



INTERNATIONAL UNION  
OF RAILWAYS

# UN CEFAC CAPACITY BUILDING SEMINAR

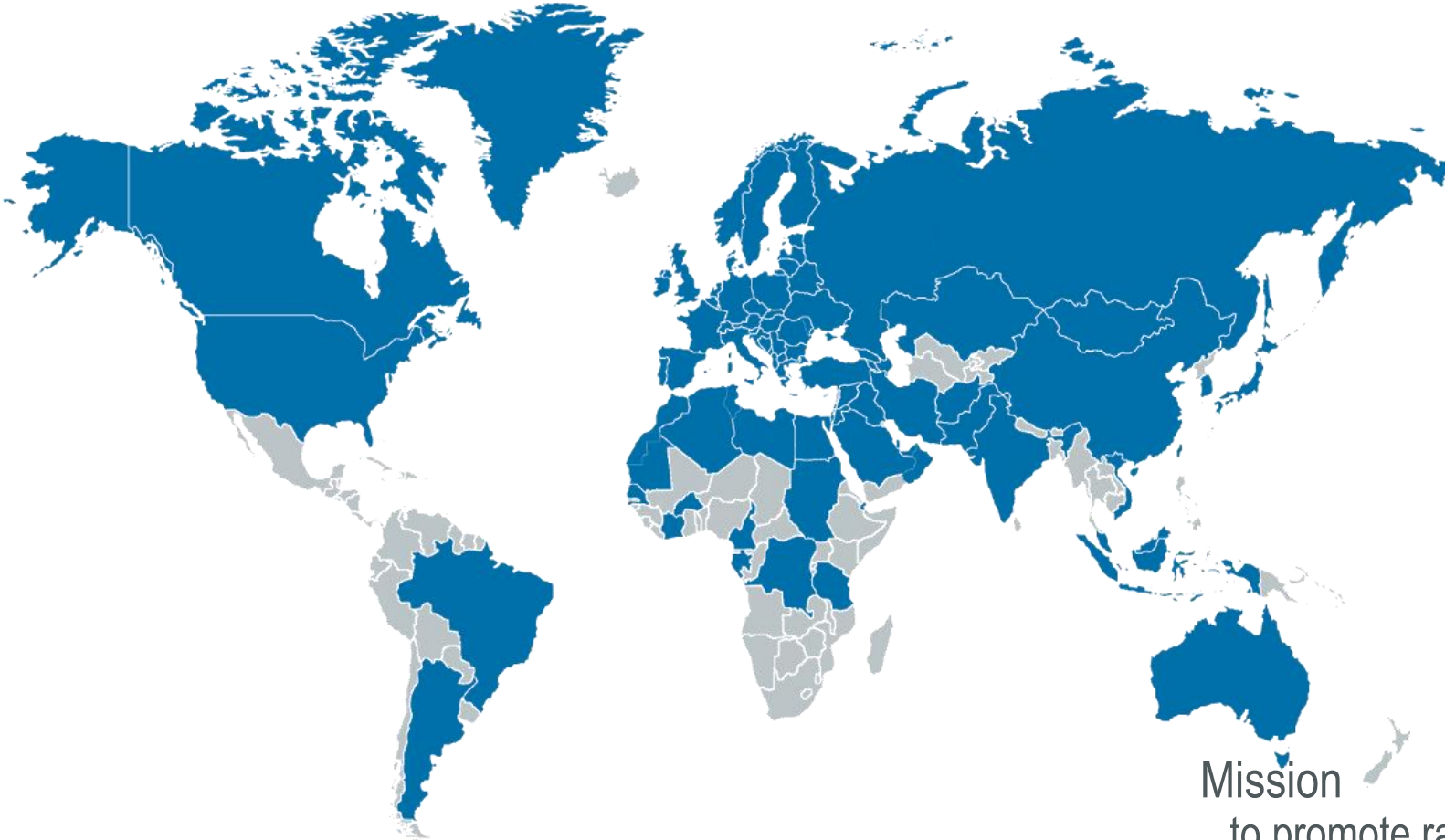
## SUPPORTING PILOT PROJECTS

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Freight Director and Coordinator for Europe  
22 May 2023

# Executive summary

- UIC as Global Association is supporting the digital transformation of its members as enabler for improving cross border freight services
- The Freight Department offers key tools for this: support and expertise in corridor development and Raildata digital platform
- ECN is a desired use case from the market no matter the region
- We are not starting from scratch – the international community has been engaging to develop standards and implement interoperable solutions able to cater for the needs of multimodal stakeholders
- Already now, Raildata can be a partner of pilot initiatives
- Raildata is the corner stone of the digital modernisation of the sector with the DP-RAIL initiative for which a CEF application was filed in January 2023

# UIC: A long history at the service of member railways and international railway cooperation



Over 200 members

- Railways
- Rail operators
- Infrastructure managers
- Railway service providers
- Public transport companies



UIC MEMBERS

Mission

to promote rail transport at world level and meet the challenges of mobility and sustainable development.

# UIC Freight objectives and levers



- Enhancing interoperability and capacity optimisation
- Encouraging innovation /digitisation of processes and implementation of technology game changers key to drive modal shift
- Ensure Safety & Security are kept at highest level
- All leading towards productivity enhancement

