Encuentro Nacional Datos Abiertos

CANARIAS DATOS ABIERTOS

Los datos en la cultura del conocimiento abierto

IV Encuentro Nacional de Datos Abiertos

#ENDA2025 #IVENDA

Óscar Corcho

Universidad Politécnica de Madrid

#IVENDA
#ENDA2025
LANZAROTE

Retos en la transformación de una organización para ser centrada en datos, usando grafos de conocimientos.

El caso de la Agencia Europea de Ferrocarriles

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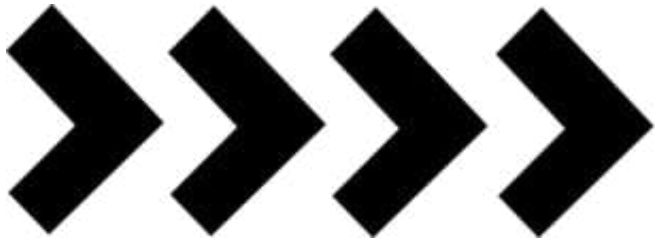

Retos en la transformación de una organización para ser centrada en datos, usando grafos de conocimientos.

El caso de la Agencia Europea de Ferrocarriles

Objetivo de esta presentación

Reflexionar sobre cuáles son los **ingredientes principales**, los **retos** y las **oportunidades** en la transición de una organización ”tradicional” hacia una organización centrada en datos.

Basándonos en un caso real en el que mi equipo ha participado en los últimos 4 años: **Agencia Europea de Ferrocarriles.**

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Primera pregunta para el público (I)

¿Cómo podríamos definir lo que es una organización centrada en datos?

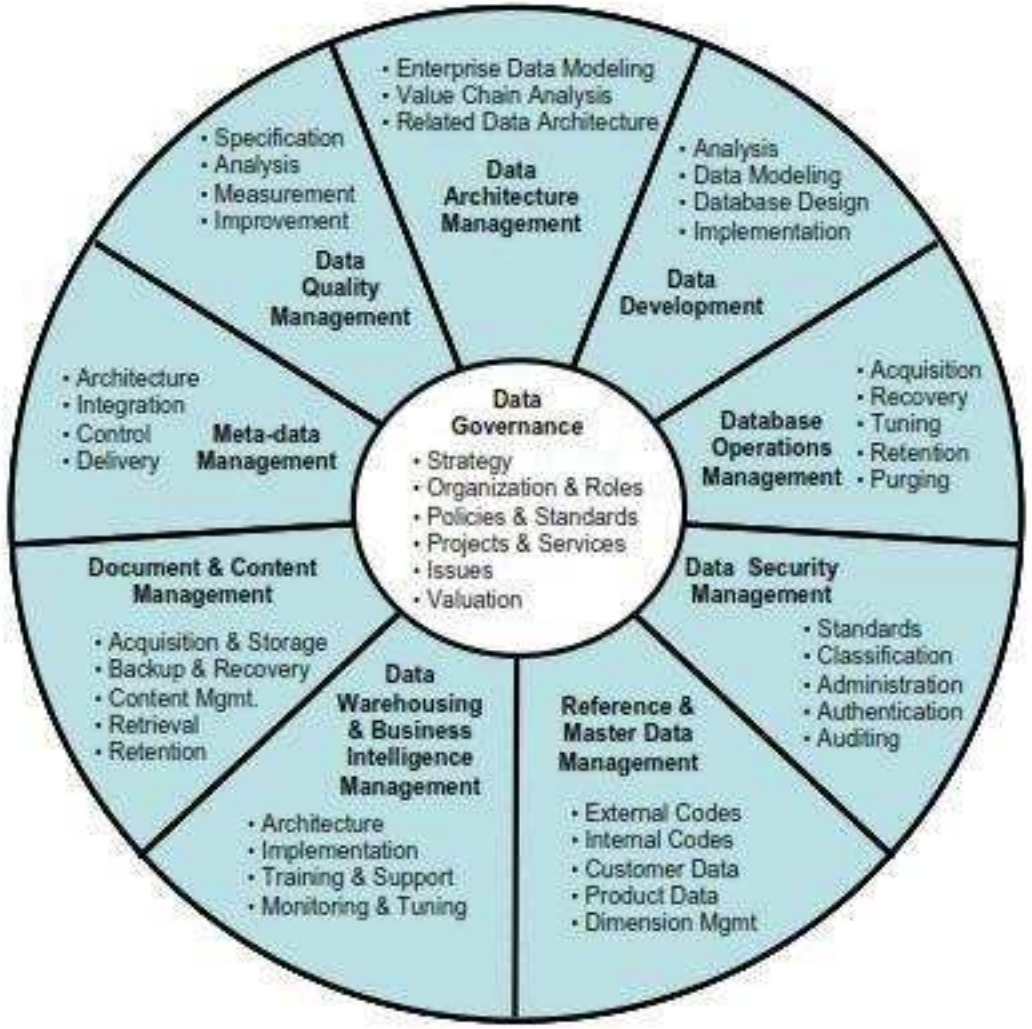
¿Cómo definirías lo que es una organización centrada en datos?

Una **organización centrada en datos** (o *data-driven organization*) es aquella que **toma decisiones estratégicas, operativas y tácticas basadas en datos** y en su análisis, en lugar de basarse principalmente en la intuición, la experiencia o las jerarquías. Esto implica no solo tener acceso a datos, sino también una cultura, infraestructura y procesos que permitan usarlos de forma efectiva y continua.

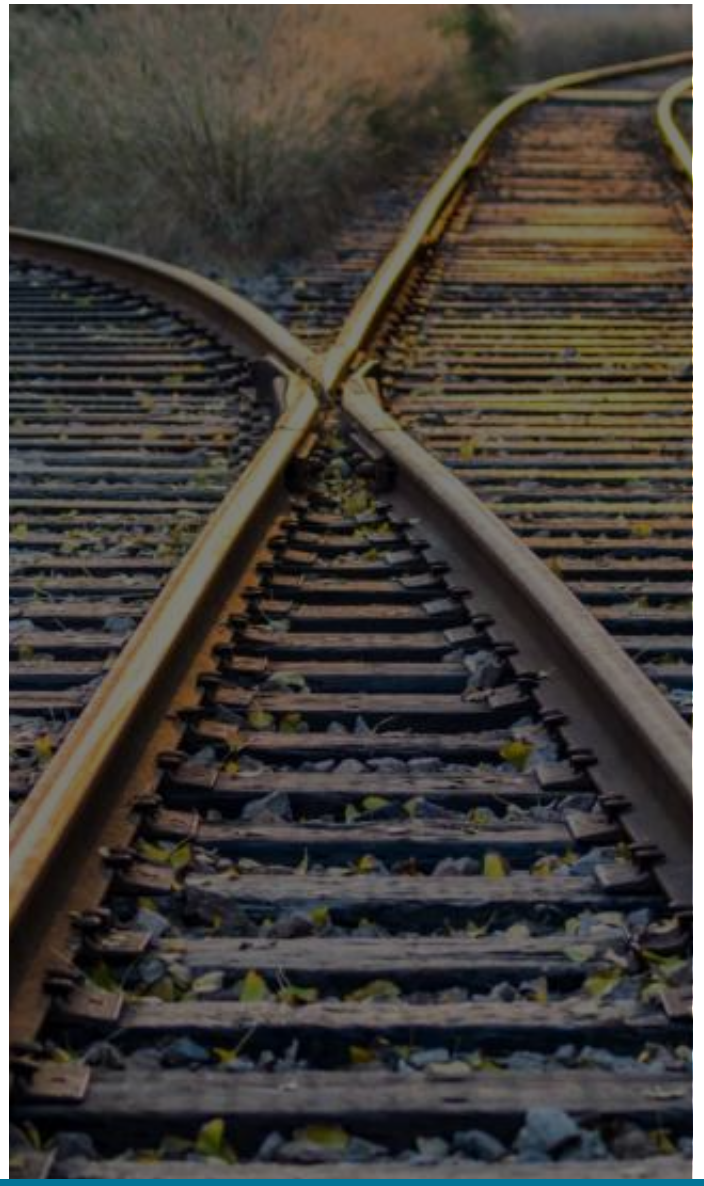
Primera pregunta para el público (II)

Características clave de una organización centrada en datos:

1. **Toma de decisiones basada en evidencias**:
   Las decisiones importantes se sustentan en datos cuantitativos y cualitativos, y en modelos analíticos o predictivos, en lugar de opiniones personales o intuiciones.
2. **Cultura orientada a los datos**:
   Hay una cultura organizacional que *literacy*) entre todos los empleados información.
3. **Gobierno del dato sólido**:
   Existen políticas, estándares y proc la ética en el uso de los datos.
4. **Accesibilidad e integración de datos**:
   Los datos están disponibles, bien documentados y centralizados o federados de forma coherente, lo que permite su reutilización por diferentes áreas.
5. **Capacidades analíticas y tecnológicas**:
   Se cuenta con herramientas, infraestructura (por ejemplo, data lakes, data warehouses, plataformas de BI) y perfiles técnicos (científicos de datos, ingenieros de datos, analistas) para transformar los datos en conocimiento.
6. **Feedback y mejora continua**:
   Los procesos y decisiones se revisan y ajustan continuamente en función de los resultados observados y del nuevo conocimiento obtenido a partir de los datos.



