



INTERNATIONAL UNION
OF RAILWAYS

unity, solidarity, universality

From Inspire to Railway Business Solutions

Powered by Inspire, 5th of March 2013

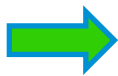
Erika Nissi, UIC Senior Advisor

Agenda

- 1) **“Facts”** about Inspire
- 2) Ideas around Inspire
- 3) Conclusion

Railways have limited knowledge of Inspire

- Inspire is **not well know** by railways or only considered as another administrative burden.
- Railways are waiting **MS** to make a data request to them (as data providers to Inspire)
- Railways are very **seldom aware of the possibilities** that Inspire can offer them as data users.

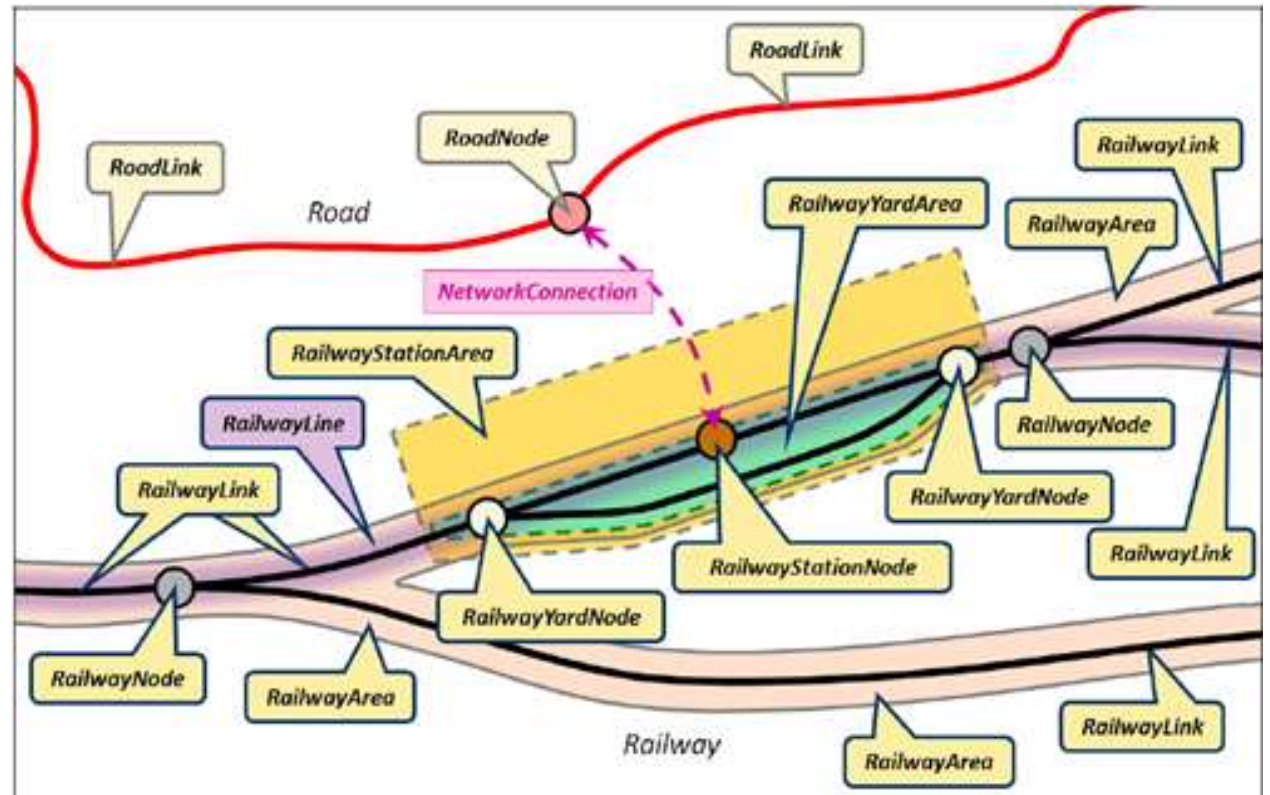


UIC has done dissemination as Inspire is a **big opportunity** to solve railways' data exchange difficulties.

Inspire specifications for railways are very general

Positive: gives the possibility for railways to define their own data sets.

Negative: there will be **different interpretations** and inconsistent data sets



More **steering** and **precise specifications** are needed.

Inspire specifications are not completely adapted to railways

Example:

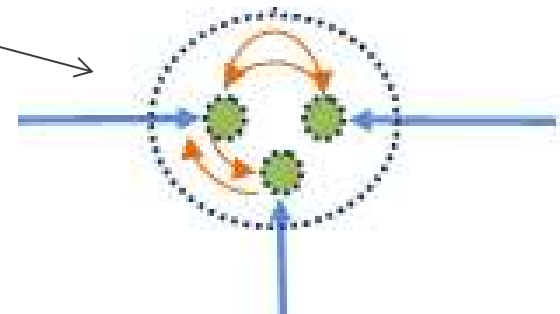
Inspire supports the railway representations at track and line levels.

The list of available *RailwayNodes* is very limited:

| «codeList» FormOfRailwayNodeValue | |
|--------------------------------------|---------------|
| + | junction |
| + | levelCrossing |
| + | pseudoNode |
| + | railwayEnd |
| + | railwayStop |

– At **track** level, a *junction* (defined as physical switch) can be used.