Corridors




Digitalisation

Operational  
solutions

# Deployment of key technologies will strongly enhance RU product quality

## Impact on RU product quality

NOT EXHAUSTIVE

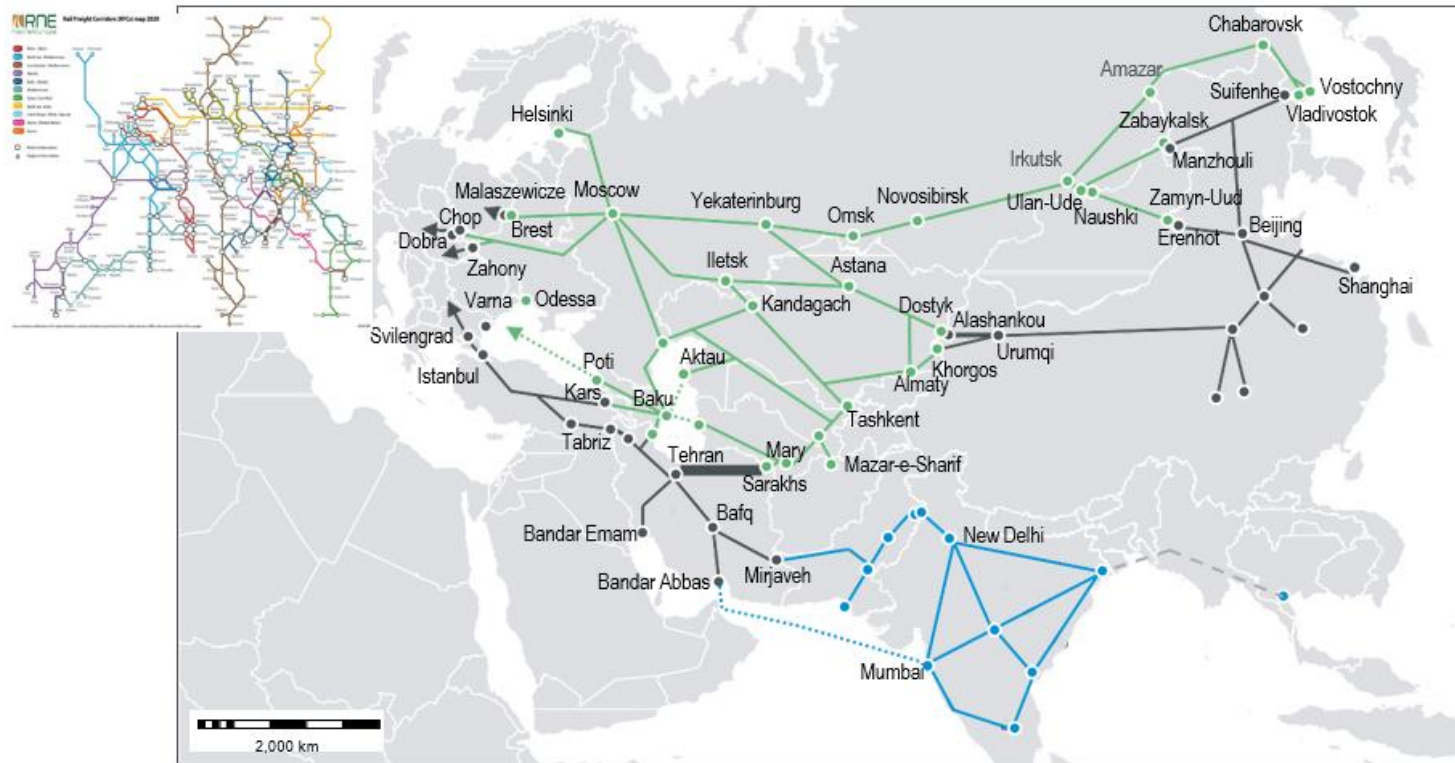
-  **Transparency**
  - Improved booking of train paths ("one-stop shopping")
  - Availability of dedicated, systemized rail freight capacity
  - Seamless integration of transport chains via Digital platforms
  - Seamless Track & Trace
-  **Transport time**
  - Significantly reduced transport times due to
    - Dedicated freight capacity bands with less disruptions
    - Better train paths
-  **Reliability**
  - Higher punctuality
    - Less trackside signalling failures (ERTMS 3)
    - Less congestion due to significantly increased capacity
  - Better synchronisation across Europe through data transparency
  - Less dependency on critical bottleneck resources (DAC, ATO)



Substantial increase in demand expected

# On a global level

Corridors facilitate the implementation of a « drive through philosophy »  
Interconnectivity is key incl for data exchange



Track gauge

— 1,520 mm — 1,435 mm — 1,676 mm

1) Conical projection to minimize visual distortion of distances; numbering based on route usage for Eurasian rail cargo transport

# Rail operations require improved processes and infrastructure to bridge current service gaps

Focus areas for improvement of operations

## Process improvement

### Customs harmonization

- Unified application of CIM/SMGS across countries, good types and block and wagonload trains
- Pre-arrival customs clearance

### Process digitization

- Acceptance of electronic consignment notes
- Digital platform for multi-stakeholder data sharing, e.g. real time shipment monitoring
- Uniform data security standards

### Regulation standardization

- Consistent legal requirements for rail transport across good types, incl. special goods
- Simplified regulations for transit shipments

### Multimodal connectivity

- Increase of ferry capacities and service reliability
- Seamless integration and expansion of intermodal infrastructure at connection ports