Extraído del marco de trabajo DAMA



01

Contexto: El caso de la Agencia Europea de Ferrocarriles (European Agency for Railways)

Contexto legal. Leyes en el sector ferroviario (I)

Legal context. EU Laws and the Railway sector (I)

primary law

European Treaties

(principles)

i.e freedom of movement

secondary Law

Directives, Regulations,
decisions, recommendations, opinions

Commission Acts:
Implementing and Delegated Acts

Committees consisting
of EU countries' representatives

LEGAL BASE: shared competences in single market, transport and trans-European Networks

Contexto legal. Leyes en el sector ferroviario (II)

Legal context. EU Laws and the Railway sector (II)

FROM

fully integrated State railways
monopolies
stagnating modal share
lack of market orientation
increasing costs and indebtness
outdated technologies

POLICY ACTIONS

4th Railway Package 2016

EUROPEAN UNION AGENCY FOR RAILWAYS

Safety & Interoperability

TO

high quality, customer oriented transport services
a level playing field
cost efficient operations, lower need for public funding
market driven innovation

First rail market legislation (1991)	First railway package (2001)	Second railway package (2004)	Third railway package (2007)	Rail freight corridor Regulation (2010)	Recast of first package (2012)	Fourth railway package (2016)

Contexto legal. Leyes en el sector ferroviario (III)

Legal context. EU Laws and the Railway sector (III)

- **Interoperability of the rail system** Directive (EU) 2016/797
  - Technical Specifications for interoperability (TSIs)
  - Functional and technical specifications for Agency registers (RINF, ERATV, ERADIS ...)
- **Safety** Directive (EU) 2016/798
  - Information Sharing System (ISS)
- **Single European Railway Area (SERA):** Directive (EU) 2012/34/EU
  - Network statements and capacity path allocations
- **Rail Freight Corridors (RFCs)**
  - Regulation (EU) No 913/2010
    - Rail Facilities Portal
- **Trans European Network –Transport (TEN-T)**
  - Regulation (EU) No 1315/2013 Link

B2G data exchange. / Intercambio de datos Business2Government

Contexto legal. Evolución de la regulación RINF

Legal context. RINF Regulation evolution

to **ensure the transparency, interoperability, and coordination of railway infrastructure data** across the EU
- Facilitating the safe and efficient operation of trains across borders.
- Supporting the design and authorization of railway vehicles.
- Enabling compatibility checks between infrastructure and rolling stock.
- Monitoring the progress of EU rail system interoperability.
- Enabling reuse of infrastructure data in other IT tools and services.

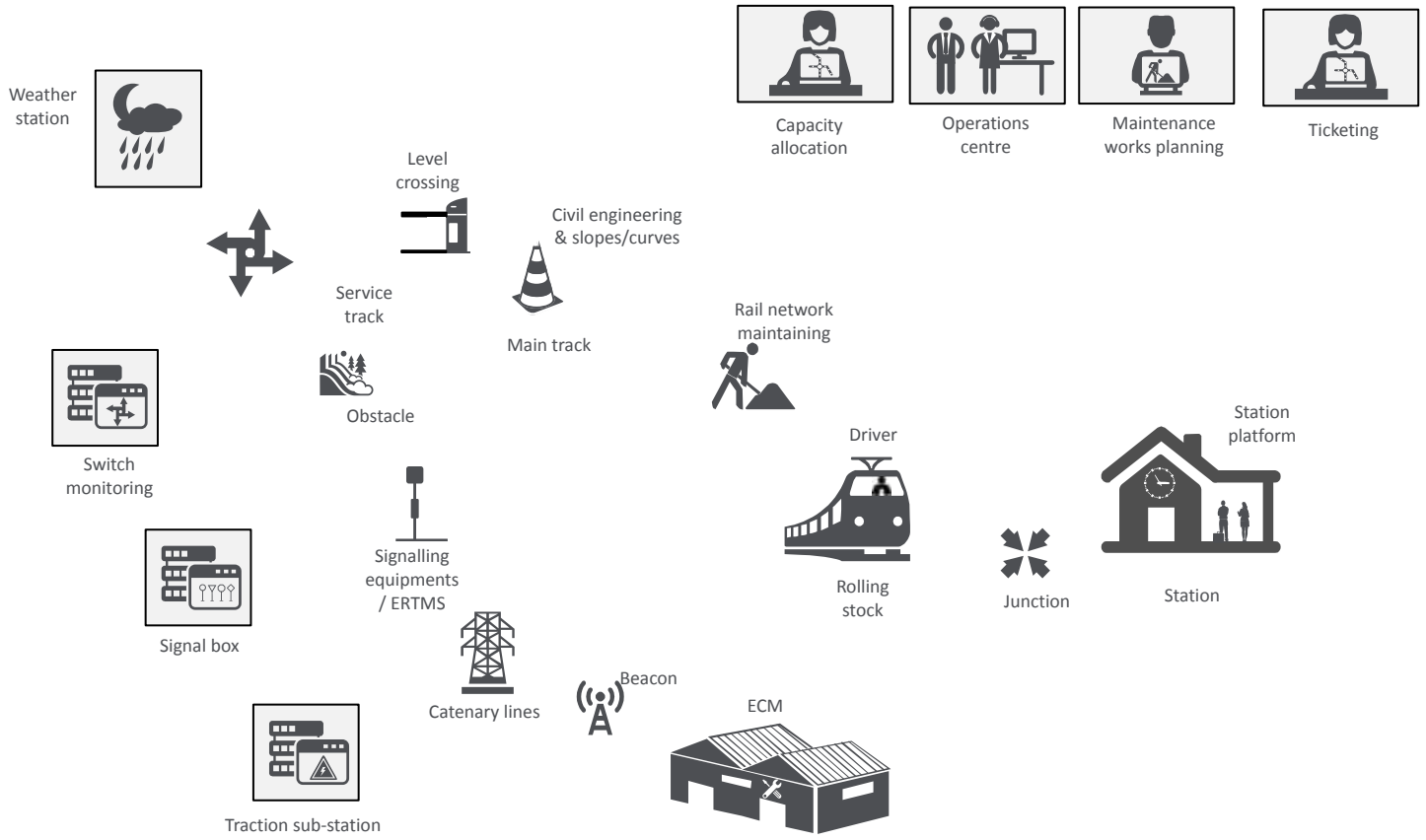
supports the **Single European Railway Area (SERA)** by enhancing cross-border interoperability

asegurar la transparencia, interoperabilidad y coordinación de los datos de infraestructura ferroviaria en la UE
- Facilitar la operativa internacional de trenes eficiente y segura.
- Dar soporte al diseño y autorización de vehículos.
- Permitir la comprobación de compatibilidad entre los vehículos y la infraestructura.
- Monitorizar el progreso de la interoperabilidad en el Sistema ferroviario europeo.
- Permitir la reutilización de dats de infraestructura en otras herramientas y servicios.

Dar soporte a la **Single European Railway Area (SERA)** mediante la mejora de la interoperabilidad entre fronteras

Contexto organizativo. Muchos actores

Organisational context. Many stakeholders



- Many physical assets scattered all over the railway topology
- Physical assets in movement handled and operated by multiple actors

- Muchos elementos físicos distribuidos en la infraestructura ferroviaria
- Algunos en movimiento, y operados por multiples actores

Contexto organizativo y técnico

Problemas “habituales” en el punto de partida

Contexto técnico

RINF como la capa de datos que da soporte a servicios digitales transfronterizos

EU-wide digital Once-Only Principle for citizens and businesses

interoperable europe Act

Route Compatibility Check Service

Digital Route Book Service

Rail Freight Portal

PLC and SLC Service allocation

Digital Network Statement

PRIME KPIs Catalogue on Capacity

TEN-T

RNE RIS & Capacity Planning Tools

ERSAD

ISS

Digital Map

ERA KG (RINF + otros registros)

Contexto técnico. Calidad de los datos RINF

Technical context. RINF data quality

Country	Data Provider Code	Data Provider Name from OCR	Last Import Date	Overall data completeness	Completeness over the core parameters	Completeness over the RCE parameters	Number of OPs	Number of SOLs	Total length of lines (kilometers)	Total length of tracks (kilometers)
Austria	3786	Raab-Oedenburg-Ebenfurther-Eisenbahn AG	28/10/2024	100.00%	100.00%	100.00%	13	12	26	26
France	NRE	-	28/01/2025	99.01%	98.72%	99.04%	11,050	12,866	26,902	51,061
France	CY26	TSO	07/02/2025	98.82%	100.00%	97.71%	6	5	35	35
Austria	0081	ÖBB-Infrastruktur AG	18/12/2024	98.41%	99.82%	96.88%	1,728	1,917	5,142	7,333
Czech Republic	NRE	-	08/01/2025	98.35%	96.36%	96.36%	3,677	3,901	9,875	11,818
Latvia	NRE	-	22/11/2021	98.20%	96.41%	98.06%	36	40	1,505	1,853
The Netherlands	0084	ProRail	10/01/2025	97.98%	99.94%	96.15%	775	871	3,152	5,735
Luxembourg	0082	CFL Gestionnaire Infrastructure	22/01/2025	97.12%	93.32%	98.13%	102	99	263	438
Bulgaria	NRE	-	16/09/2024	96.79%	93.00%	98.25%	322	350	3,766	4,755
Italy	3572	Ferrovie del Sud Est e Servizi Automobilistici S.r.l.	31/10/2024	96.48%	96.02%	95.63%	97	100	473	473
France	3436	USEA	15/07/2024	96.15%	96.20%	94.95%	29	28	332	1,323
Portugal	0094	Infraestruturas de Portugal	01/08/2024	96.03%	95.79%	91.46%	786	791	2,504	3,204
Italy	3525	Ferrovie Emilia Romagna S.r.l.	17/01/2025	94.05%	94.00%	94.48%	133	125	351	351
Italy	0083	Rete Ferroviaria Italiana RFI	28/01/2025	93.04%	96.47%	94.62%	2,770	3,183	16,131	24,318
Finland	3109	Finnish Transport Infrastructure Agency	27/01/2025	92.74%	92.98%	88.00%	754	790	5,784	6,591
Finland	0010	VR-Yhtymä Oyj	21/03/2024	92.24%	85.49%	96.73%	38	0	0	0
Slovenia	NRE	-	28/01/2025	89.99%	83.99%	95.81%	319	319	1,192	1,515
Italy	3379	SOCIETA FERROVIE UDINE CIVIDALE srl	17/10/2023	89.41%	91.43%	83.25%	7	6	15	15
Italy	3456	La Ferroviaria Italiana S.p.A.	15/10/2024	89.12%	100.00%	92.48%	25	24	84	84
Italy	3908	Gruppo Torinese Trasporti S.p.A	18/08/2022	86.21%	94.29%	78.51%	7	6	21	21
Italy	3856	Ente Autonomo Volturno S.R.L	20/10/2023	85.46%	93.28%	76.89%	26	24	1,726	1,726
Norway	NRE	-	24/10/2018	83.05%	76.61%	77.68%	375	378	3,907	3,907
Greece	NRE	-	30/01/2019	82.51%	91.86%	91.66%	188	193	3,021	3,606
Poland	NRE	-	18/05/2022	77.94%	92.65%	81.78%	4,213	4,911	19,817	28,608
Romania	0053	Compania Națională de Căi Ferate Române	01/12/2024	76.34%	58.58%	74.68%	2,192	2,330	10,542	13,498
Germany	NRE	-	30/10/2024	75.12%	79.98%	76.82%	21,601	13,845	38,176	60,005
Sweden	NRE	-	30/01/2025	75.09%	82.91%	68.23%	1,095	1,186	10,764	13,021
Slovak Republic	0056	Železnice Slovenskej republiky	10/12/2024	71.31%	71.34%	75.53%	1,040	1,074	3,128	3,970
Italy	3857	Ferrotramviaria S.P.A.- Divisione Infrastruttura	25/07/2023	70.18%	78.21%	67.58%	28	28	103	177
Belgium	NRE	-	10/01/2025	69.78%	84.01%	76.47%	1,308	1,746	3,963	6,888
Spain	NRE	-	17/12/2024	66.82%	67.89%	59.79%	2,380	2,541	15,497	22,090
Denmark	NRE	-	27/01/2022	59.42%	47.82%	58.71%	563	352	2,048	3,068
Italy	0064	Ferrovienord	29/11/2023	53.21%	61.85%	50.78%	126	125	318	496
Lithuania	0024	AB "Lietuvos geležinkeliai"	21/12/2021	53.09%	97.28%	62.46%	177	181	1,742	2,155
Switzerland	NRE	-	18/11/2024	47.27%	88.36%	49.85%	3,281	1,570	4,401	62,300
Croatia	NRE	-	12/02/2025	42.85%	77.68%	43.04%	578	581	2,448	2,689
Hungary	NRE	-	07/11/2023	34.72%	51.02%	23.94%	1,836	1,977	6,592	7,875
Estonia	NRE	-	20/01/2019	31.89%	39.11%	52.05%	101	106	1,011	1,108
Ireland	-	-	never	0.00%	0.00%	0.00%	-	-	-	-