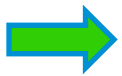
– At **line** level, a kind of “**macro node**” (including several junctions) is missing



Today no clear, unambiguous, way of modeling a ‘junction’ at line level

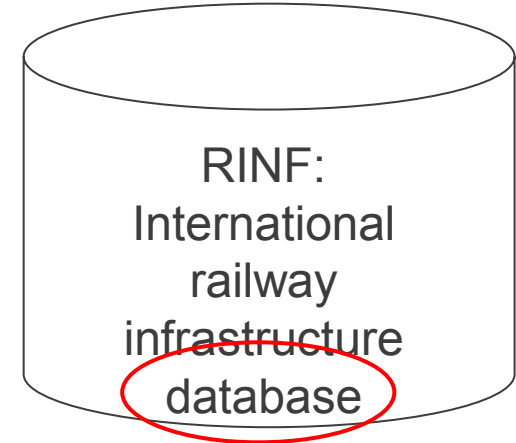
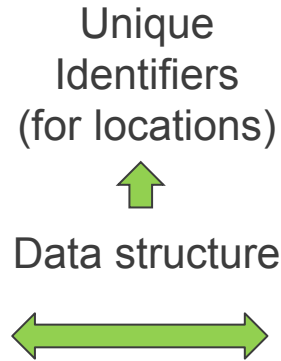
Inspire within a larger legislative framework → RINF

- Railways need to comply also with **EU interoperability legislation**, including, e.g. **Register of Infrastructure (RINF) ≈ 2015**.
- RINF : 120 attributes on railway track and trackside equipment.
- In the light of **the Inspire implementation**, railways requested and obtained a **6 months extension to RINF development** to integrate, at least in rough terms:
 - Topological data model
 - Generic method for unique identifiers
 - Use of GIS



It is in railway's interest to **close the gap** between Inspire and RINF for synergy effects

Inspire and RINF are complementary



Inspire Advantage:

Provides access to **different data sets** (Annexes I-III) within MS

RINF Advantage:

Provides **railway data** from Point A to Point B within EU

Agenda

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UIC experience in data-basing - ERIM

In 2005 UIC ERIM (European Rail Infrastructure Masterplan) activity created a **GIS database** on main European corridors of 50 000 route-km

- **Cartographic overviews** on infrastructure attributes, traffic volumes / forecasts, capacity bottlenecks.
- **Consensus building** for infrastructure harmonisation



In 2010, UIC stopped the data collection. Main reasons:

- **Time constrains** within railways to provide data in ERIM structure (fromPoint - ToPoint)
- Multiplication of **other (EU) databases**
- ERIM benefits were **too general**, compared to the work load



Need a **simplified data collection** to keep it sustainable !

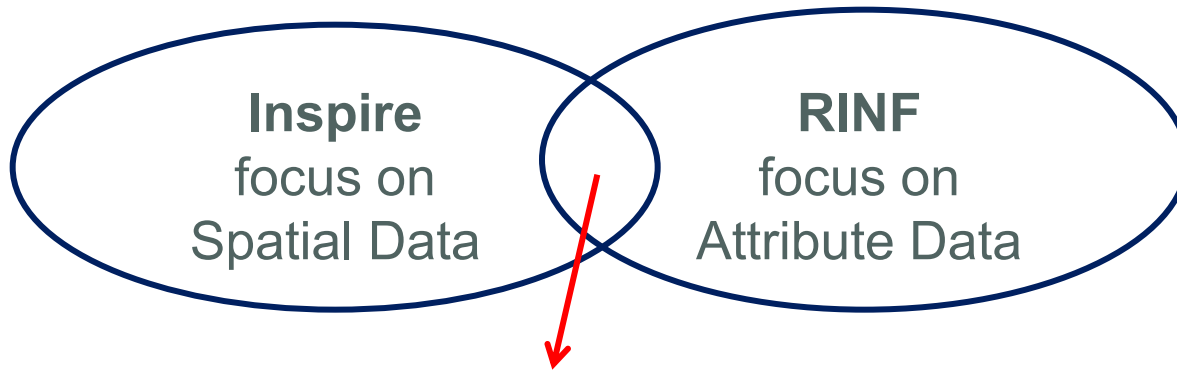
European Rail Infrastructure **MODELLING** – Task Force

Inspire was one of the trigger, it gave a **common objective** to this Task Force

Created in 2012 within UIC by :

- Infrabel (BE)
 - RFF (FR)
 - Prorail (NL)
 - Network Rail (UK)
-
- Strong input to the recent RINF development (cf. Slide 6)
 - Some other (brainstorming) ideas as follows.

Inspire and RINF have complementary scopes



Only **few overlapping / discrepancies** which could be overcome

- ≈ 20 common attributes
- Coordinate systems (RINF: WGS 84, Inspire ETRS 89)