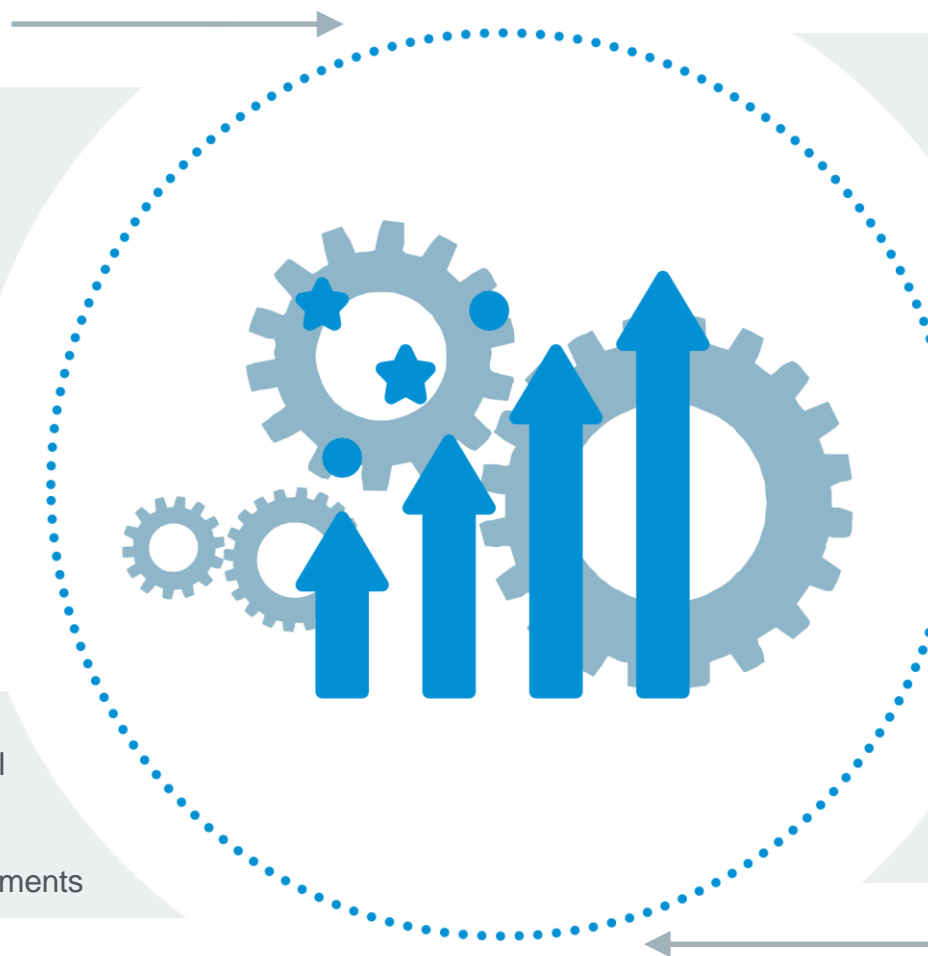
### Inland terminal expansion

- Construction of new intermodal dry ports at key corridor points, e.g., Kars
- Expansion of capacities (e.g., bogie supply, track equipment) at gauge change terminals
- Extension of terminals for long trains

### Network modernization

- Electrification and installation of automated signaling systems
- Purchase of locomotives and wagons

## Infrastructure improvement



# Digitization and coordinated harmonization are major improvement potentials

Customs and border crossing identified as bottleneck by the market

## Key take-aways and bottlenecks

- 1 Customs perceived to be manageable but with a lot of improvement potential**
  - Number of border crossings and non-efficient customs processes as bottlenecks
  - Border crossing procedures perceived to be cumbersome but manageable by operators
  - Mostly "first time" issues or "normal" problems

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- 2 Lack of data digitization and CIM/SMGS harmonization complicating processes**
  - Many documents such as consignment notes and declarations still done with paper at certain borders – Time-consuming and error-prone processes
  - Common CIM/SMGS consignment note is still not accepted in some countries

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- 3 Suboptimal physical infrastructure at some border crossing points**
  - Lack of modern systems and qualified personnel at some customs
  - Cargo inspection difficult and time-consuming (due to trucking) if customs not integrated in terminal

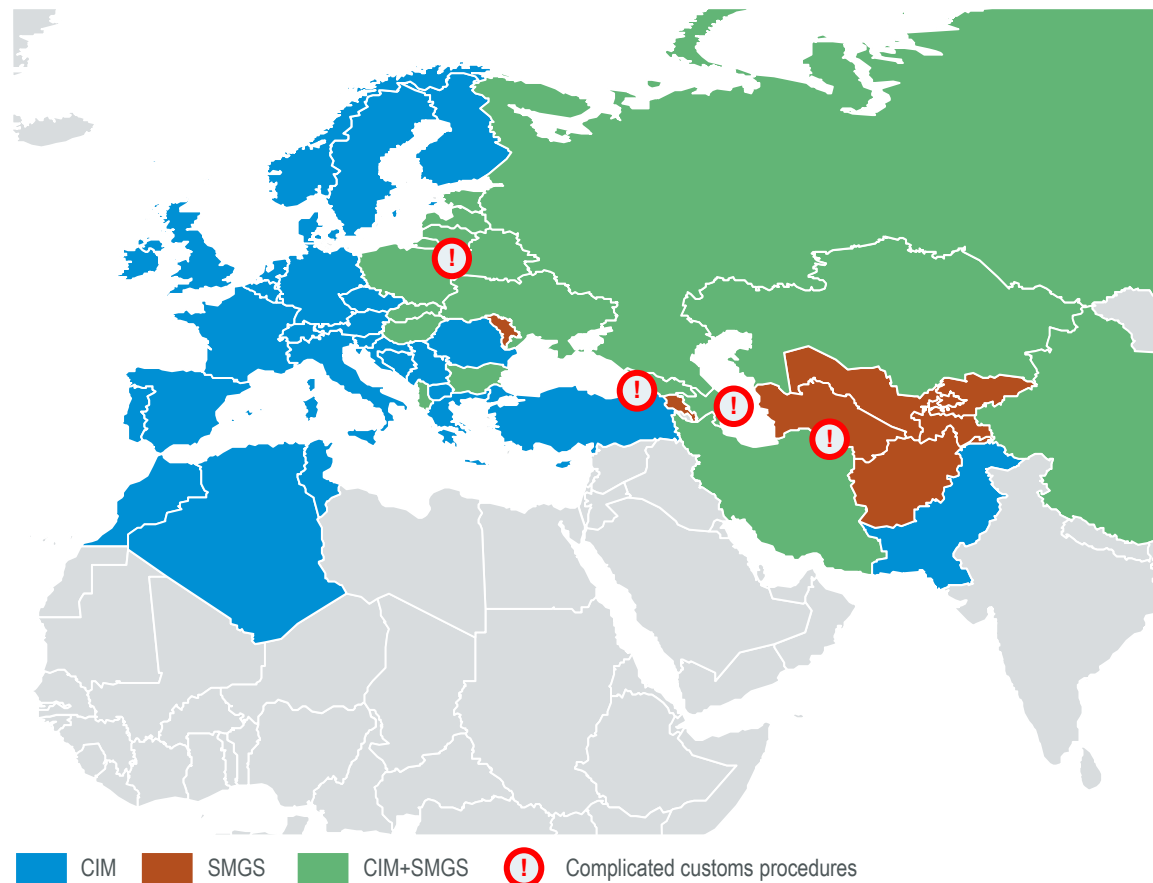
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- 4 Rail naturally more difficult for customs due to inherent characteristics**
  - Long distance over land in the transit country mandatory for rail cargo
  - Customs mandated to conduct stricter controls for hazardous and illegal goods