02

La transición (organizativa y técnica) hacia una organización centrada en datos

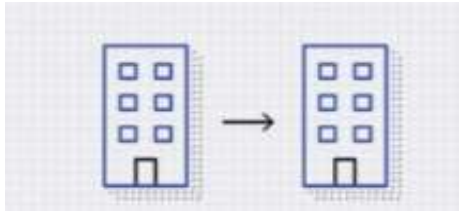
El panorama de datos de ERA

Marco legal del sector ferroviario

Intercambio de datos entre empresas y administración pública

B2G

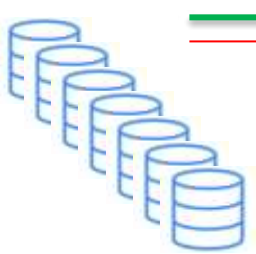
Intercambio de datos entre empresas **B2B**



- TAF/TAP (IM, RU exchange)
- ERTMS (Supplier IM, RU)

Intercambio de datos dentro de la agencia

Registros BASE



RINF
ERADIS
ERATV
EVR
VKM
Safety Related DBs

Registros
OSS
Estadísticas

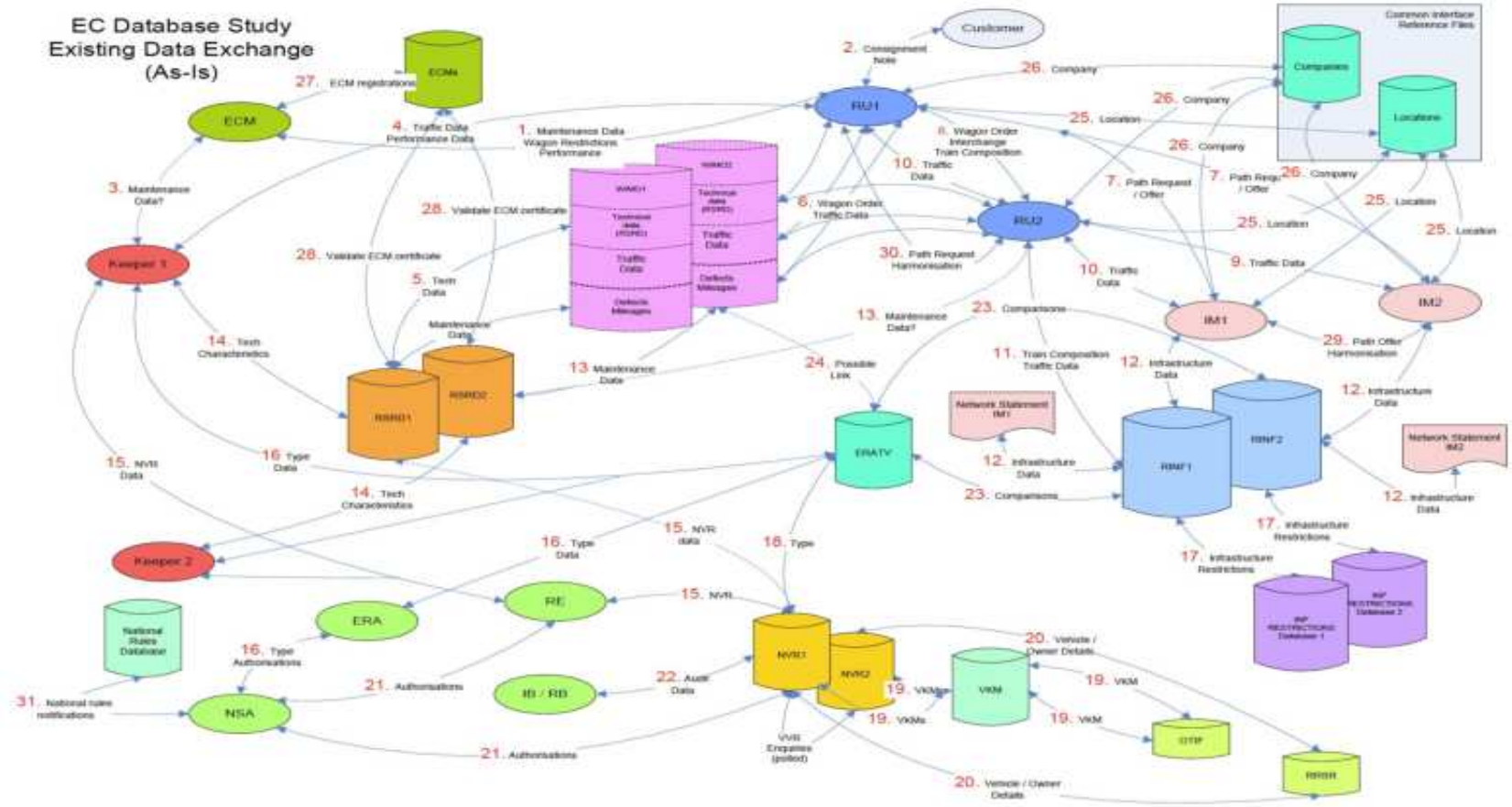
1° Metadatos – Ontología Común – Catálogo de datos – Datos de referencia

2° Acceso a datos

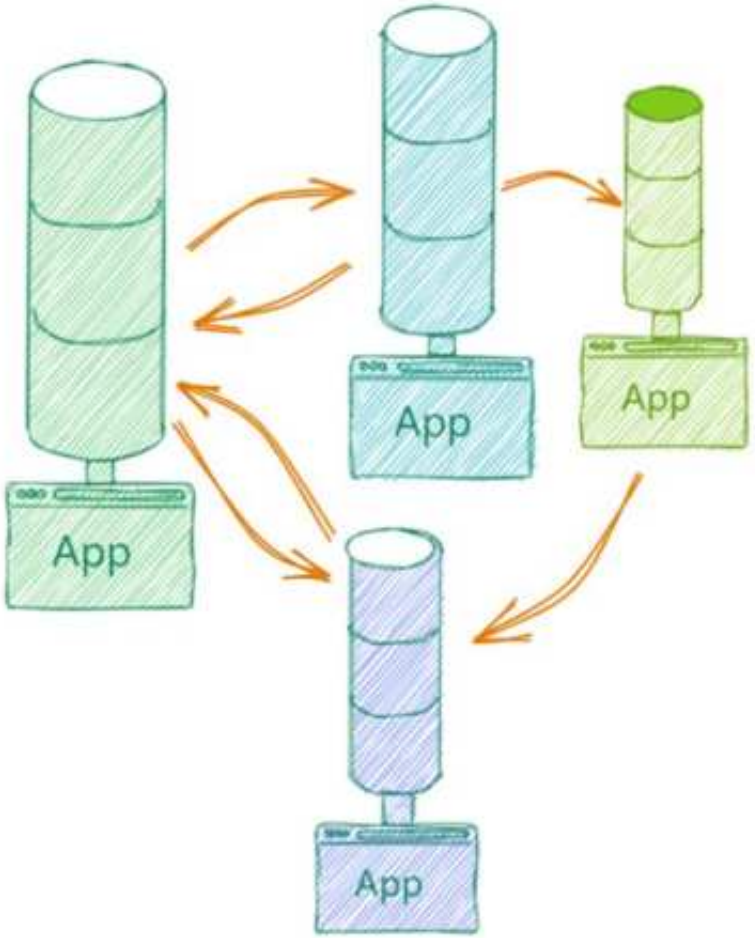
ERA actúa como un **agente neutral** e intermediario de datos con un papel active, validando, curando, almacenando y publicando información basada en registros, para que pueda ser reutilizada y explotada por el sector, mediante la **mejora la interoperabilidad** entre los distintos actors.