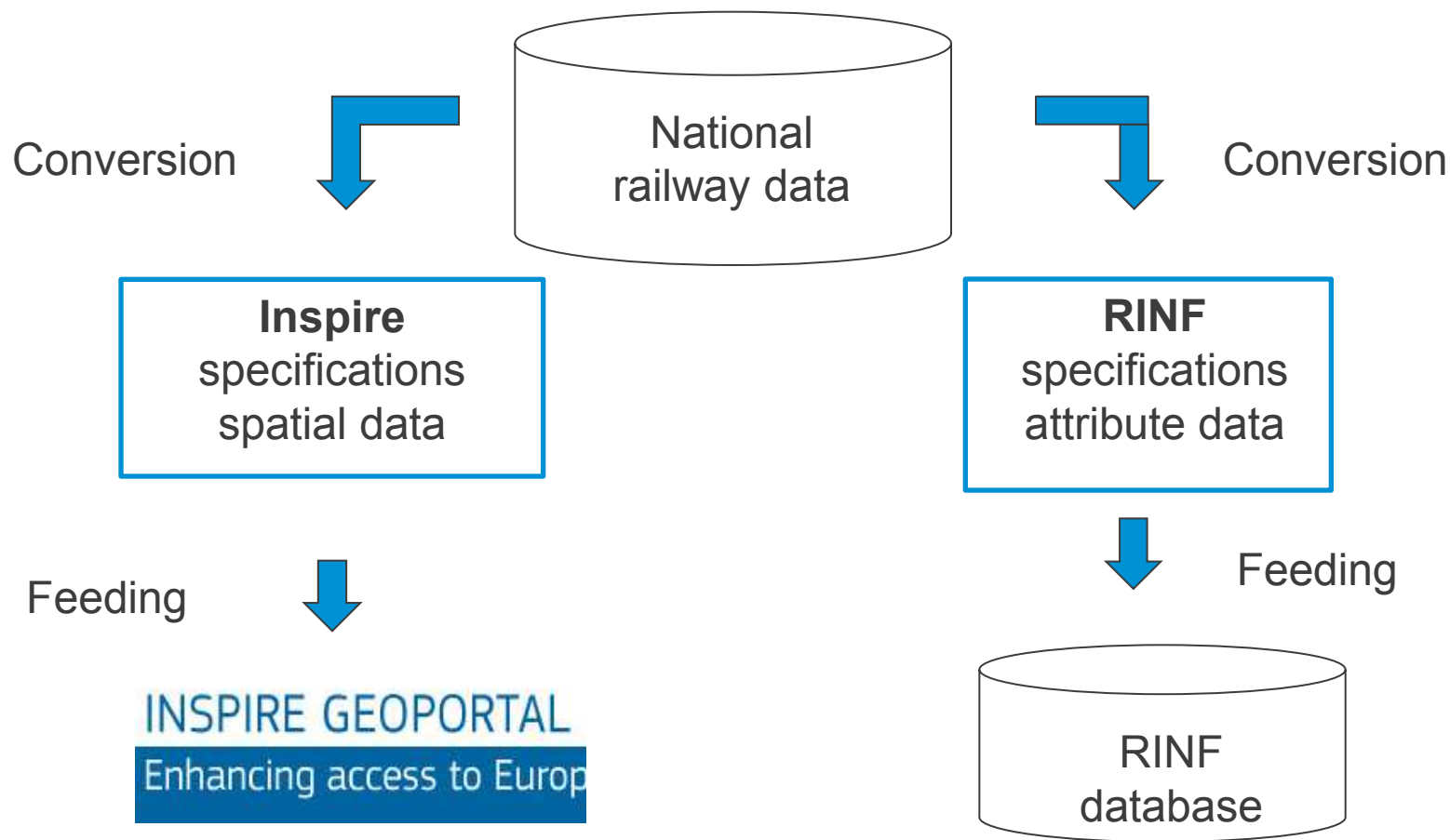


ERIM Task Force proposes to combine the specifications:

Use Inspire specifications for **spatial data**

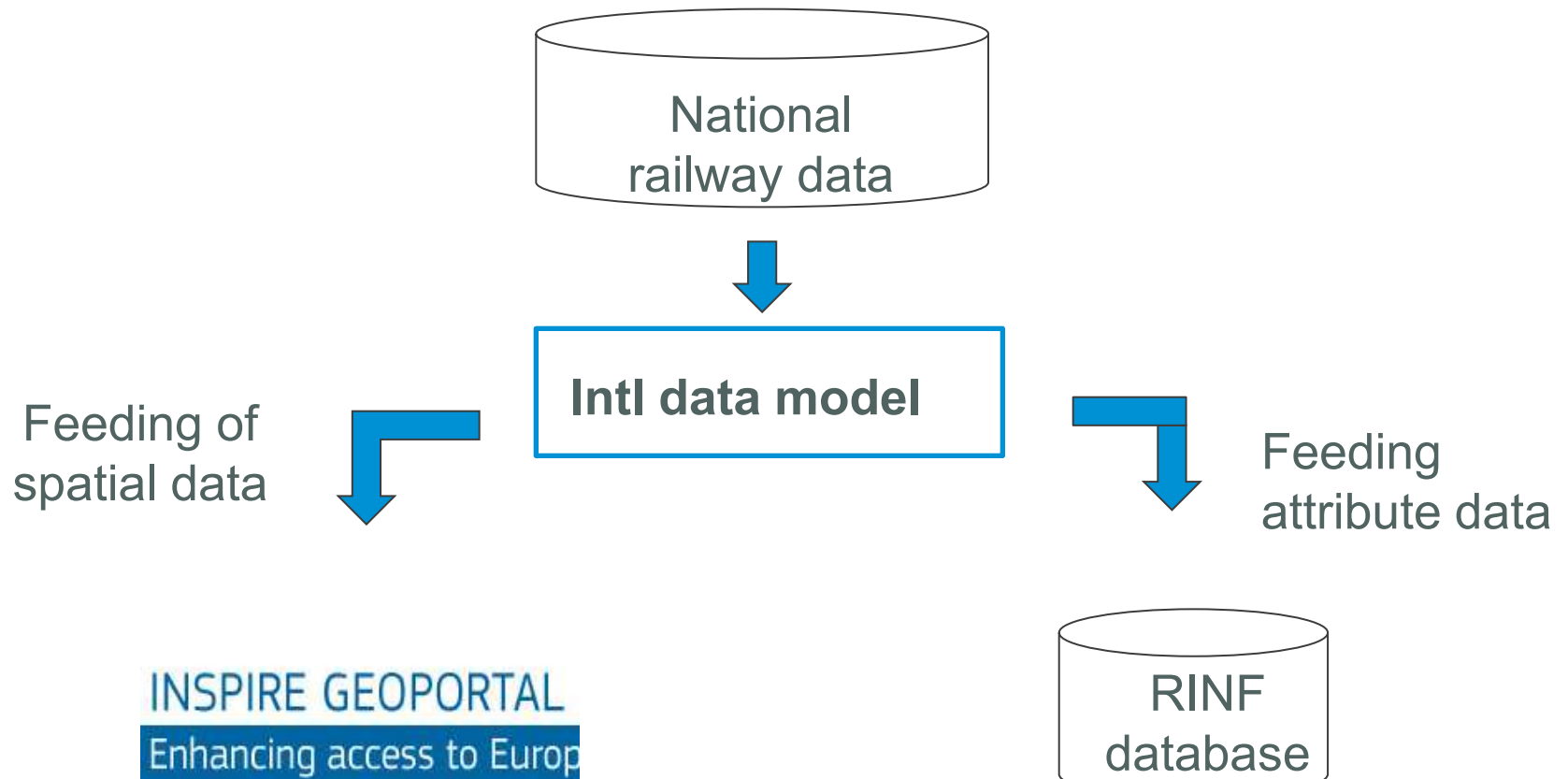
Use RINF specifications for railway **attribute data**

