

Supporting INSPIRE implementation: the Thematic Clusters for topographic and cadastral reference data

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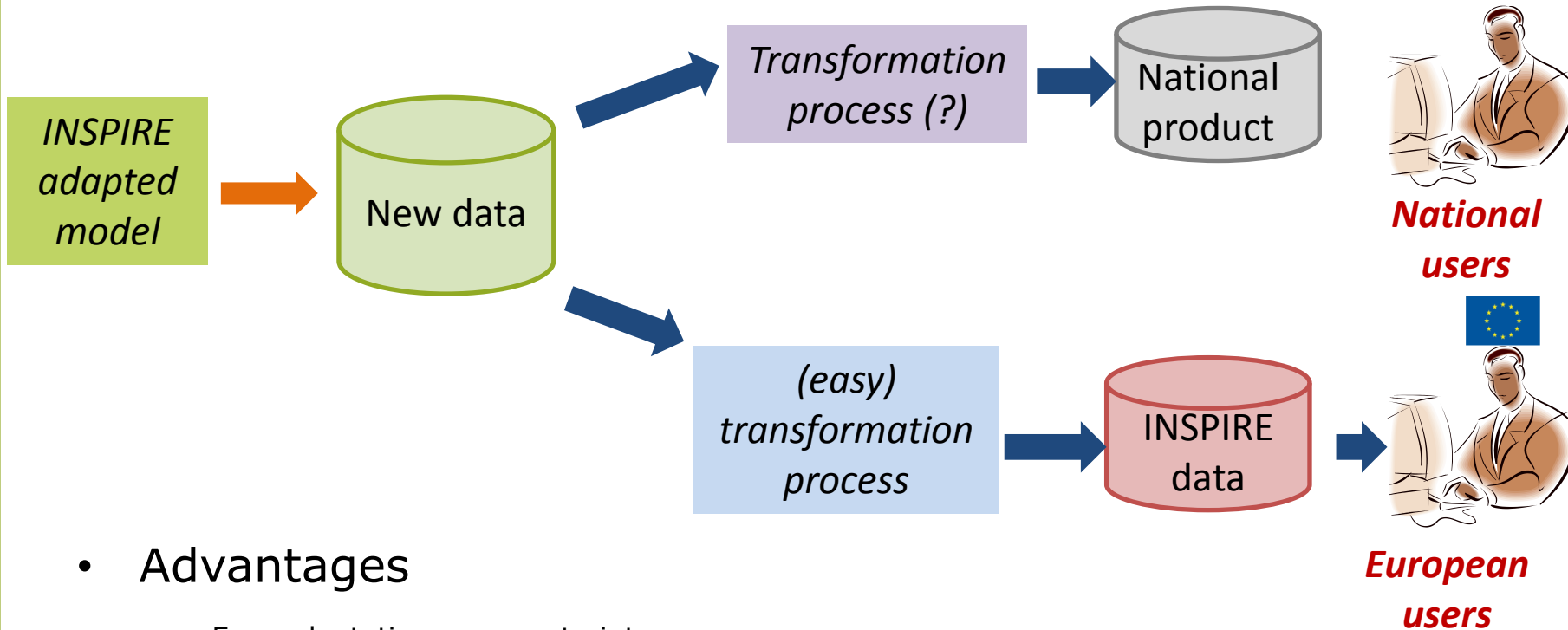


Examples of implementation topics Extension of INSPIRE schemas

Context

- When developing new products, data producers generally want to be “close to” INSPIRE
- Data producers may have more data than in INSPIRE data models