El ecosistema de intercambio de datos (desactualizado)

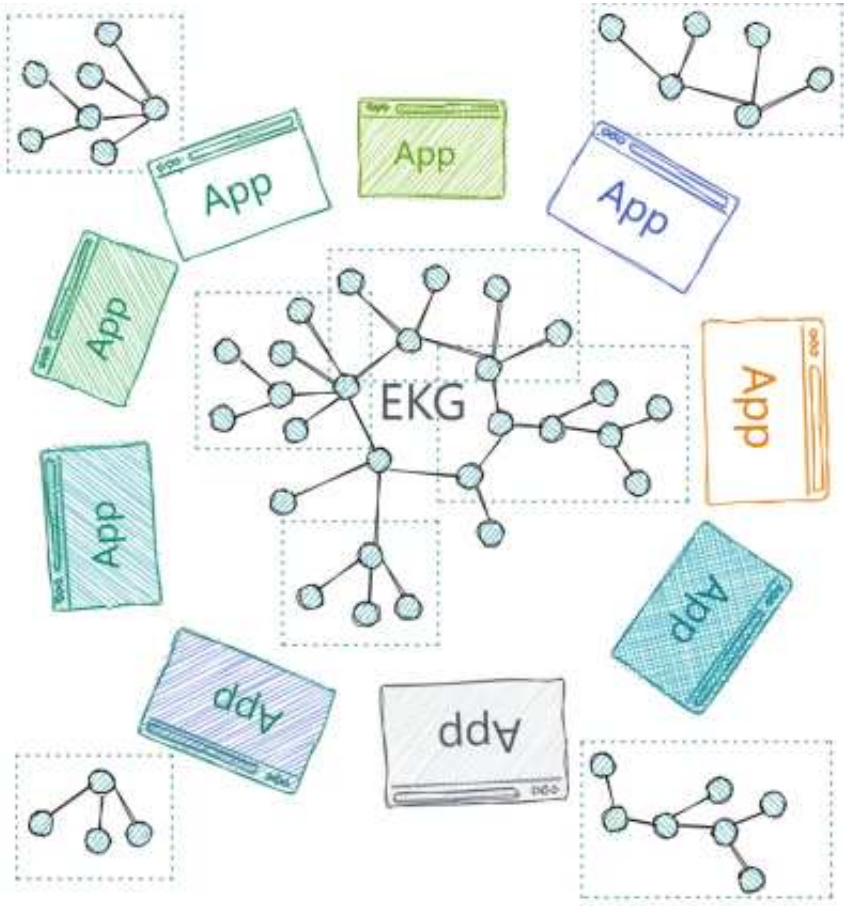
The EU regulatory rail data Exchange ecosystem (outdated)



FROM / DESDE



TO / HACIA



El camino hacia una organización centrada en datos

2019

Datos en silos

Decisión del Management Board sobre la adopción de Linked Data

2022

Registro de vehículos (ERATV)

2025/2026

ISS - European Railway Occurrences Data *

Vehicle Authorization Data *

Datos conectados

Cada registro está regulado por un texto legal diferente:

- Reglas y algoritmos encapsulados en código, de difícil mantenimiento y poco transparente
- No hay definiciones compartidas
- No hay taxonomías compartidas

Contexto organizativo. Comunicaciones

Organisational context. Communications

Moving Europe towards a sustainable and safe railway system without frontiers.

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Home > News > ERA takes action to reduce fragmentation in the European rail data landscape

ERA takes action to reduce fragmentation in the European rail data landscape

Published: 06 December 2023 Updated: 07 December 2023

The European Union Agency for Railways (ERA) has taken significant steps towards its mission of fostering a sustainable and safe railway system without frontiers. On 6 December 2023, ERA announced the official launch of the ERA Railway Factsheets, an intuitive tool aimed at unlocking data and addressing fragmentation within the European railway data landscape. Importantly, ERA presented its fundamental work on linked data and the ERA knowledge graph: the data architecture that enables efficiency gains for the entire European railway sector.

Press release

Page content

Watch the recording of the press briefing

Background information

Related links

Related documents

The ERA Factsheets offer a comprehensive overview of the rail sector across European countries with one-click access. Covering aspects such as transport statistics, railway organisations, rolling stock, infrastructure, safety, market structure, and the legal framework, the tool unlocks data from ERA and other organisations, providing a broad and accurate representation of the European railway landscape.

Whereas ERA Factsheets bring fragmented data together in an accessible format, ERA's linked data project changes the fundamentals on how railway data is defined and shared. Today, railway data is typically kept in isolated and incompatible databases. Linked data is central to ERA's strategic plan to overcome challenges such as data gaps, unaligned definitions, and accessibility barriers. It sets the foundation for more efficient data sharing between railway actors across Europe and novel applications. ERA presents the substantial progress that has been achieved and several future use cases.

Through linked data and the Factsheets, ERA is taking a crucial step towards increasing the efficiency of railway operations, filling knowledge gaps, and facilitating informed policymaking.

> Linked Data and the ERA Railway Factsheets contribute to our mission to create a sustainable and safe railway system for Europe. They provide tangible solutions to historical challenges in the European railway data landscape. By addressing fragmentation and enhancing accessibility, we aim to streamline operations and facilitate evidence-based policymaking to empower European railways.
>
> — Josef Doppelbauer, ERA's Executive Director

The ERA Railway Factsheets are set to be regularly updated, reflecting the commitment to ensure that the information remains current and relevant over time. ERA encourages stakeholders, innovators, and citizens to explore the Factsheets, available on ERA's website, and provide feedback to contribute to the continuous improvement of this pivotal tool: https://www.era.europa.eu/content/era-railway-factsheets

Contexto organizativo. Documentos de trabajo

Organisational context. EC working documents

Rail

In the **railway sector**, infrastructure data are the basis for building up mobility data. The revised common specifications for the **register of railway infrastructure (RINF)** [53] establish the RINF as the common source of rail infrastructure data. It is based on the **ERA ontology** [54] which defines machine-readable and structured data elements of the rail system and is the **building block of the EMDS for rail.**

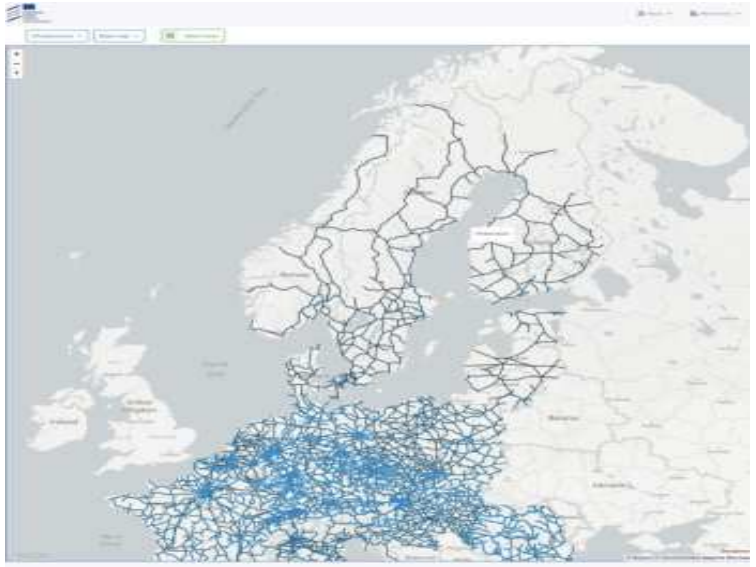
EUROPEAN COMMISSION

Brussels, 29.11.2023
COM(2023) 751 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

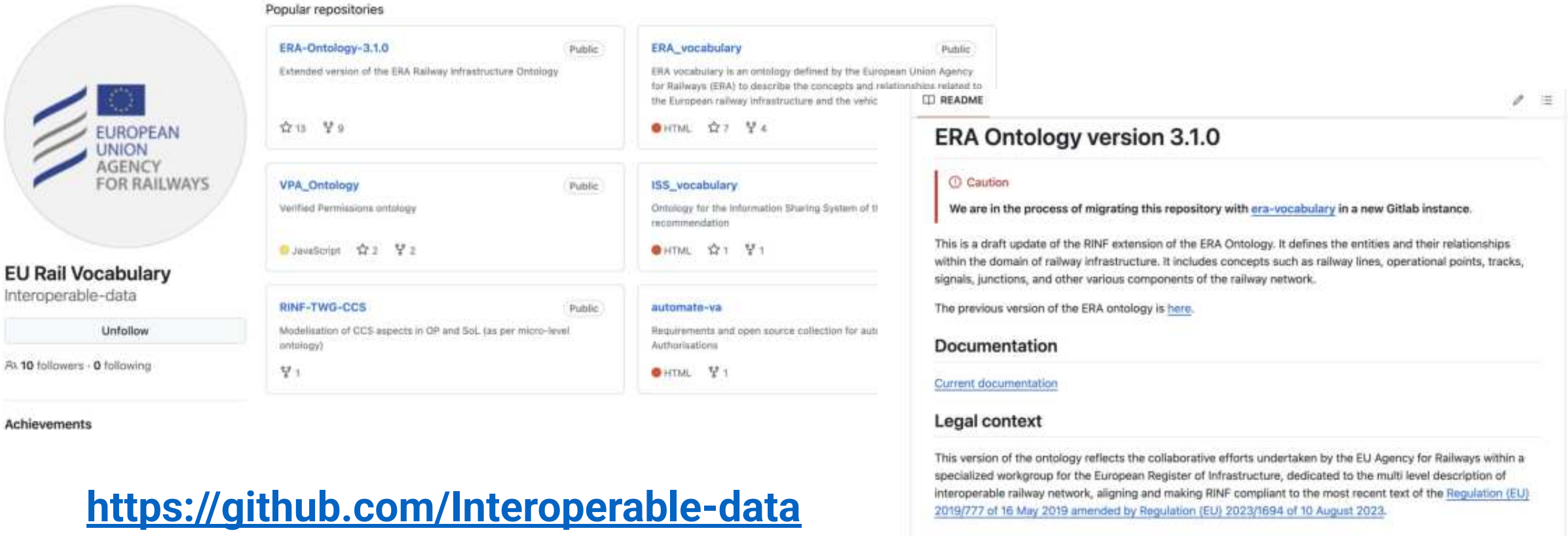
Creation of a common European mobility data space