Data provision **without** international coordination



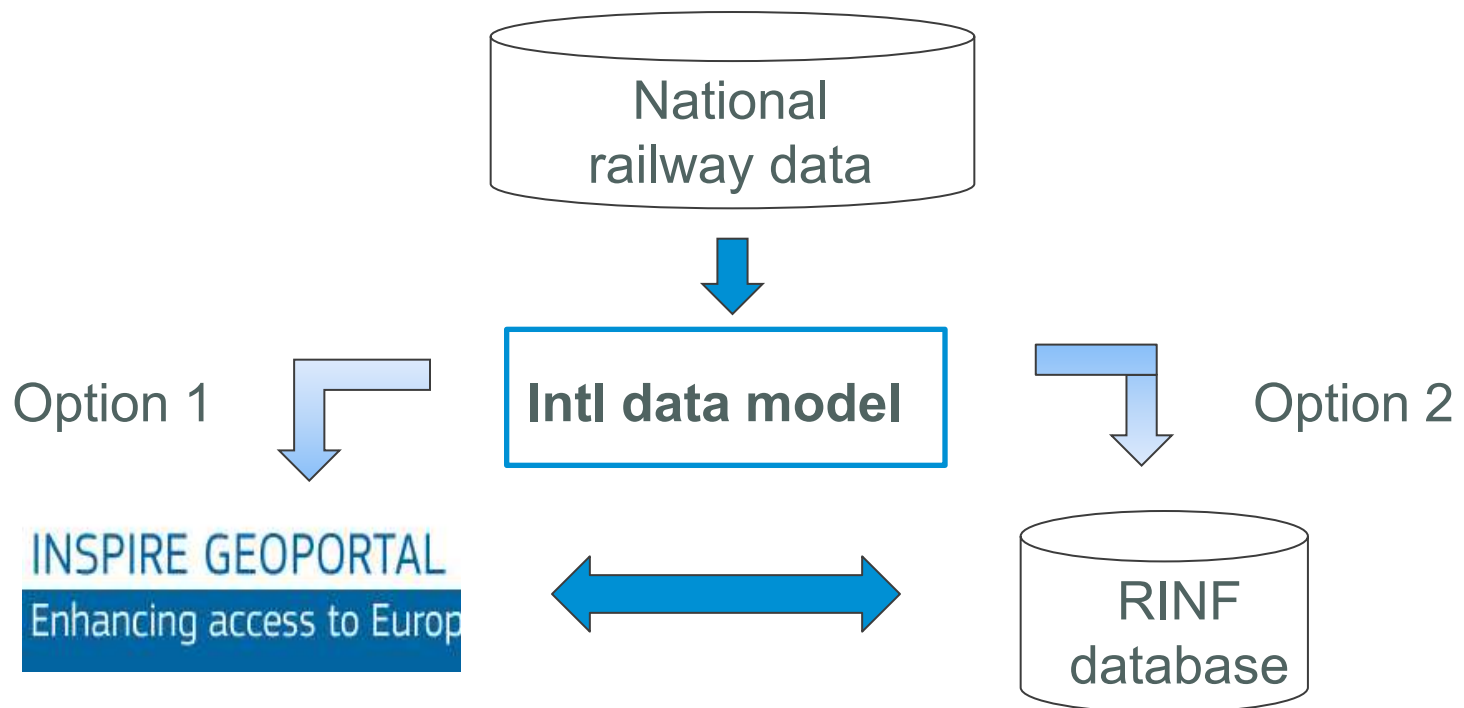
Data provision **with** international coordination, case 1

Pre-condition: Creation of common international railway data model



Data provision **with** international coordination, case 2

Pre-condition: Approval for a one centralised railway data repository



One data conversion, **one** feeding, **one** data source
for all data and **one** "truth".