# Market players have learned to perform customs reliably – Still improvement potential concerning its efficiency

Legal situation and customs: continued efforts of CIT – OSJD – UNECE and others are key  
Standards developed by the community need to support multimodality and be interoperable



## Current situation

- The Eurasian Silk Road spans **two customs unions** – EU and the **Eurasian Customs Union** (Russia, Kazakhstan, Armenia, Kyrgyzstan, Belarus). The lack of customs control in the latter ensures the efficient border crossing on the northern route
- The middle corridor has **four border crossings** that are **not covered by Customs Union**, and the southern corridor five (compared to two on the northern corridor)
- Customs procedures where **problems** tend to arise are cited to be between:
  - **Turkmenistan and Iranian border** (due to vested interest)
  - **Baku Port** (as reloading and customs cannot be parallel)
  - **Georgian and Turkish border** (due to issuance of new consignment note)
  - **EU border entries at Polish entries other than Malaszewicze** (due to lack of customs infrastructure and capabilities)
- With the introduction of **CIM/SMGS common consignment note** and its acceptance by China in 2017, significant **time and cost savings** could be achieved

# Stakeholders have been collaborating for some time

We are not starting from scratch

## RailData:

- is special group of the UIC, established in 1995
- develops and runs Data Exchange platforms for European freight railway undertakings
- Members/users represent over 70% of yearly ton-km in EU.

RailData tools are the core element for digitalization of international rail transport:

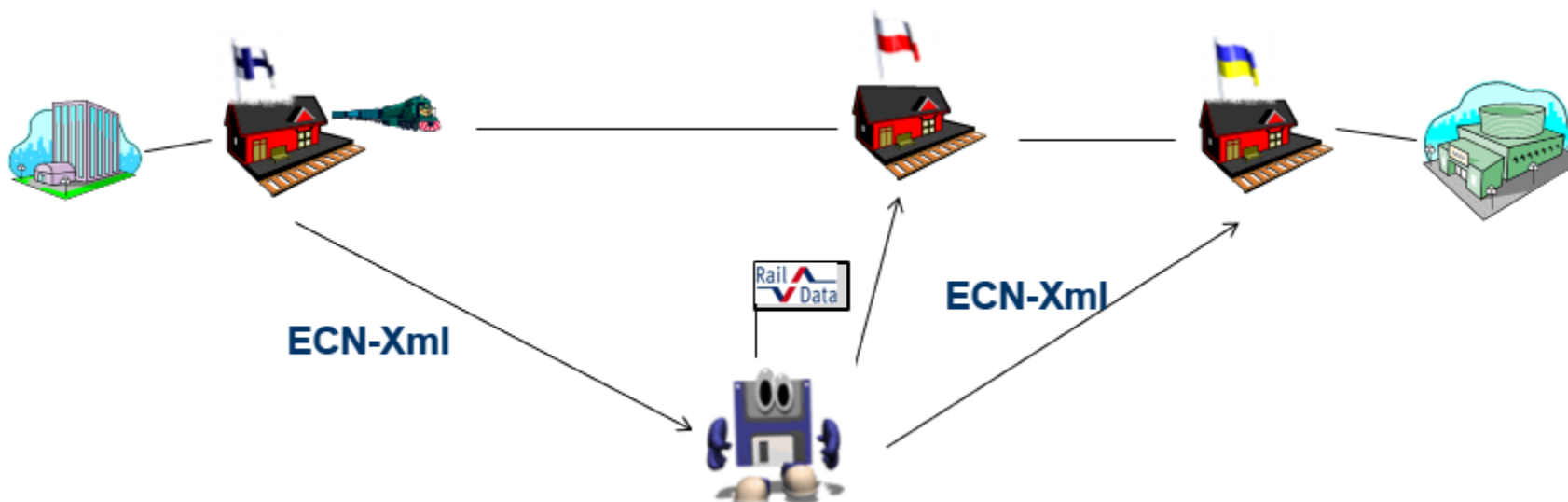
- Exchange of data about wagons position and status: ISR
- Exchange of consignment note data: ORFEUS
- Database of commercial responsible for wagons  
CoReDa
- Trains and wagons handover quality management: ATTI