Link



Contexto técnico. Una ontología en evolución

Technical context. An evolving ontology



https://github.com/Interoperable-data

Contexto técnico. Datos de referencia en SKOS

Technical context. SKOS reference data

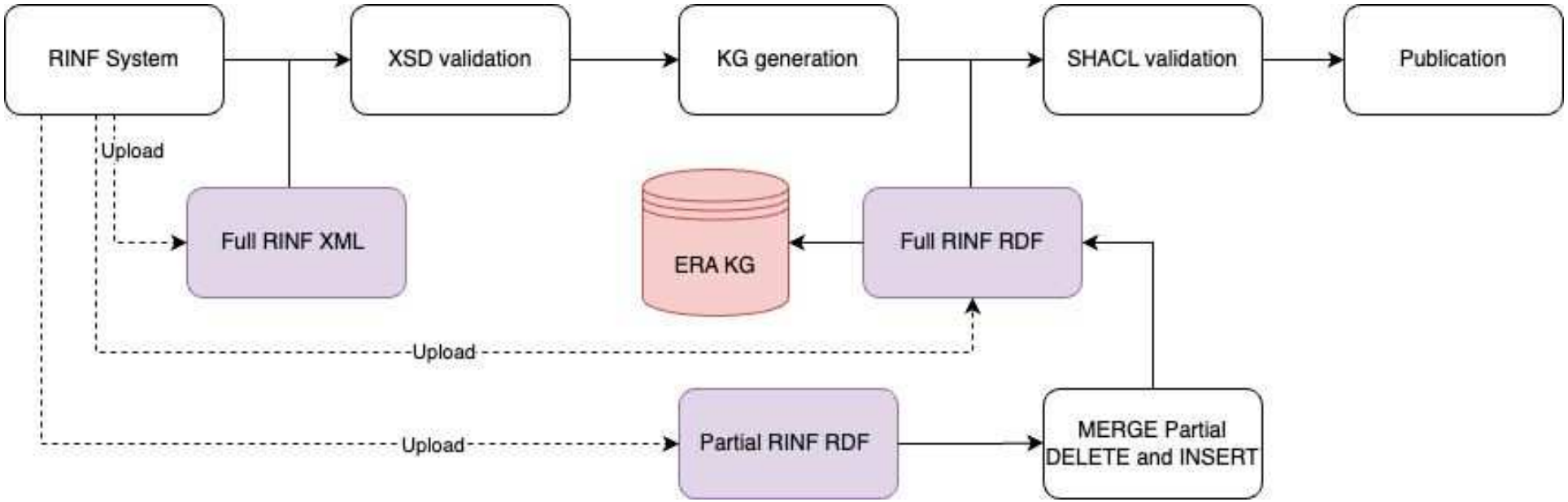
ERA SKOS Concept Schemes. Version 3.0.1

Summary

List of SKOS Concept Schemes

Contexto técnico. Transformación de datos

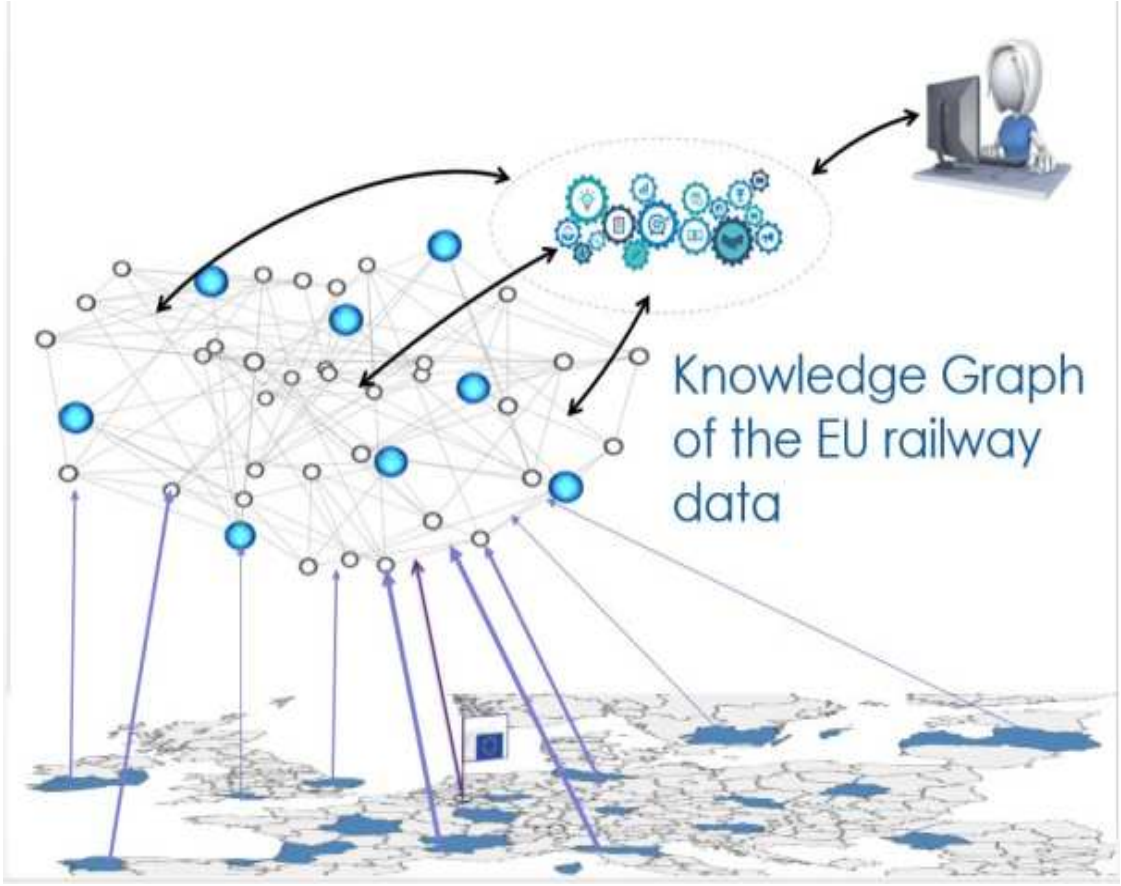
Technical context. Data transformation pipeline



Contexto técnico. El grafo de conocimientos de ERA

Algunos números:

- Más de 100 millones de tripletas
- Más de 31.000 líneas de mapeos
- Más de 500 SHACL shapes (property shapes y SPARQL shapes)
- +270K segmentos de vía
- +50K estaciones
- +50k objetos georreferenciados (lat/long)
- +2k tipos de vehículos
- 27 países europeos



Contexto técnico. Resumen

Base legal del sector

Harmonización de procesos

Harmonización de…

- Términos – vocabulario – gobernanza de ontologías
- Datos de referencia – vocabularios controlados SKOs
- Datos maestros (localizaciones)

ERA como un proveedor de vocabularios y de identificadores para el intercambio de datos en el EU Common European Mobility data space, facilitando la interoperabilidad de datos en el sector del transporte europeo

Mobility

Article 7a

ERA vocabulary

"ERA Vocabulary" means a Technical Document issued by the Agency pursuant to Article 4(8) of Directive (EU) 2016/797, establishing human and machine readable data definitions and presentations and linked quality and accuracy requirements for each data element (ontology) of the rail system.

The Agency shall ensure the ERA vocabulary is maintained to reflect regulatory and technical developments affecting the rail system. The first update shall be made available by [*PO please enter 6 months after enter into force of this regulation*]";

(6) the Annex is amended in accordance with Annex VII to this Regulation.

ERA vocabulary (europa.eu)

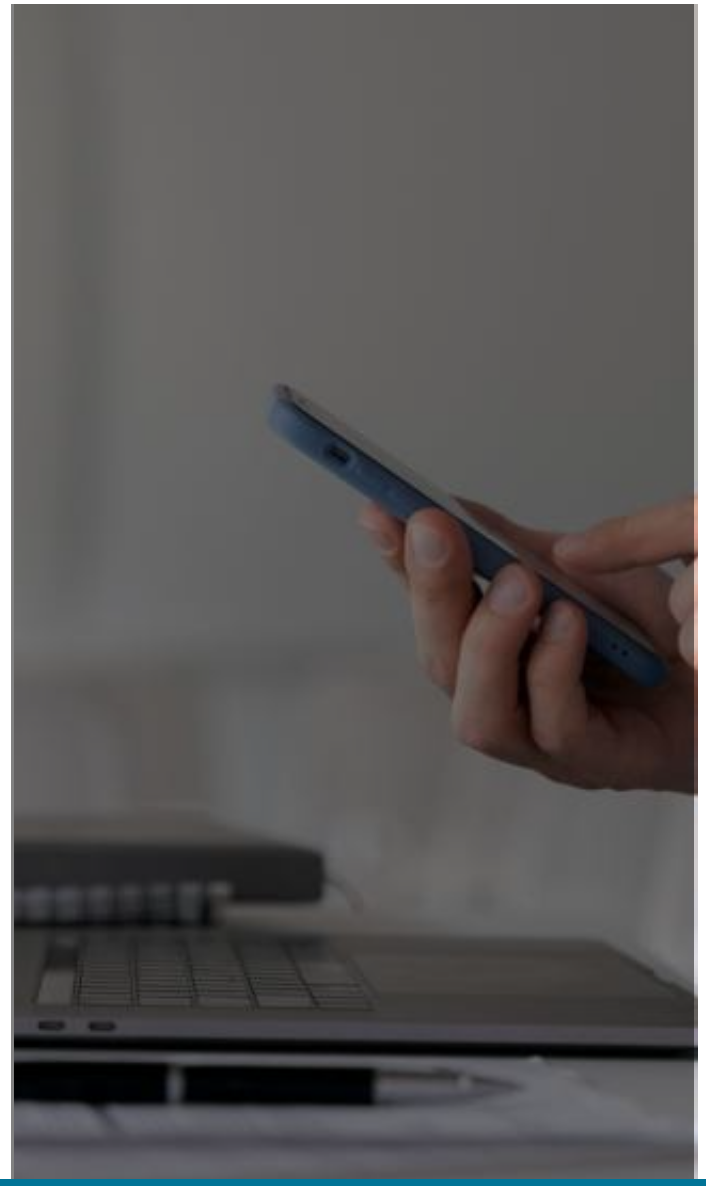
SKOS Concept Schemes used in the ERA vocabulary (europa.eu)