Data model is needed for several EU directives

The data model is not needed only for EU data collection (Inspire, RINF, Network Statement) but also for other Directives, such as:

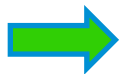
European Rail Freight Corridor Organisations (EEIG)

→ Need to set up a Corridor Information Management, based on very heterogeneous national railway data.

European Train Control System (ETCS)

→ Need to exchange big amounts of very precise track data between information systems of railways and ETCS suppliers.

ETCS suppliers are **international players** and standardised data exchange could decrease the data expenditures and “vendor locks”.



Huge savings in data management could be achieved with a common data model and corresponding exchange format

ERIM Task Force starts a feasibility study spring 2013

1) Topological **data model**

- Main focus is to serve / solve railways **business needs**. The EU compliance should come as a “by-product”.
- This international data model doesn't prevent the use of **national models**. However, many railways don't have yet any !

2) Corresponding **data exchange format**

- To exchange efficiently massive data sets between IS.
- Development of **railML®** , open source railway data exchange format created in 2001



Depending of the national differences, the finalisation of the points 1-2 would cost about **500 K€** (?).

Challenges of railway data modelling

Financing

- Railway decision makers don't understand spatial data modelling and consider GIS only as an IT matter, not as strategic approach.
- Railways have so many existing problems to be financed
 - ➔ Difficulties to explain / **convince our decision makers**

Complexity of the railway technology, e.g.

- Tracks and track side equipment contain **a lot of technology and data** (e.g. NL: 1 route-km = 127 km of underground cables).
- Train movements are authorised / controlled by distance
 - ➔ **Few experts available** with railway and modelling knowledge.

The data model needs to service 3 different levels of usage.

1. LINE level → Inspire
Intermodal interoperability

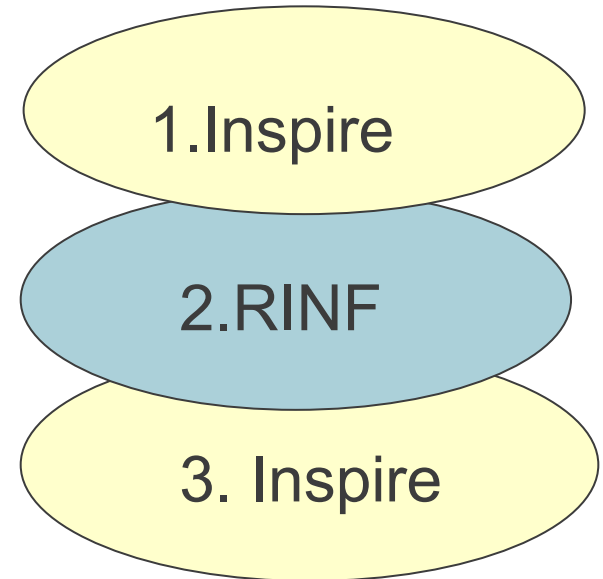
2. **OPERATIONAL** level → RINF

- National: Path construction, capacity calculations, timetabling etc.
- International: Intramodal interoperability

3. TRACK level → Inspire
Detailed infrastructure representation

Define for each level:

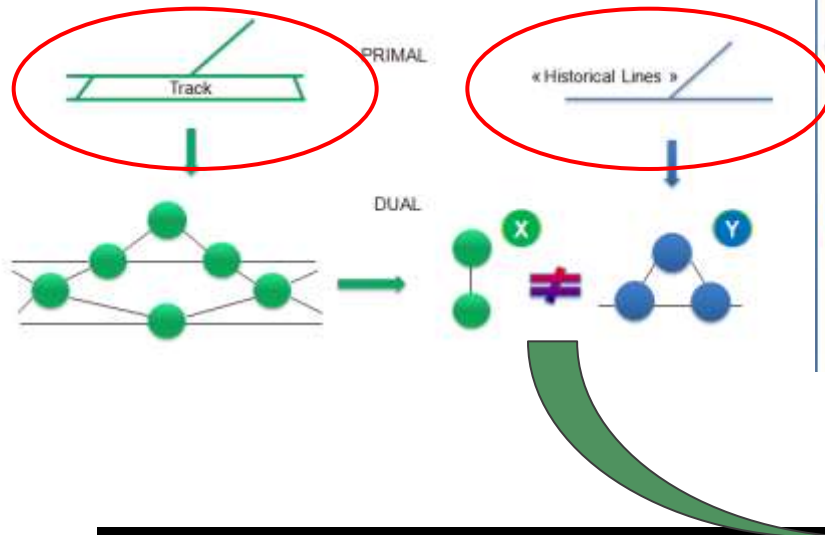
- Topological backbone
- Related physical objects and logical functions