<https://www.raildata.coop/>

# Orfeus to support ECN

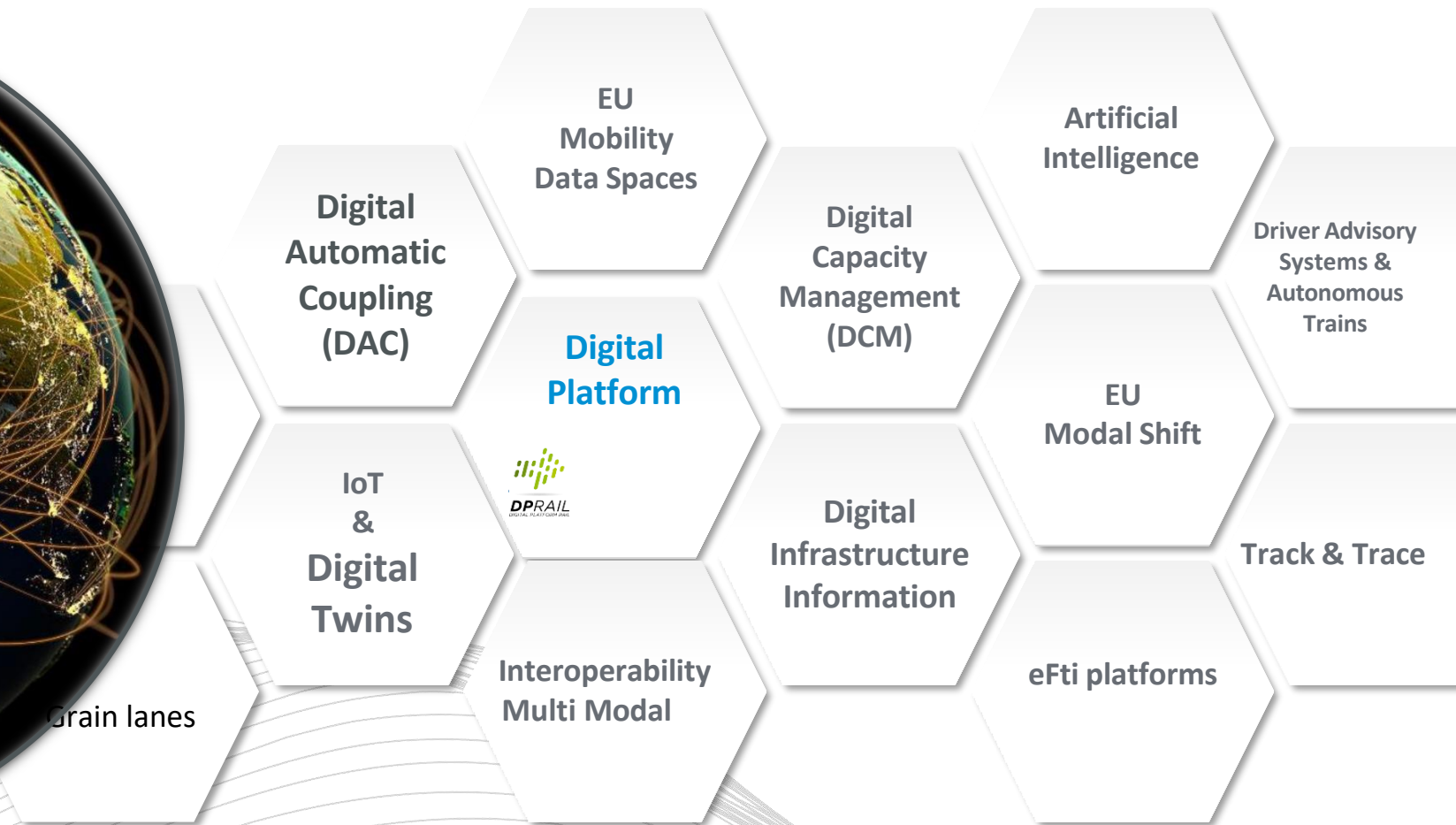
ORFEUS (**O**pen **R**ailway **F**reight **E**DI **U**ser **S**ystem) ensures the exchange of railway CIM consignment notes data between the co-operating railway undertakings (RU) using a Central Data System (CDS).

The ECN-xml message is capable to carry 100 % of consignment note data or CUV wagon note data and matches the requirements of the electronic consignment note defined by the CIT.



# Our common objective is pushing sector digitization

THE BIG PICTURE – RAIL FREIGHT IN FULL TRANSFORMATION



# Gamechanger DP-RAIL – OUR AMBITION

“

*By 2026, we want to achieve a **seamless data flow** in European rail freight operations through a **trusted digital ecosystem** connecting key rail freight partners*

”

- ✓ **Deliver convenient and compliant access** to essential and high-quality **operational data**...
- ✓ **Improve coverage** by successively connecting railway undertakings and **breaking data silos**...
- ✓ **Boost and incentivize innovation** to ensure the railway sector's future competitiveness...

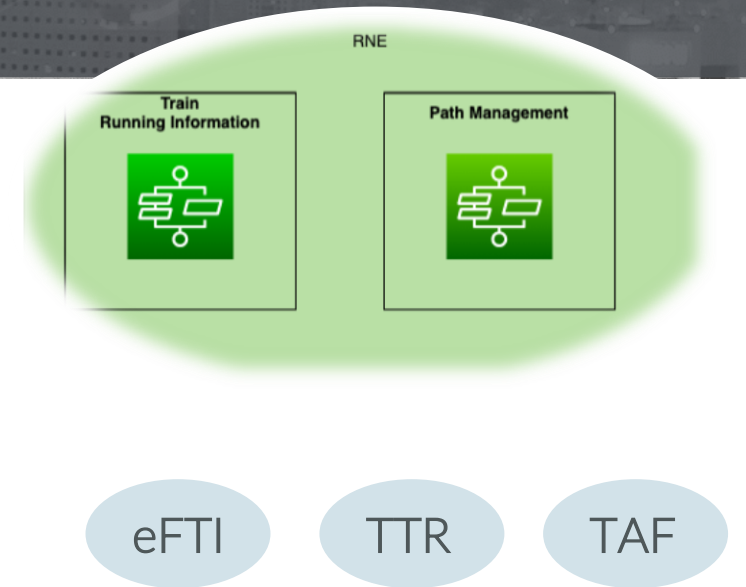
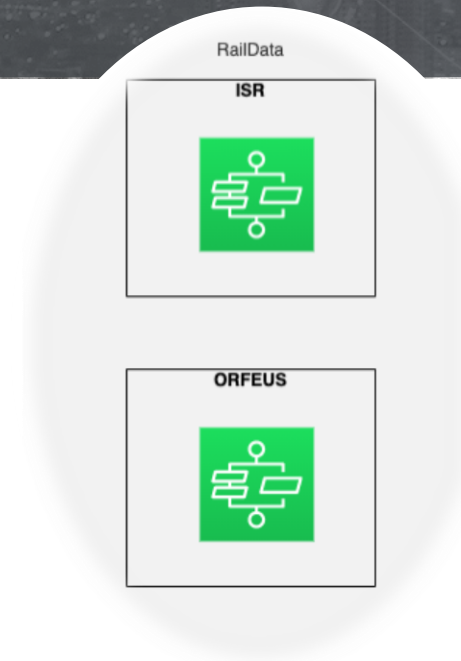
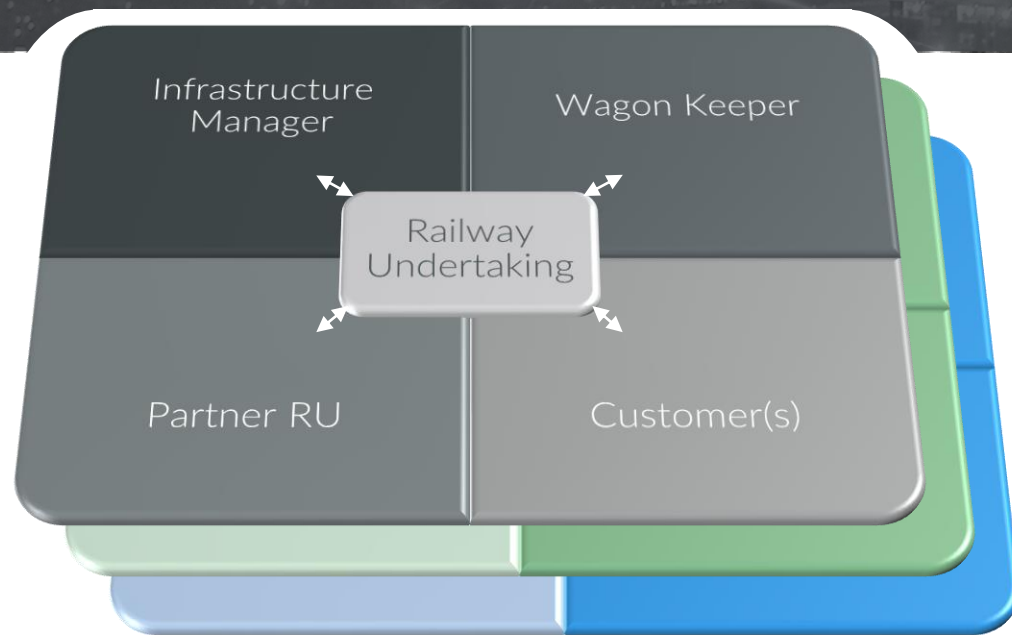
# DP-RAIL allows us to move from a data patchwork landscape...