SHACL Validating RDF graphs

Link to ERA eng. rules

- Article 7 enacts semantic approach via ERA vocabulary/ontology

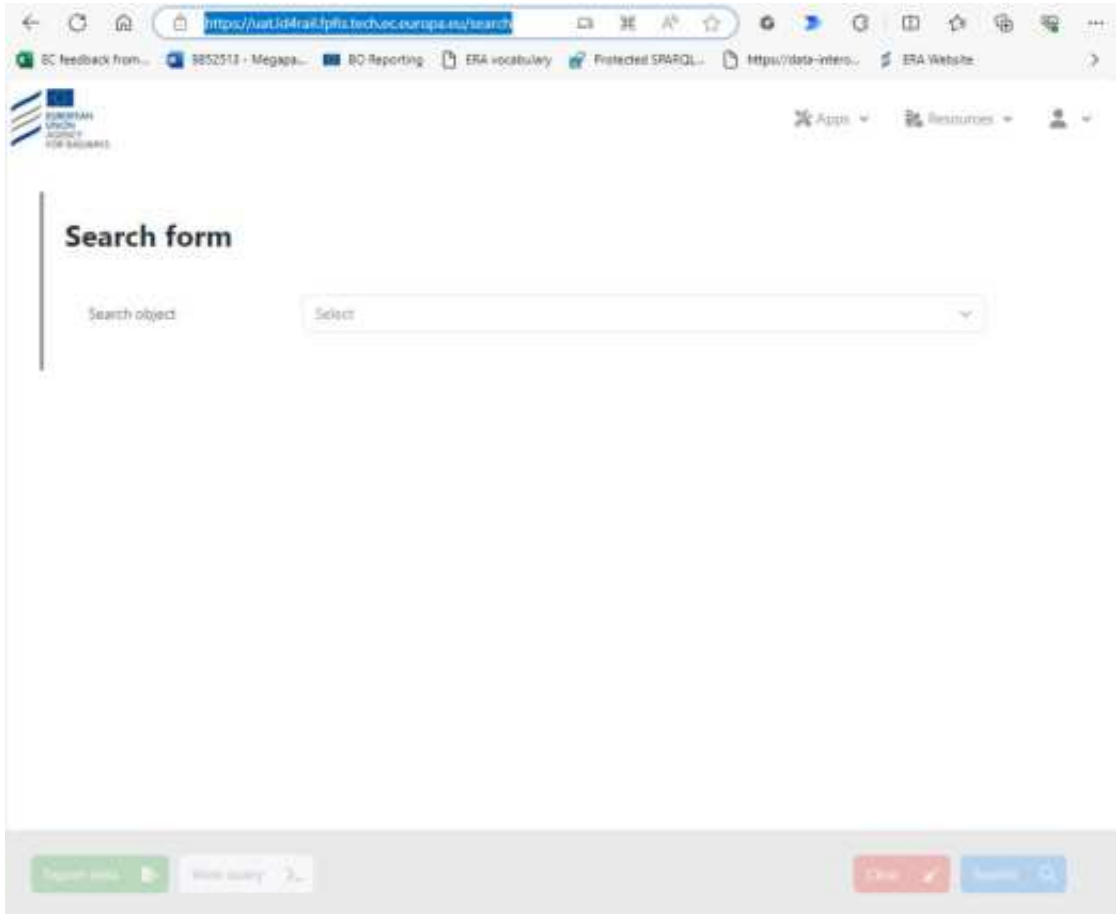
1st EU legal text enacting an ontology in the railway sector



03 Algunas aplicaciones que ahora son posibles

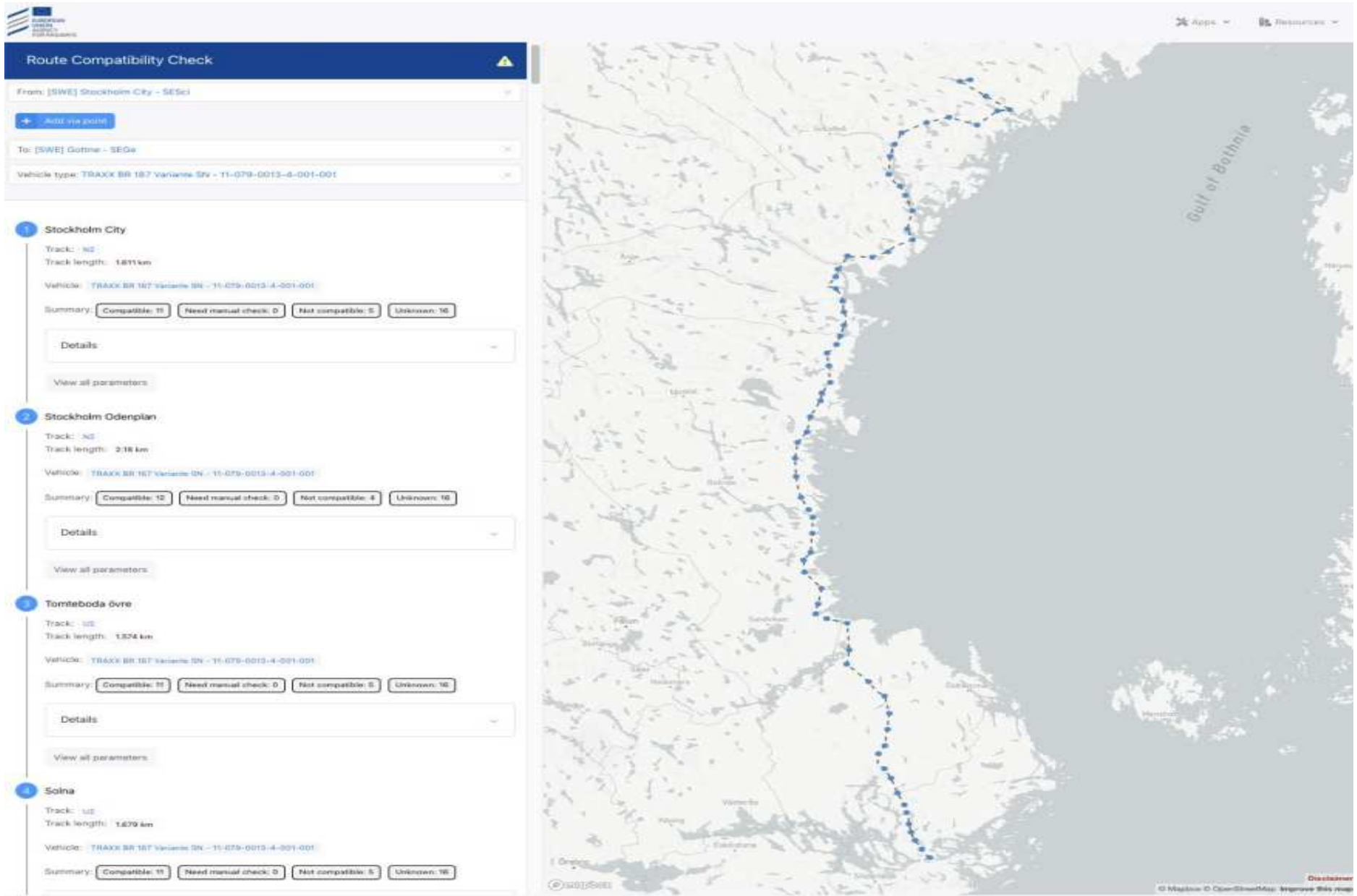
EUROPEAN UNION AGENCY FOR RAILWAYS
Apps
Resources
Search Form
Map Explorer
Route Compatibility Check
RINF - Register of Infrastructure
Welcome to the Register of Infrastructure (RINF) System. This platform enables the Search of information regarding the characteristics and capabilities of operational points and sections of lines that belong to the static rail network, and the Route Compatibility Check (RCC) where the objective is to check if a certain railway vehicle can travel the route between two operational points. Vehicle type information is originated from the European Registry Authorized Type of Vehicle (ERATV).

Search



[ERA — Search form (europa.eu)]