Automatic data (des)aggregation is needed for lines

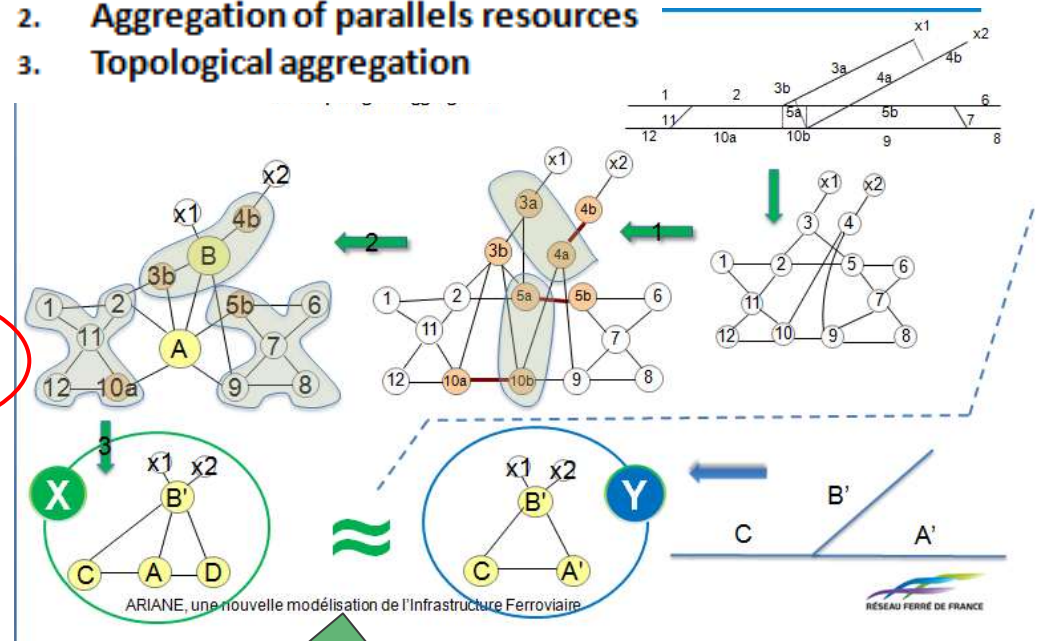
The **line model** is not a straight forward deduction from **track model**.

Complementary steps need to be defined and then automated.



3 steps algorithm :

1. Cutting of track route sections
2. Aggregation of parallels resources
3. Topological aggregation



Railway nodes need also aggregation

THONVILLE Extrait

V17.33.180.188 - 01

Décapage par propriétaires - Représentation du décapage des VS dans le cadre de la mise à jour annuelle des VS - retour CER (extraction Base de consultation)