Option 1: free adaptation of INSPIRE



- Advantages

- Free adaptation; no constraints

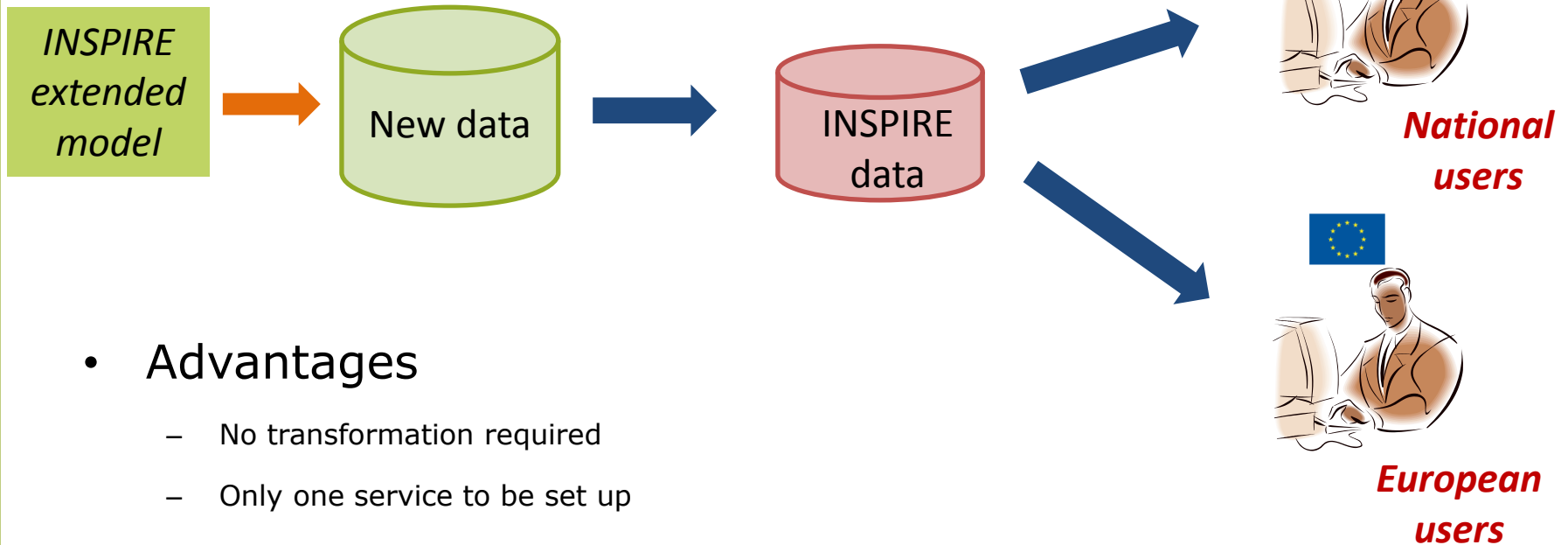
- Drawbacks

- 2 services to be set up
- INSPIRE data used only for pan-European or X-border applications



Interoperability
poorly achieved

Option 2: extension of INSPIRE



- Advantages

- No transformation required
- Only one service to be set up
- INSPIRE data used by all users

- Drawbacks

- Constraints on extended model

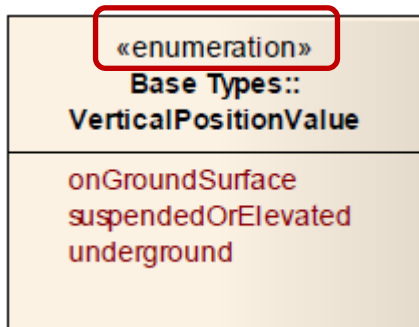
Extension of INSPIRE: brakes

- Code lists and enumerations

- Context:

- **Enumerations and some INSPIRE code list are not extensible**
- General case for Annex I themes
- => issue for making extended INSPIRE schemas

- Example 1: VerticalPosition



INSPIRE model



*Potential request for
change
Enumeration ->
hierarchical code list
(extension « narrower »)*

*More generally, review
extensibility of Annex I
code lists*

« code list » VerticalPositionValue
onGroundSurface
suspendedOrElevated
1
2
3
...
underground
-1
-2
-3
....

Extension of INSPIRE: brakes

- Example 2: ServiceTypeValue

- INSPIRE

- Restricted scope (theme US)
 - restricted to management of environmental issues;
 - » Education
 - » Health
 - » Security
 - » ...

- **Culture and sport facilities excluded**

- Code list only “narrower” extensible

- But

- more information in some existing data
 - user requirements (ex: POI for Eurostat)

Eurostat POI

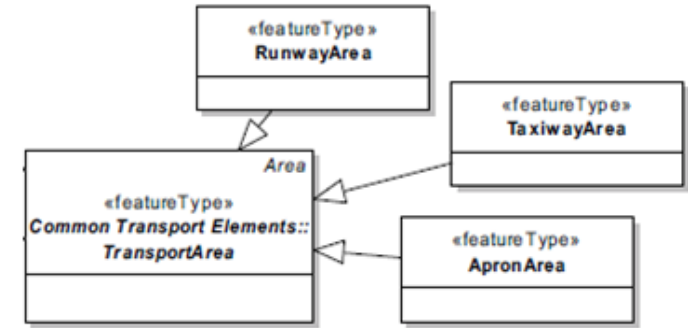
Feature	Importance
Hospitals ^[1]	Mandatory
Primary Schools (ISCED ^[2] 1)	Mandatory
Secondary schools	High
Universities	High
Emergency medical services	High
Disposal sites and landfills	High
Police stations	Medium
Embassies	Low
Government buildings	Low
Libraries	Low
Sport stadiums and facilities	Low
Cinemas	Low
Concert halls	Low
Cultural centres	Low
Museums	Low
Operas	Low
Other event facilities	Low
Postal offices	Low
Recreation facilities	Low
Theatres	Low