SIMPLIFIED AS-IS

Inefficient

Unstructured

Slow to adapt



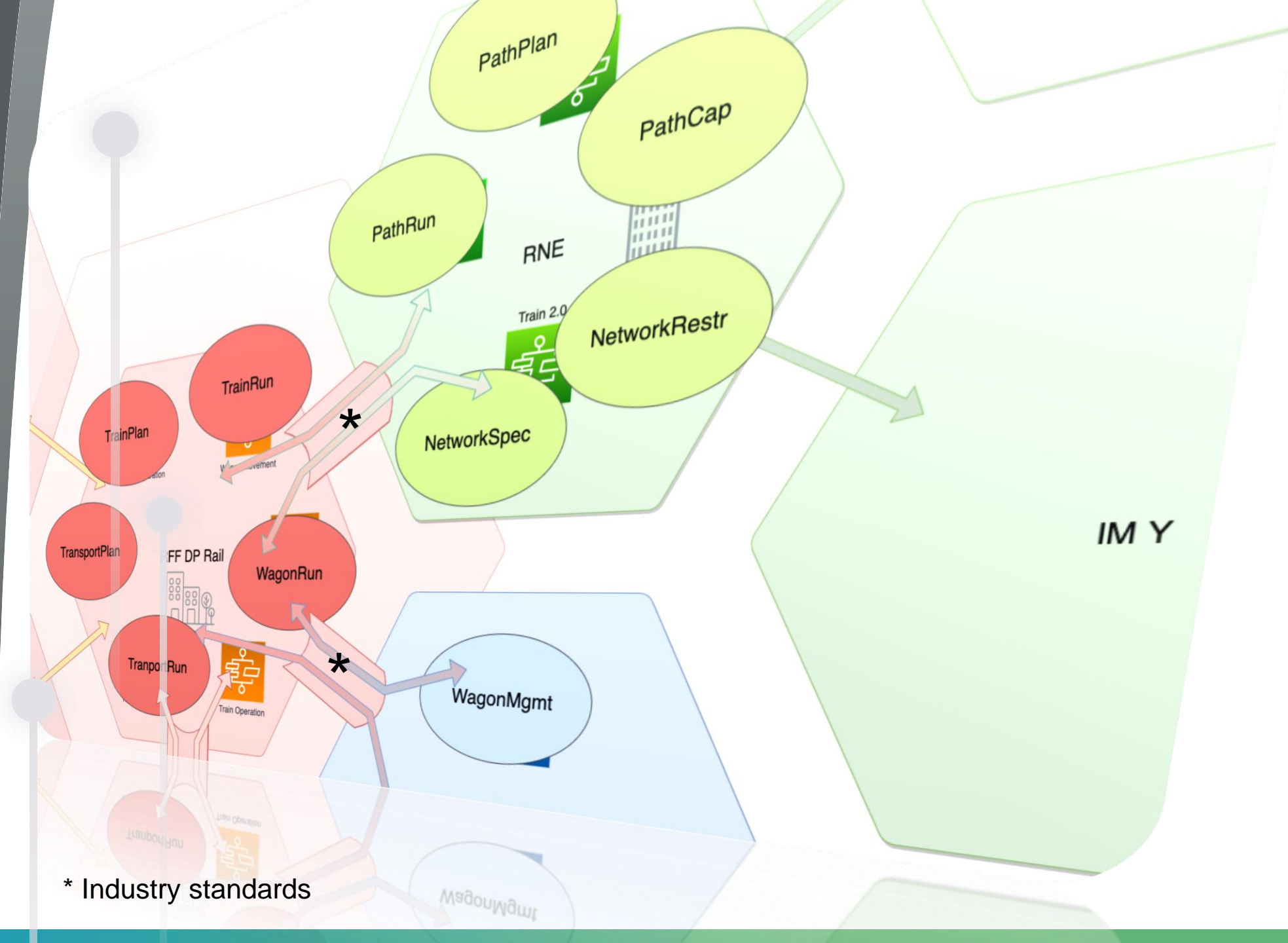
DP-RAIL as a central platform enabling communication between ecosystems

Leveraging existing standards

Booster for creation of European Mobility Data Space

Definition of a common data catalogue

Relentless focus on data quality



# How are we doing this? Our first Use Cases...



## Digital Train Operation

Enable all stakeholders (including non-incumbent RUs and operative staff) to participate in [standardized TSI compliant data exchange](#) regarding [train operations](#) completing [wagon movement](#) messages



## Digital Train Handover

[Shorten, digitalize and standardize handover processes](#), e.g. by distributing necessary transport documentation digitally and increase coverage of Hermes30. Reduce physical / manual hand over processes to a minimum.



