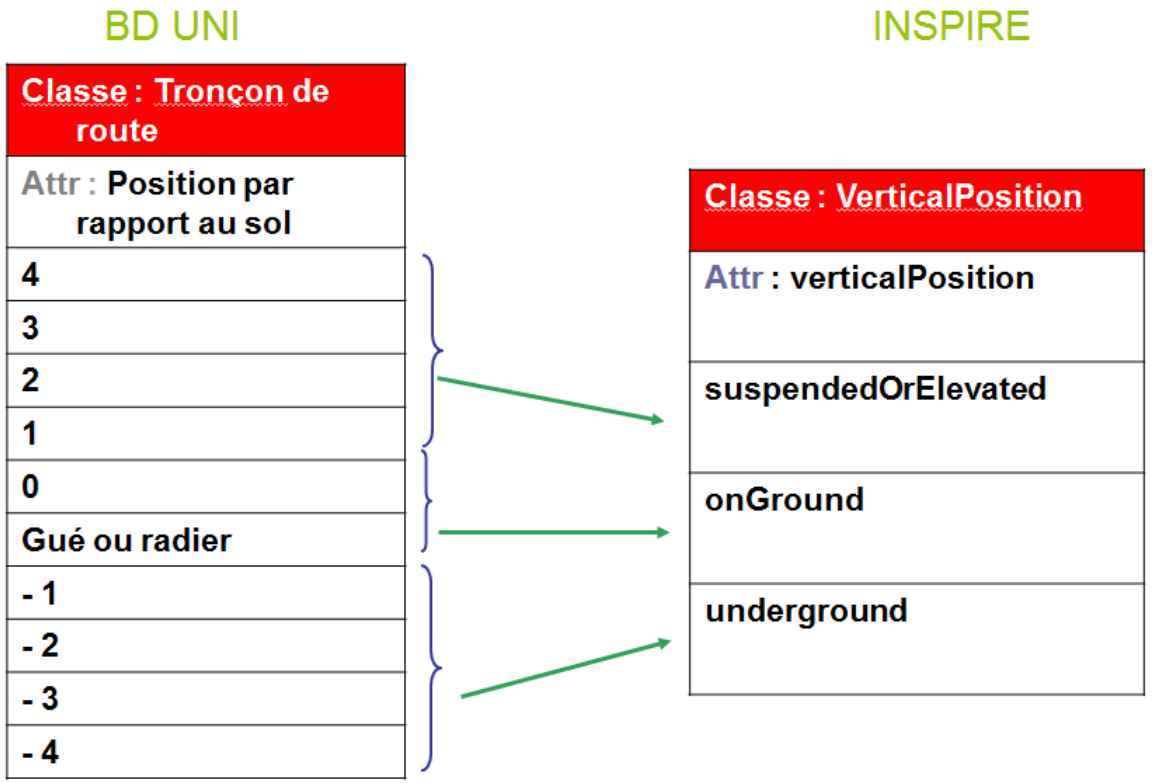
Avoid wrong transformations

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



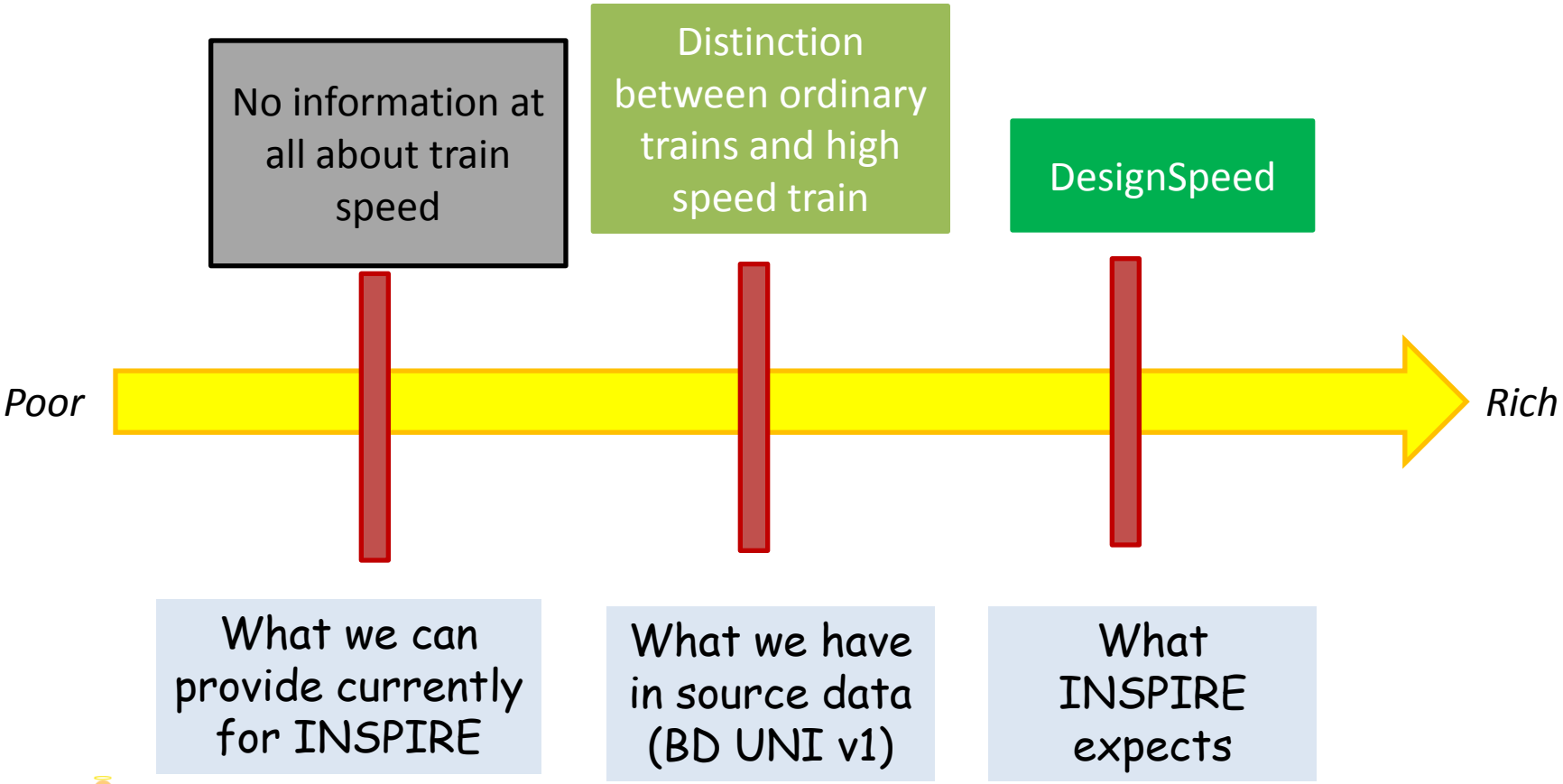
Avoid loss of information

- 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

Attributes of « commune »

Attributes of the upper AU

- 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

IGN

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				BDUniGE
Element	Attribut Lien	Type	Transformation	Classe

identifier	localId	string	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"
				Arrondissement municipal/Commune/Arrondissement/ Département/Région/Etat