.....Excluded from INSPIRE

Extension of INSPIRE: brakes

- Validation
 - Data producers are unsure about validity of data according to INSPIRE extended schema
 - In theory, extending INSPIRE data models according to Generic Conceptual Model is fine
 - But, in practice:
 - will validation tools validate data against extended schema?
 - May depend on tools?
 - who will ensure that rules of GCM have been respected?

Extension of INSPIRE: brakes



- Example

- INSPIRE context

- Data specifications (TN) : Runways must be represented as areas
 - Generic Conceptual Model : “Extending an INSPIRE data specification would imply at a minimum that:
 - the extension does not change anything in the INSPIRE data specification but normatively references it with all its requirements
 - **the extension does not add a requirement that breaks any requirement of the INSPIRE data Specification** »

- Existing data (ERM – 250K)

- Runways are (logically) represented by lines
 - => extension includes additional feature type « RunwayLine »

- Is it correct to extend INSPIRE schema in this way?

Topics for discussions

- Have you tried to extend INSPIRE schemas?
 - For which purposes?
 - Which issues ? Solutions?
- Is INSPIRE influencing design of new products? How?
 - Formal extension of INSPIRE schemas?
 - Adaptation of INSPIRE schemas?
 - Principles, purpose, ...?
- What MIG should do?
 - facilitate extensions of INSPIRE data models?
 - ...?

Examples of implementation topics Flattening of logical model?