## Digital Train Composition

Enable RUs to create [Train Composition Messages](#) easily and [share digitally](#) with other involved RUs and IMs.



## Track & Trace / Telematic wagon data

[Boost data quality](#) in tracking related fields by implementing a sharing logic and rulebook on the digital platform. On this basis, high-quality telematic data is shared with RUs for their disposal enhancing wagon movement messages



## Digital Consignment Note

Provide digital tool enabling all RUs, especially those without connection to existing platforms such as Orfeus, to [deliver and access TAF TSI COM](#) messages





THANK YOU

<https://www.raildata.coop>  
[www.dp-rail.eu](http://www.dp-rail.eu)  
[www.railfreightforward.eu](http://www.railfreightforward.eu)  
[www.uic.org](http://www.uic.org)

**Back up**



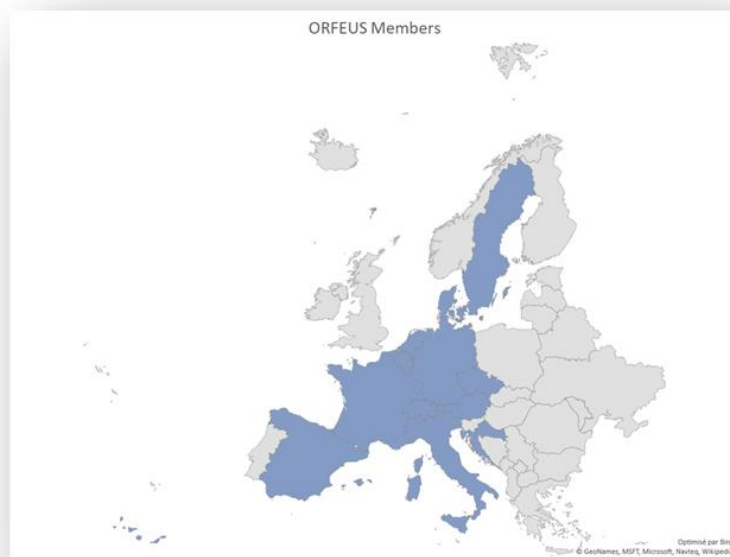
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# RAILDATA

A legacy digital platform  
(a UIC Special Group <https://www.raildata.coop/> ) that can be  
leveraged NOW to facilitate the exchange of Electronic  
Consignment Note data

## UIC activity with its digital platform RAILDATA

### Exchange of electronic Consignment Note data



**Figure 1 - Geographic Scope of ORFEUS**

- 16 RUs participating in the ORFEUS system
- 95 000 messages with Consignment note information are sent by members via ORFEUS each month
- consignment note *related* data (pre-advice) is being exchanged

# ECN Data Exchange



Figure 2 - ECN and Data Flows

- Some RUs currently support the use and transmission of the ECN
- ECN exchange on the **entire network** is possible on a technical level through ORFEUS
- Exchange is limited to bi-lateral exchange due to **legal, business, process, and technical constraints**



## Constraints for Deployment

biggest obstacle to full deployment is that RUs cannot support the cost burden of both paper-based and electronic processes

- Dangerous Goods (Legal)
- IT System Constraints (Business)
- Member States require paper CNs (Process, Legal)
- Compliance with TAF-TSI (Legal)
- NCTS - Customs (Process, Business, Technical)
- Cost (Business)

## Addressing the Constraints

- There has been a commitment by Raildata to provide the portal for stakeholders to communicate the mandatory ECN and Status messages in order to assure compliance with the TAF-TSI Regulation
- ECN message specification has been updated to include information to support Customs and the NCTS requirements
- The technical specification for CIM/SMGS message format is under development
- Coding issues, particularly for Locations and Company Codes are being addressed
- Wide sector project DP-RAIL awaiting financing from EU



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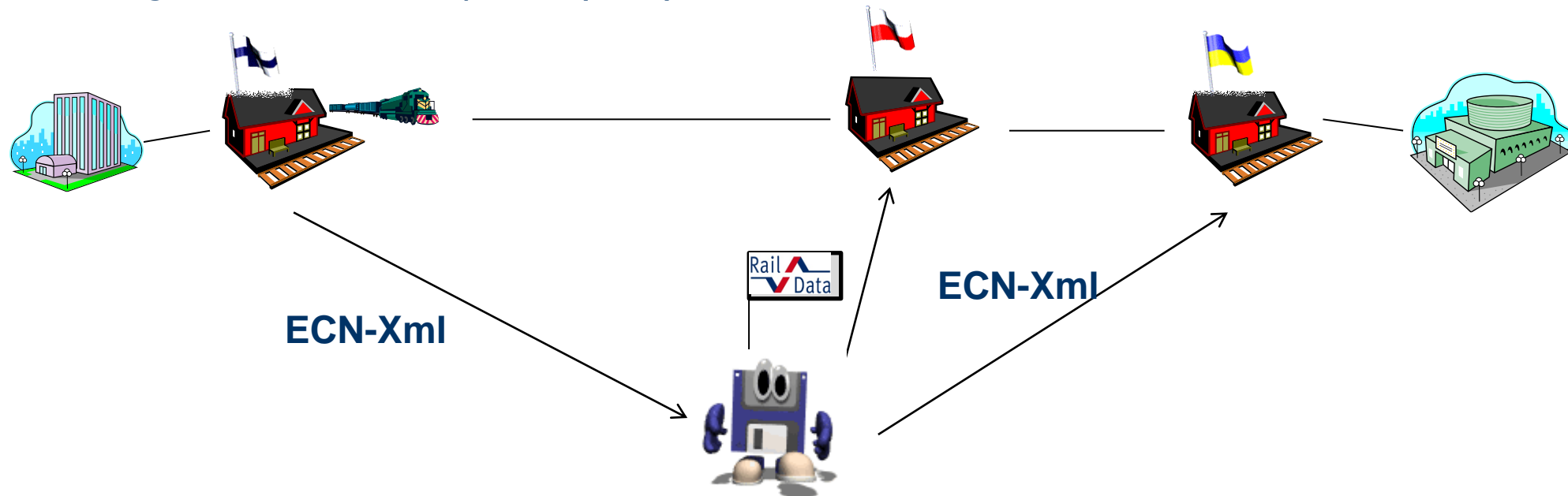
# ORFEUS

Open Railway Freight EDI User System



# What is ORFEUS?

ORFEUS (**O**pen **R**ailway **F**reight **E**DI **U**ser **S**ystem) ensures the exchange of railway CIM consignment notes data between the co-operating railway undertakings (RU) using a Central Data System (CDS).