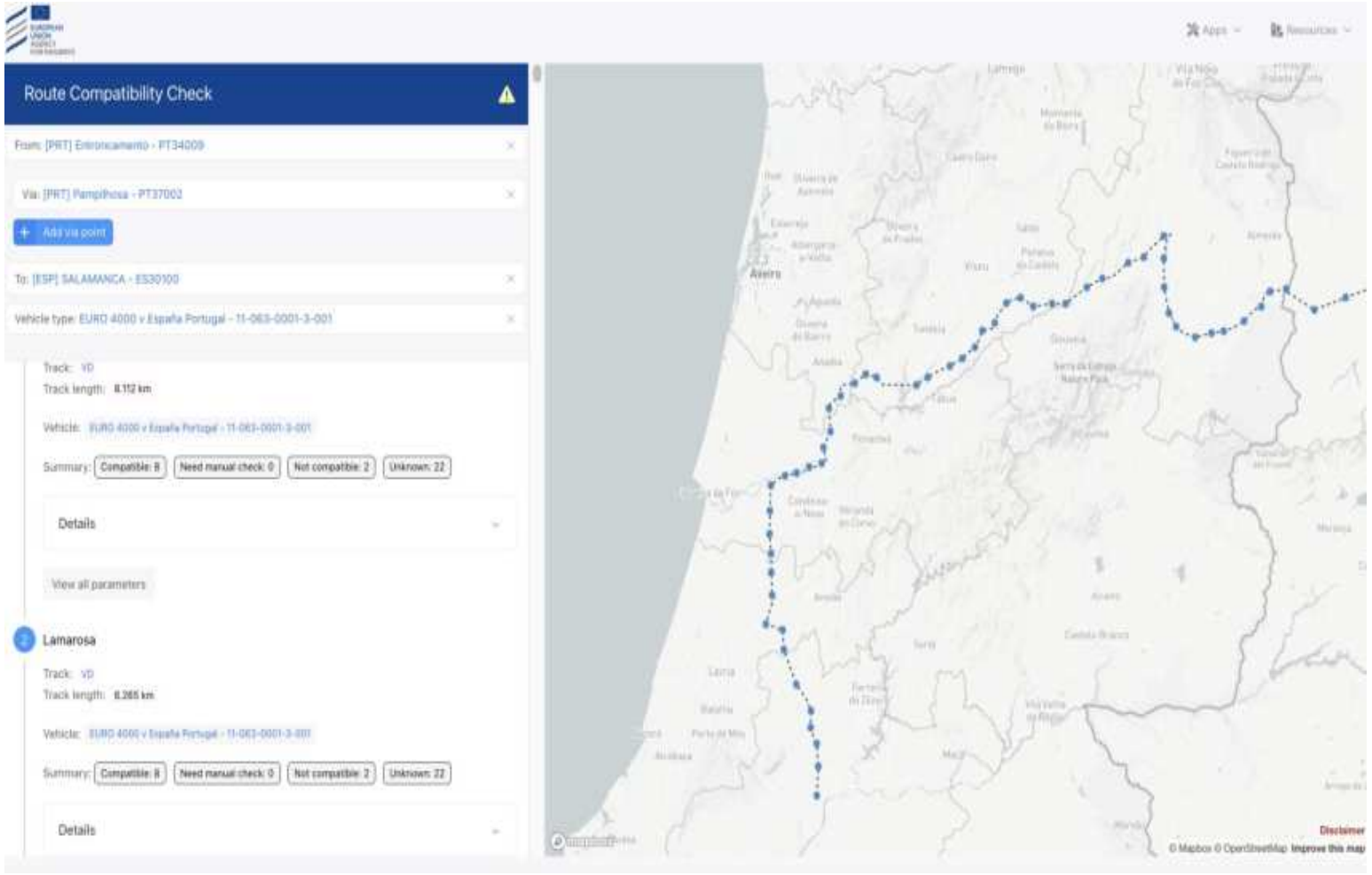
Map Explorer



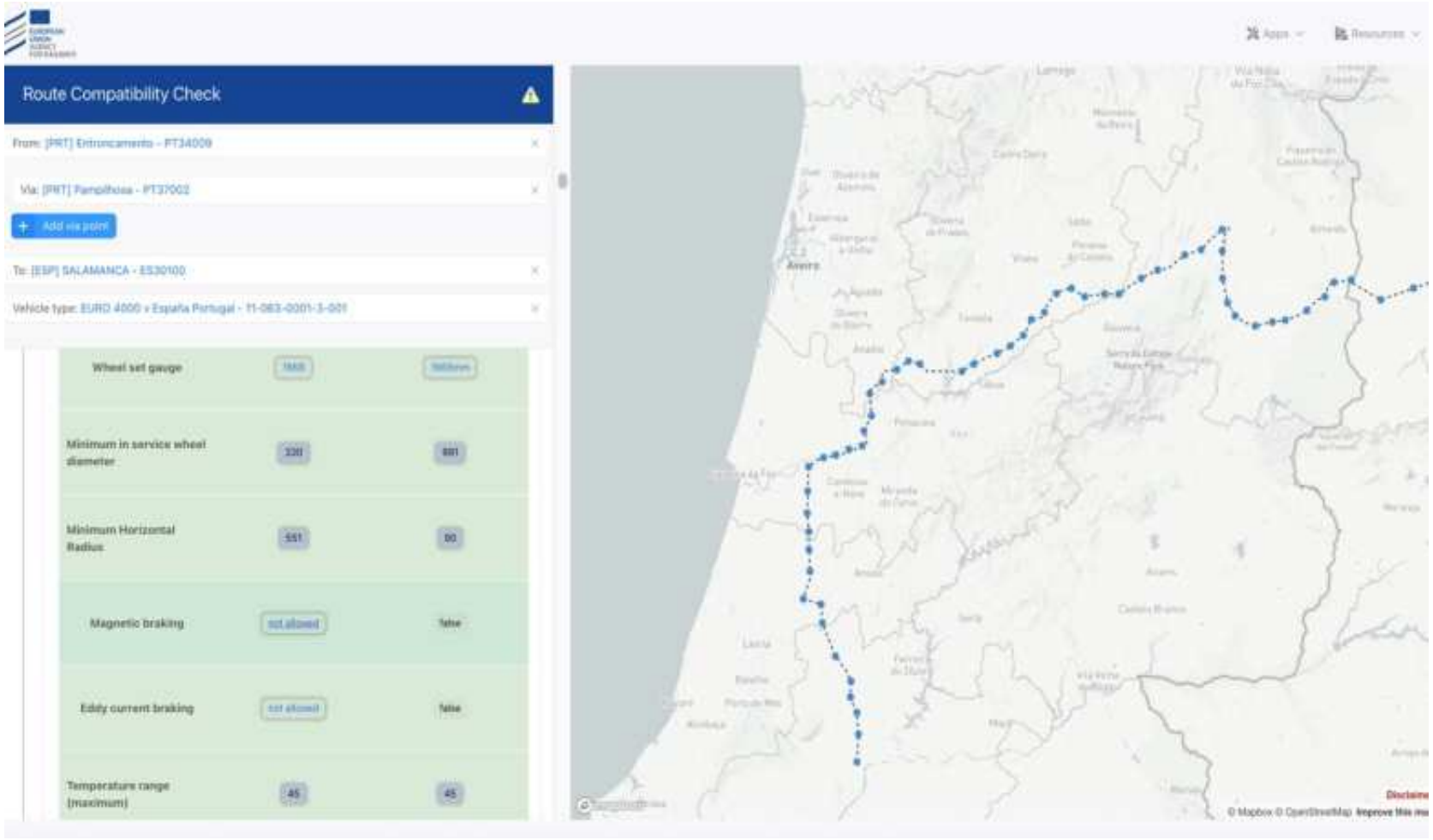
Encuentro Nacional Datos Abiertos

CANARIAS DATOS ABIERTOS

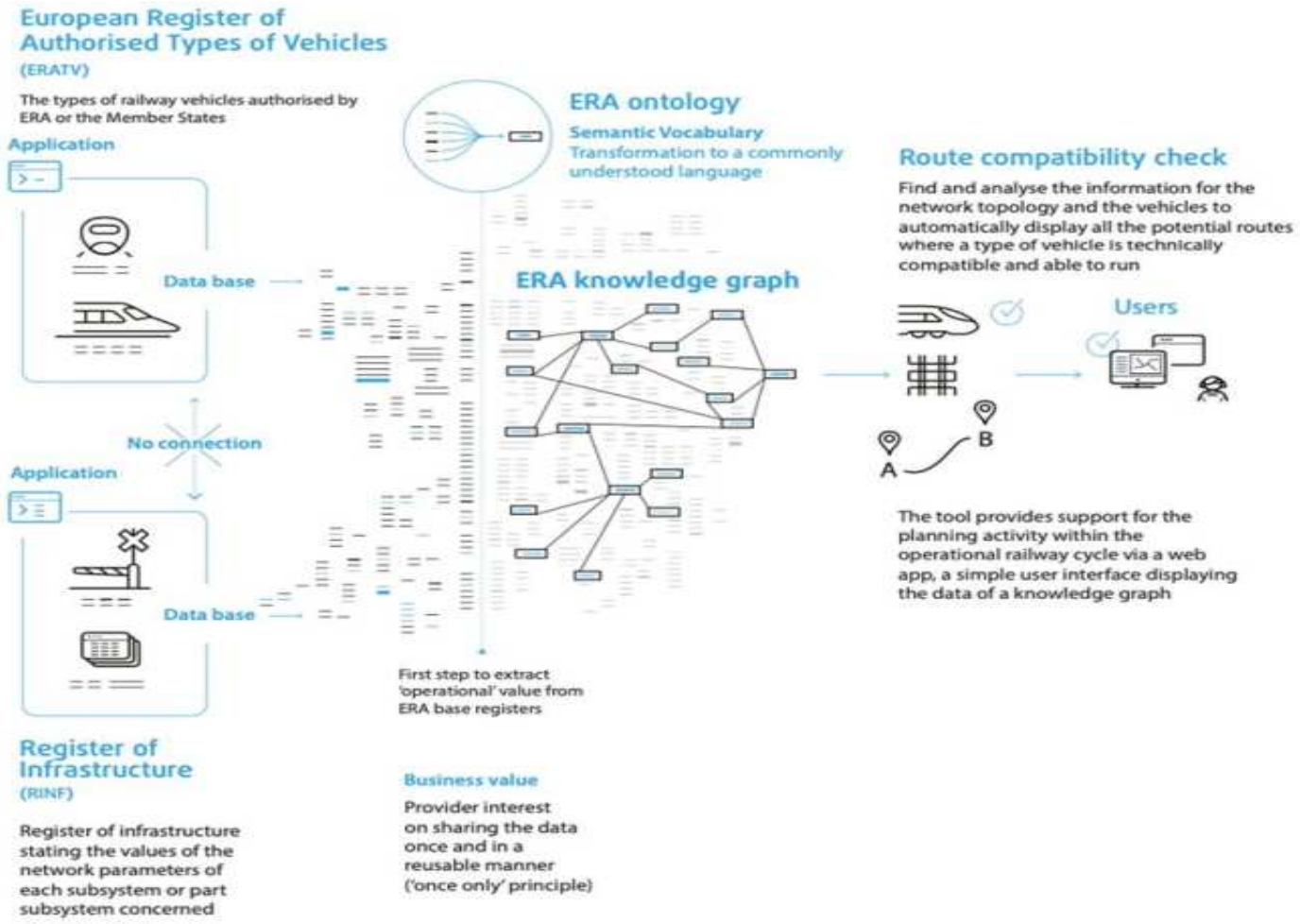
Route Compatibility Check



Route Compatibility Check



Route Compatibility Check



Appendix D

Route compatibility and Route Book

D1 Parameters for the vehicle and train compatibility over the route intended for operation