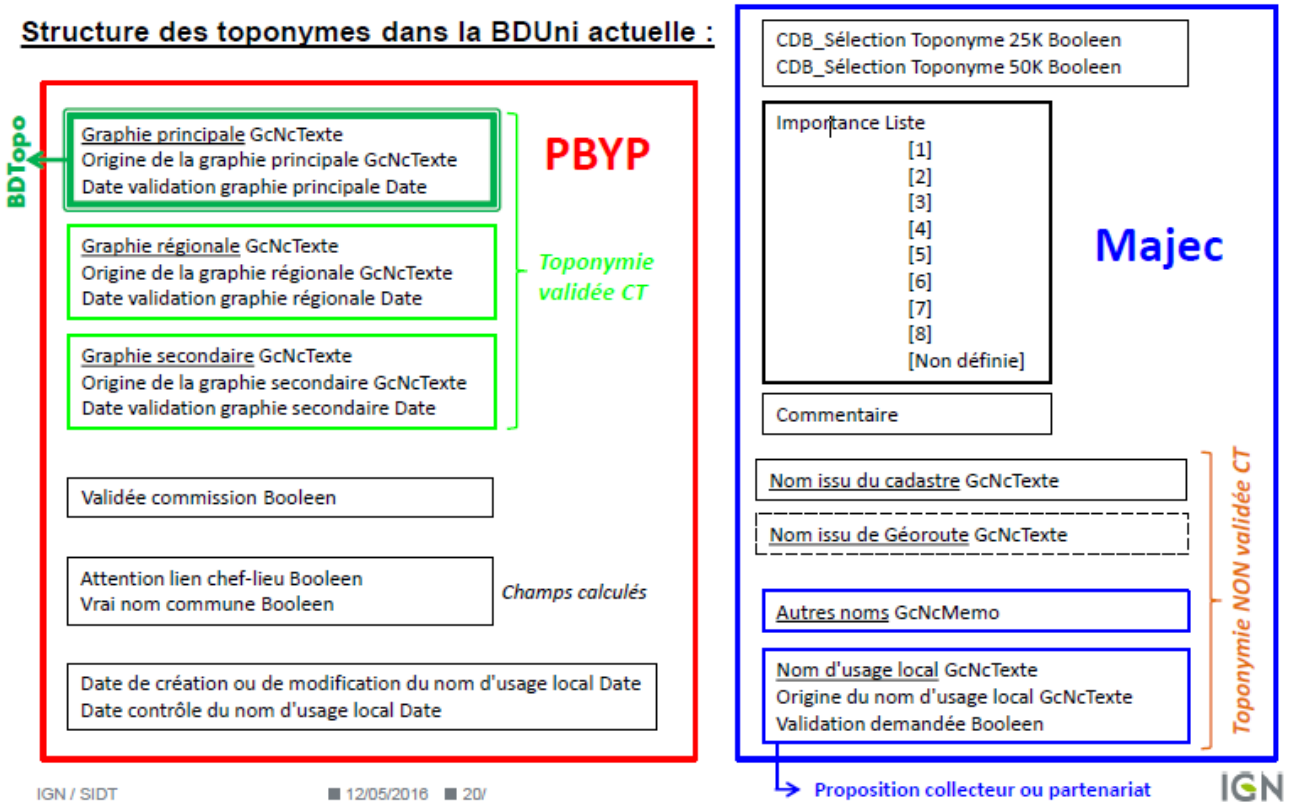
Make transformations easier

- **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

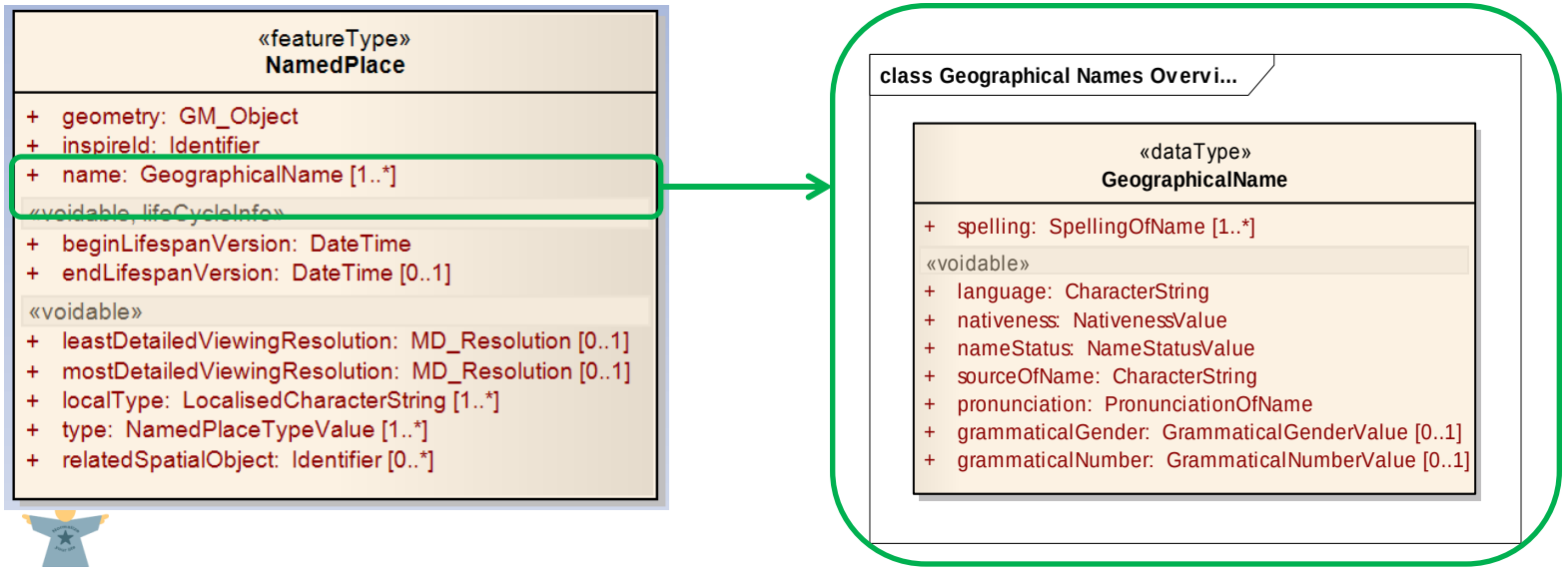


Pumping up our data model

- **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, …



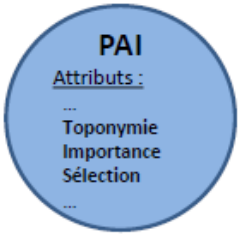
Pumping up our data model

Plusieurs solutions de modélisation dans la BDUni 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 : ... }, ...
{...
...
...
...
...
... }, ...]}

Hierarchic structure in our new product!

STATUT
Validé
Collecté
Partenarial
Régional
Autre
(BAN ?)

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

IGN

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

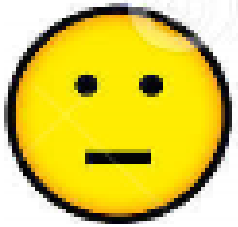
Modelling approach

- **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	

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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

Étapes suivantes

- **Production d'une version test des données:**
  - Migration des données dans le nouveau modèle BD UNI v2
    - France entière
  - Enrichissements en cours:
    - Collecter: partenariat avec le cadastre pour le thème BU
    - Calculer : ex: attribut vitesse moyenne sur tronçons de route
    - Exposer des attributs internes (ex toponymes variés) => mise à niveau
    - Exposer des attributs vides (ex: DesignSpeed) dans l'attente d'une source de données

Étapes suivantes

- **Validation des nouvelles spécifications**
  - Enquête qualitative
    - Entretiens avec un petit nombre d'utilisateurs
    - Juin 2017
    - => les décisions vont dans le bon sens
    - => besoin de documenter le passage BD UNI v1 vers BD UNI v2
  - Enquête quantitative :
    - En cours
    - Questionnaire en ligne

Étapes suivantes

- **Préparation des produits externes**
  - Simplification par rapport à la méthode précédente
    - Produit externe = vue, sous-ensemble de la base de production
  - Organisation en thèmes proches d'INSPIRE
    - BD UNI v1 : thème « fourre-tout » sur les points d'intérêt
    - BD UNI v2 : les points d'intérêt sont répartis dans leurs thèmes
      - Services, activités: US, PF, AF
      - Toponymes: GN