# What is ORFEUS?

ORFEUS offers 2 possibilities:

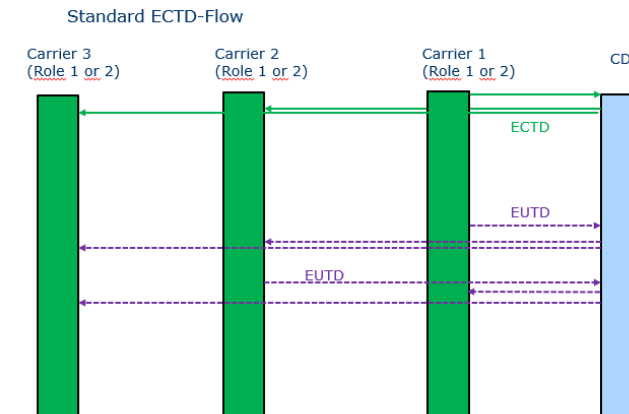


## Simple forwarding of consignment note data

Consignment note data is forwarded simultaneously to all participating railway undertakings. In addition a paper consignment note has to accompany the transport.

### ORFEUS Versions:

- ECTD 1.42
- ECTD 1.5



# What is ORFEUS?

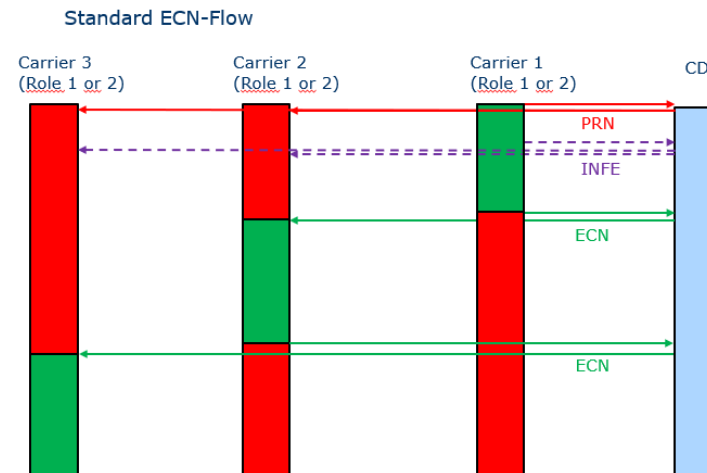


## Electronic consignment note

Instead of a paper consignment note, an electronic consignment note, handled by the CDS of Raildata, accompanies the transport.

### ORFEUS Versions:

- ECN 1.42
- ECN 1.5

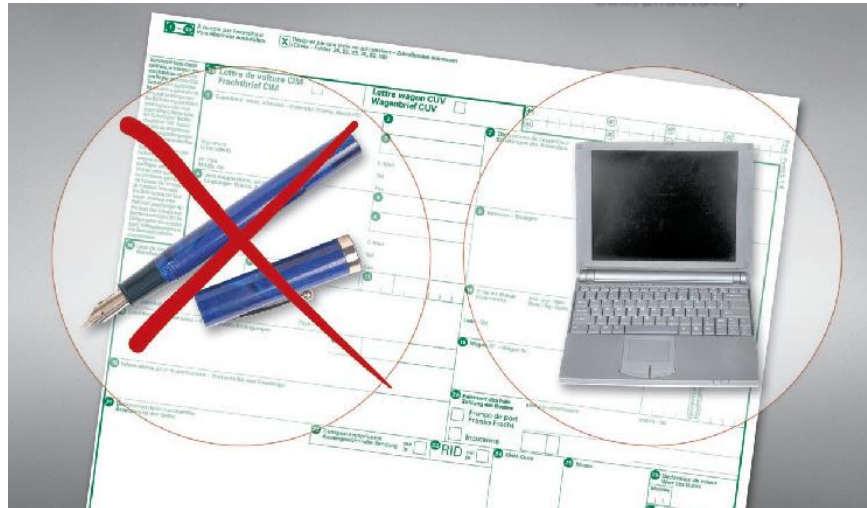


# What is ORFEUS?

Utilized message type:

The ECN-xml message is capable to carry 100 % of consignment note data or CUV wagon note data and matches the requirements of the electronic consignment note defined by the CIT .

Latest version: 1.5



## ORFEUS and TAF/TSI:

### **TODAY**

**The latest version of the ORFEUS –ECN xml 1.5 is soft compliant to the TAF/TSI consignment order message. All locations within the message are coded as TAF/TSI locations ( Primary and subsidiary location codes etc.)**

### **TOMORROW**

**The next version of the ORFEUS –ECN xml 1.6 (not implemented yet) will be completely compliant to the TAF/TSI consignment order message. The next ERA TAF/TSI data catalogue will contain the ORFEUS –ECN xml 1.6 as the consignment order message**

A small red and blue graphic element consisting of two overlapping triangles.

## Next steps with ORFEUS

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### **TECHNICAL EVOLUTION**

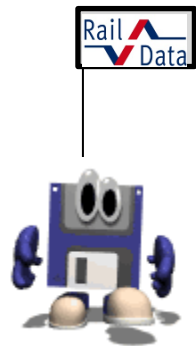
**Although still most of our partners are using xml and ftp-clients as means of transmission, new standards as JSON and connection via REST-APIs will be developed for the connection of new partners**

### **CIM-SMGS**

**A complete CIM-SMGS consignment note schema was developed in cooperation with OSJD and CIT but is not implemented yet in the central data system**

## Why using ORFEUS?

- No longer collection of consignment note data at handovers to next RU



- **Potential of automatic billing**



- **Waiving of paper consignment note**