Faisceau Triage EST

RFF

Chantier Entretien

SNCF MAT

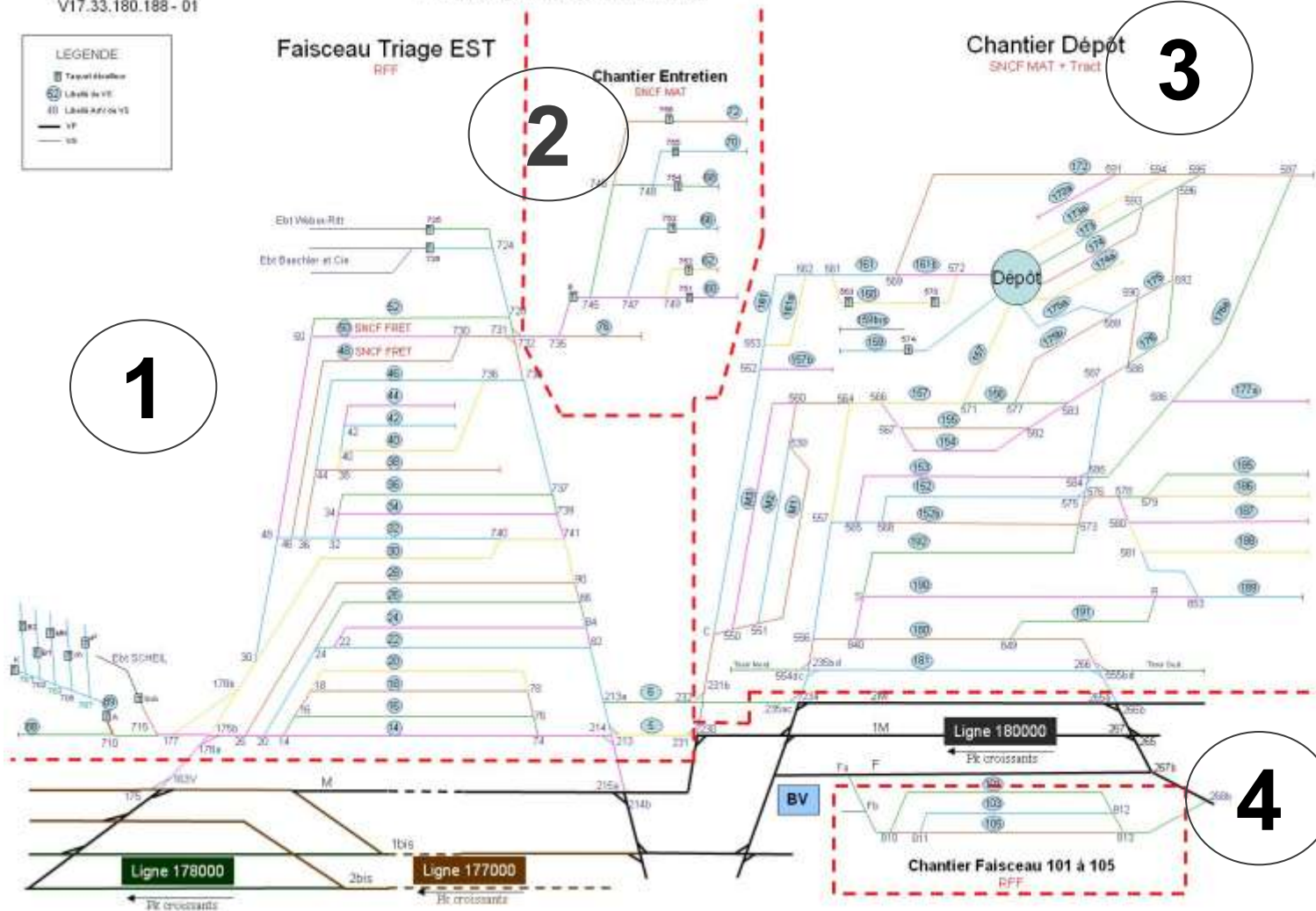
Chantier Dépôt

SNCF MAT + Tract

3

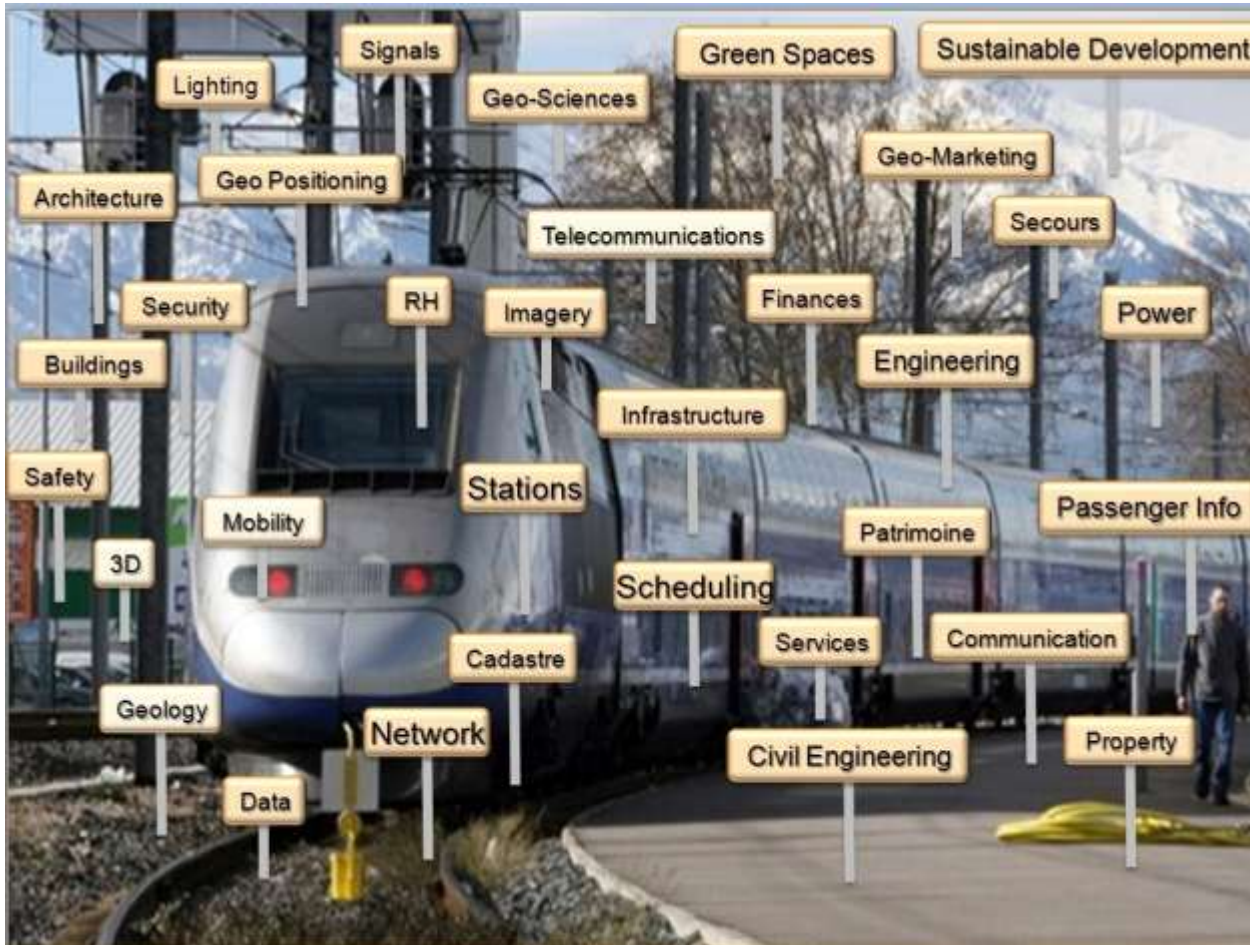
1

2



4

Railways need many data sets to run their daily business.



Source: ESRI

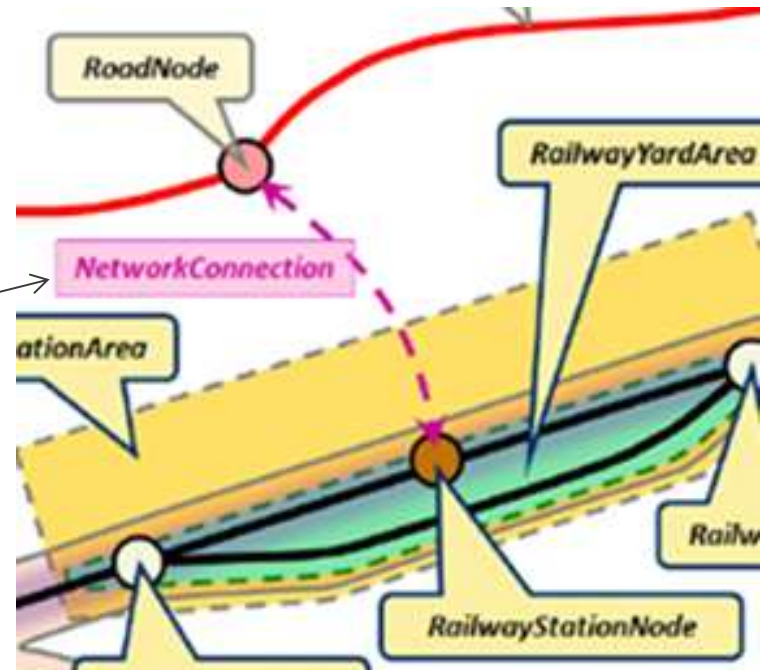


Harmonisation is urgently needed !