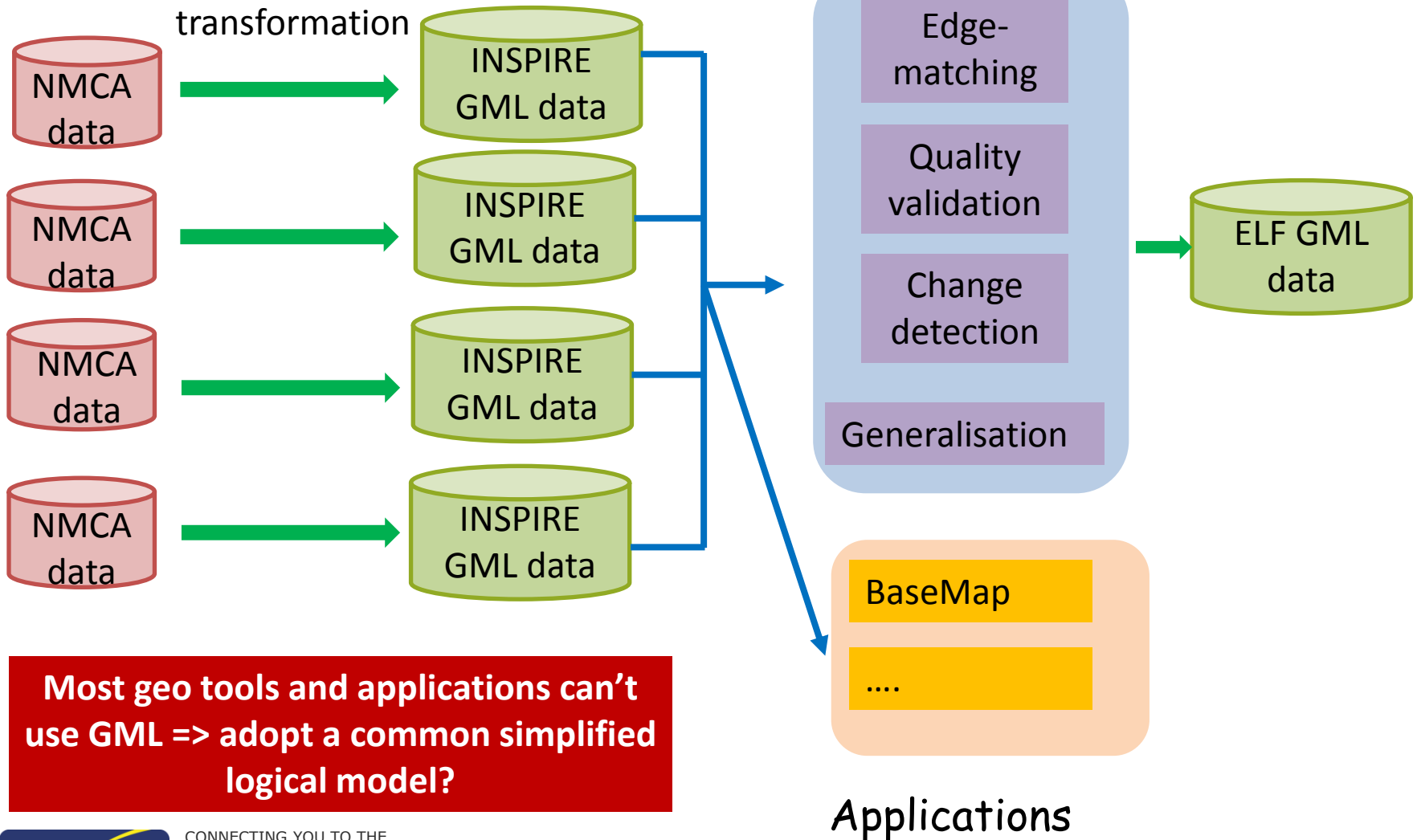
General context

- INSPIRE models use complex modelling patterns
 - Complex attributes (data types)
 - Undefined multiplicity [1..*] or [0..*]
 - Generic geometry (GM_Object, GM_Primitive)
 - Linear referencing (TN)
 - ...
- that can be handled by GML but not by classical GIS formats

Issues

- GML is an exchange format not a working one
 - Huge volume of data
 - But due to complexity of INSPIRE models, no easy export to other (working) GIS formats
- Lack of client applications for INSPIRE data
 - Several surveys done by data producers => poor results
 - INSPIRE data not accepted at all
 - INSPIRE data accepted but lack of information, difficult to handle, ...

ELF context



Most geo tools and applications can't use GML => adopt a common simplified logical model?

Applications

ELF investigation

- To “simplify” the complex INSPIRE modelling patterns, several options are generally possible:
 - Multiple values of attribute

Options	Example
A) Copies of the property are added to the class so that the class has as many properties as the maximum cardinality	property[1..2] → property_1 and property_2
B) Concatenation of the values into one property	property[1..4] → property='value_1:value_2:value_3:value_4'
C) Link to additional table	property[1..*] → additional table with attributes: UID and property

Flatten
model

Relational model

ELF investigation

- The options to be chosen depend on the software (client application)
 - Multiple values of attribute
 - Flattening options : nice for basic GIS
 - Relational option: acceptable for DBMS
 - Generic geometry (GM_Object, GM_Primitive)
 - May be kept in one feature type : PostGre/PosGIS
 - Has to be split into several feature types (point, line, surface):
ESRI
 - ...

ELF investigation

- The options to be chosen depend on the use case
 - Content : need to keep whole content?

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A) Copies of the property are added to the class so that the class has as many properties as the maximum cardinality	property[1..2] → property_1 and property_2
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=> keeping whole potential content of INSPIRE may lead to huge number of "flatten" attributes (e.g. GN)

- Structure

ELF investigation

- Examples:

	Change detection	Generalisation	BaseMap
Content	Whole content	Whole content	Simplified content
Flat / Relational	Flat	Flat	Flat
TN properties	To be kept as feature types	To be transformed into attributes (at least those used in decision process)	To be transformed into attributes

⇒ Heterogeneous requirements

⇒ No common simplified logical model in ELF (until now)

Main findings

- INSPIRE GML data
 - Is interoperable
 - But not (easily) usable by tools
- It looks impossible to have a common logical model adapted to all use cases, to all client applications and keeping all potential INSPIRE data
- A logical model that is usable by tools may be not so “simple” for users (e.g huge number of attributes or of relations)
- Communities may develop their own logical models that might be recognised (i.e. registered) by MIG
 - => several logical models for same conceptual one
 - Lack of interoperability ?

Topics for discussions

- Have you found client application for INSPIRE data?
- Have you found other means to facilitate use of INSPIRE data?
- What MIG/ARE3NA should do:
 - Propose official “simple” logical model(s)?
 - Which options?
 - limited content acceptable?
 -
 - Push software editors to upgrade their tools? Fund open-source tools?
 - Other solutions?