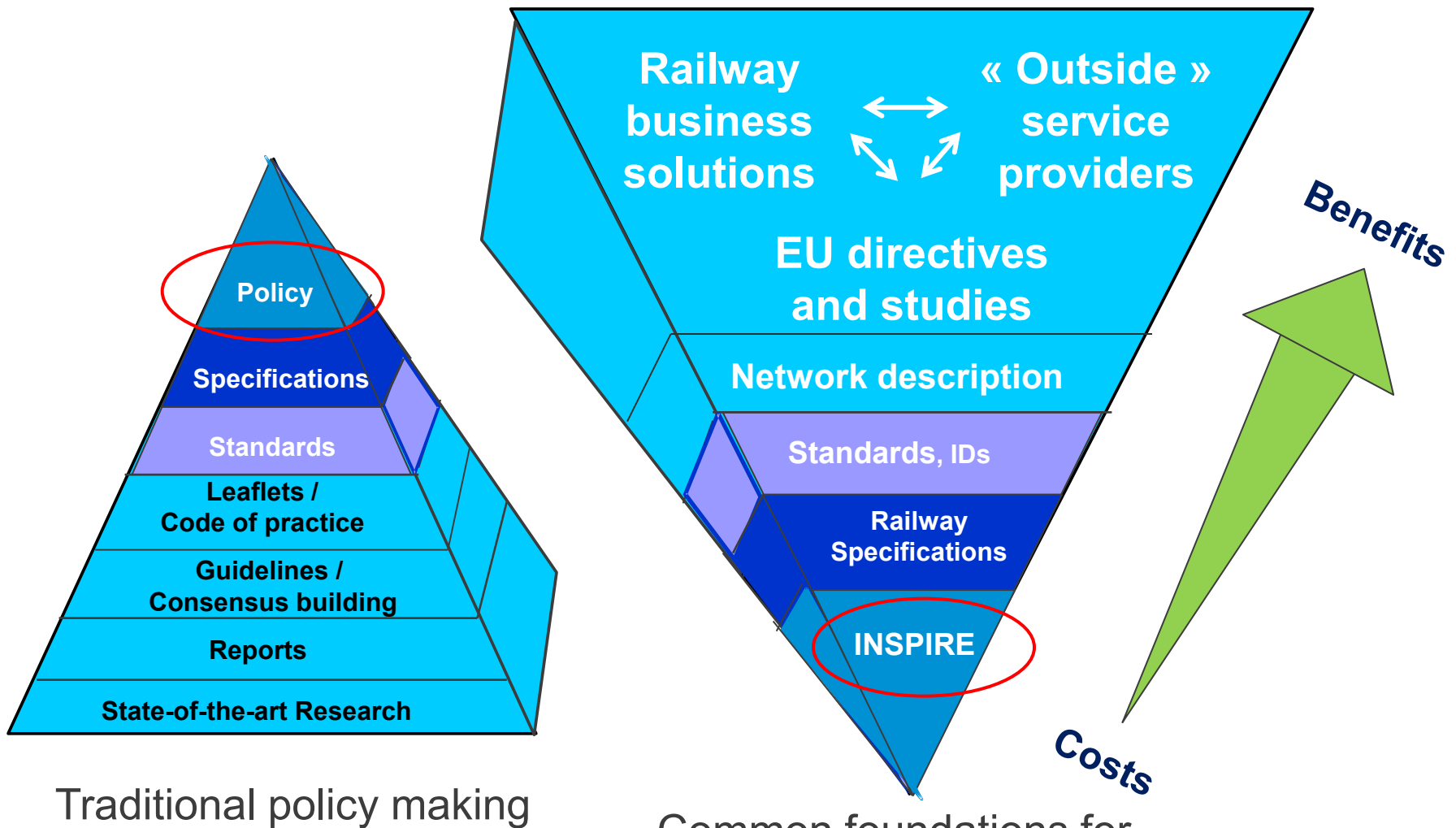
Inspire is the most promising approach as it is **global enough** !

Railways need data beyond their own domain, e.g.

- **Intermodal** door-to-door transport paths.
Has Inspire foreseen translations / common **identifiers** for network connections ?
- Emergency planning and **access routes to railway lines**.
- **Noise** emissions on populations.
- Track side **vegetation**, as it's control is a big maintenance expenditure for railways.
- Planning of **new railway lines** (soil, population, simulations on economic impact between “competing” regions).



Inspire should be considered as a starting point for



Traditional policy making

Common foundations for directives and business

Conclusion / Wish list

- Inspire is a big **opportunity** for railways !
- Inspire specifications for railways need **fine-tuning**
- UIC ERIM Task Force starting a feasibility study on:
 1. International railway **data model**
 2. Data **exchange format** } **For business !**
- The points 1 and 2 should service also **ALL EU initiatives**
- UIC would be willing to coordinate the development work.
- Ideally future EU initiatives should approve / impose the use of:
 - common data model for international use
 - **unique source of information** for (spatial) railway data



The political “rationalisation” is **now or never !**

Thank you for your attention

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