▼B

Route compatibility check interface	Vehicle information (either from ERATV, the technical file, or any other appropriate means of information)	Route information available in Register of Infrastructure (RINF) or provided by Infrastructure manager until RINF is complete	Vehicle level	Train level	Procedure to check the vehicle and train compatibility over the route intended for operation
Running characteristics	Combination(s) of maximum speed and maximum cant deficiency to which the vehicle was authorised (operational envelope that the vehicle has been assessed for); Rail inclination.	1.1.1.1.4.2 Cant deficiency 1.1.1.1.2.5 Maximum permitted speed 1.1.1.1.4.3 Rail inclination	X		Comparison of the combination of maximum speed, maximum cant deficiency and rail inclination(s), to which the Vehicle is assessed, with the cant deficiency, speed and rail inclination(s) declared in RINF or information provided by Infrastructure Manager. In case vehicle characteristics don't match infrastructure characteristics and the compatibility between the vehicle and the route might be compromised, the Infrastructure Manager shall provide the exact combination of speed and cant deficiency for the specific points in which the compatibility might be compromised within one month, free of charge and in an electronic format. *Note:* The output of the check should be taken into account by the Railway Undertaking for the route book preparation. Operational conditions might be imposed as a result of this check (e.g. speed restriction for a section of line).
Wheelset	Wheel set gauge	1.1.1.1.4.1 Nominal track gauge 1.2.1.0.4.1 Nominal track gauge	X		Comparison of the wheelset gauge with track gauge of the intended route.
Wheelset	Minimum in-service wheel diameter	1.1.1.1.5.2 Minimum wheel diameter for fixed obtuse crossings	X		Comparison of the minimum wheel diameter between Vehicle and the intended route.
Wheelset	Type of changeover facilities to which the vehicle is designed for	1.2.0.0.0.5 Geographical location of Operational Point 1.2.0.0.0.4.1 Type(s) of track gauge changeover facility (ies)	X		Comparison of the type(s) of changeover facilities to which the vehicle is designed for with the type(s) of track gauge changeover facilities of the intended route.

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	A	B	C	D	E	F	G	H	I
1	5/3/2021	ERATV			RINF			Compatibility process	Remarks
2		Index	Name	Data available	Index	Name	Data available		
3	Traffic loads and load carrying capability of infrastructure	4.5.3.1	Static axle load in working order	Yes	1.1.1.1.2.4	Load capability	Yes	How should we compare these parameters? For example: 4.5.3.1 < 1.1.1.1.2.4 4.5.3.2 < 1.1.1.1.2.4 4.5.3.3 < 1.1.1.1.2.4 ?	
4		4.5.3.2	Static axle load under normal payload	Yes	1.1.1.1.2.4.1	National classification for load capability	Yes		
5		4.5.3.3	Static axle load under exceptional payload	Yes	1.1.1.1.2.4.2	Compliance of structures with the HSLM	Yes		
6		4.5.2.1	Design mass in working order	Yes	1.1.1.1.2.4.3	Location of structures requiring specific checks	No		
7		4.5.2.2	Design mass under normal payload	Yes	1.1.1.1.2.4.4	Document with static and dynamic compatibility procedure	No		
8		4.5.2.3	Design mass under exceptional payload	Yes					
9		4.1.2.1	Maximum design speed	Yes					
10		4.8.1	Vehicle length	Yes					
11		4.5.3.4	Position of axles alog the unit (axle spacing)	Yes					
12		4.5.1	Permissible payload for different line catagories	Yes					
13									
14	Gauging	4.2.1	Reference profile	Yes	1.1.1.1.3.1.1	Gauging (only for SOLTracks)	Yes	4.2.1 <= 1.2.1.0.3.4 4.2.1 <= 1.1.1.1.3.1.1	Reference profile must be the same or compatible with the gauging of the track
15					1.2.1.0.3.4	Gauging (only for OPTracks)	Yes		
16					1.1.1.1.3.1.2	Location of points requiring specific checks	Yes		
17					1.1.1.1.3.1.3	Document with specific check procedure			
18									
19	Vertical radius	4.8.5	Minimum convex curve radius capability	Yes	1.2.2.0.3.3	Minimum radius of vertical curve	No	4.8.5 <= 1.2.2.0.3.3 4.8.6 <= 1.2.2.0.3.3	Vehicle minimum radius must be lower or equal to the minimum track radius
20		4.8.6	Minimum concave curve radius capability	Yes					
21									
22	Train detection systems	4.14.1	Type of train detection systems for which the vehicle has been designed and assessed	Yes	1.1.1.3.7.1.1	Type of train detection system	Yes	4.14.1 matches one of 1.1.1.3.7.1.1	At least one of detection systems supported by the vehicle must be available on the tracks.
23					1.1.1.3.7.1.2	Type of track circuits or axle counter to which specific checks are needed	No		
24					1.1.1.3.7.1.4	Section with train detection limitation	No		
25									
26	Hot axle box detection	4.9.2	Axle bearing condition monitoring (hot axles box detection)	Yes	1.1.1.1.7.4	Existence of trackside hot axle box detector (HABD)	Yes	4.9.2 NOT NULL and 1.1.1.1.7.4 == Y	Axle bearing must be monitoribile on the vehicle (4.9.2) and an approriate detector must be available on the tracks (1.1.1.1.7.4)
27					1.1.1.1.7.5	Trackside HABD TSI compliant	Yes		
28					1.1.1.1.7.6	Identification of trackside HABD	No		
29					1.1.1.1.7.7	Generation of trackside HABD	No		
30					1.1.1.1.7.8	Railway location of trackside HABD	Yes		
31					1.1.1.1.7.9	Direction of measurement of trackside HABD	No		
32									
33	Running characteristics	4.6.4	Combination of maximum speed and maximum cant deficiency for which the vehicle was assessed	Yes	1.1.1.1.2.5	Maximum permitted speed	Yes	4.6.4 (speed) <= 1.1.1.1.2.5 4.6.4 (cant defficiency) <= 1.1.1.1.4.2 4.6.5 == 1.1.1.1.4.3	Both conditions must be true
34		4.6.5	Rail inclination	Yes	1.1.1.1.4.2	Cant deficiency	Yes		
35					1.1.1.1.4.3	Rail inclination	Yes		
36									

04 Siguientes pasos en ERA

Grupos de trabajo por tópicos

Tras la publicación de la última version de la regulación RINF, el grupo de trabajo de RINF acordó trabajar en subgrupos por tópicos, para la definición homogénea de la presentación de datos para los nuevos parámetros.

TWGs meetings

TWGs have been composed by October 2023.

Plan

Concluded before December 2024, so that the RINF AG and RINF application are ready.

Actual

RINF AG is being published on 31st March.

Reflexiones y oportunidades

Desde diciembre de 2024

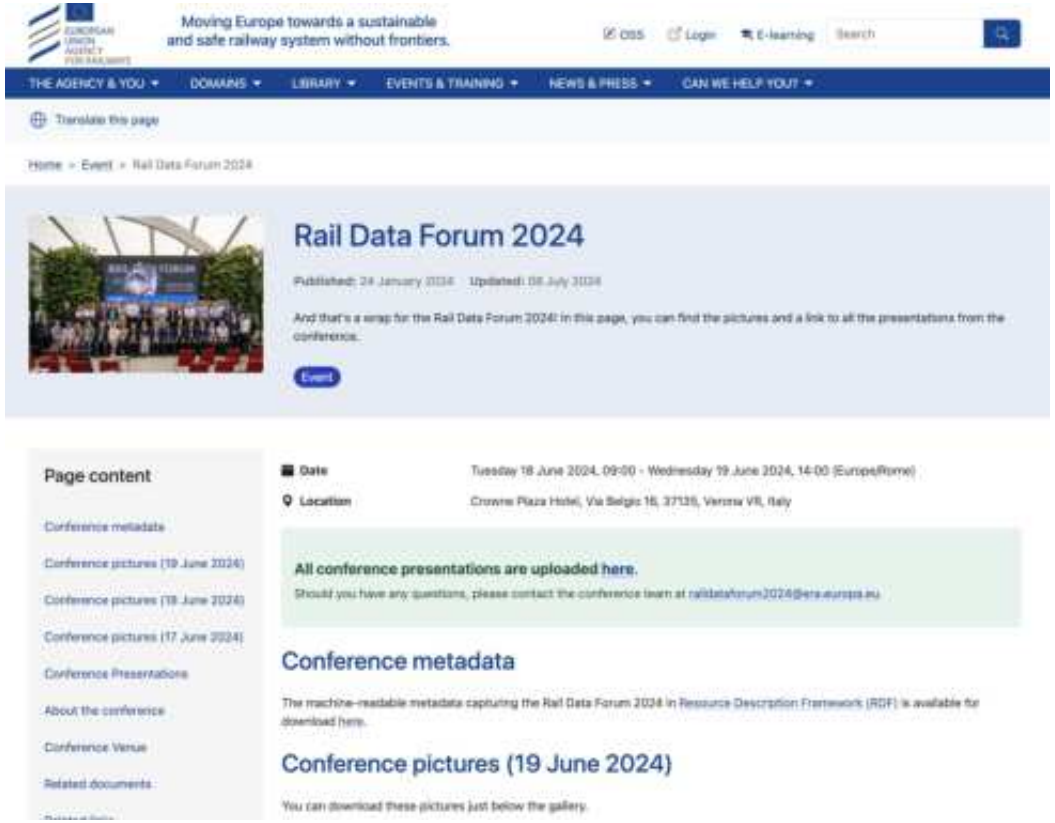
- Nueva aplicación de RINF completamente basada en el ERA KG, en user acceptance testing.
- Borrador de la RINF application guide, generada a partir de la ontología y dividida en dos partes:

  Anexo técnico de parámetros RINF, en HTML.

  Documento con más detalle de la implementación de RINF.
- Versión 3.1.0 de la ontología.

Comunidad de usuarios

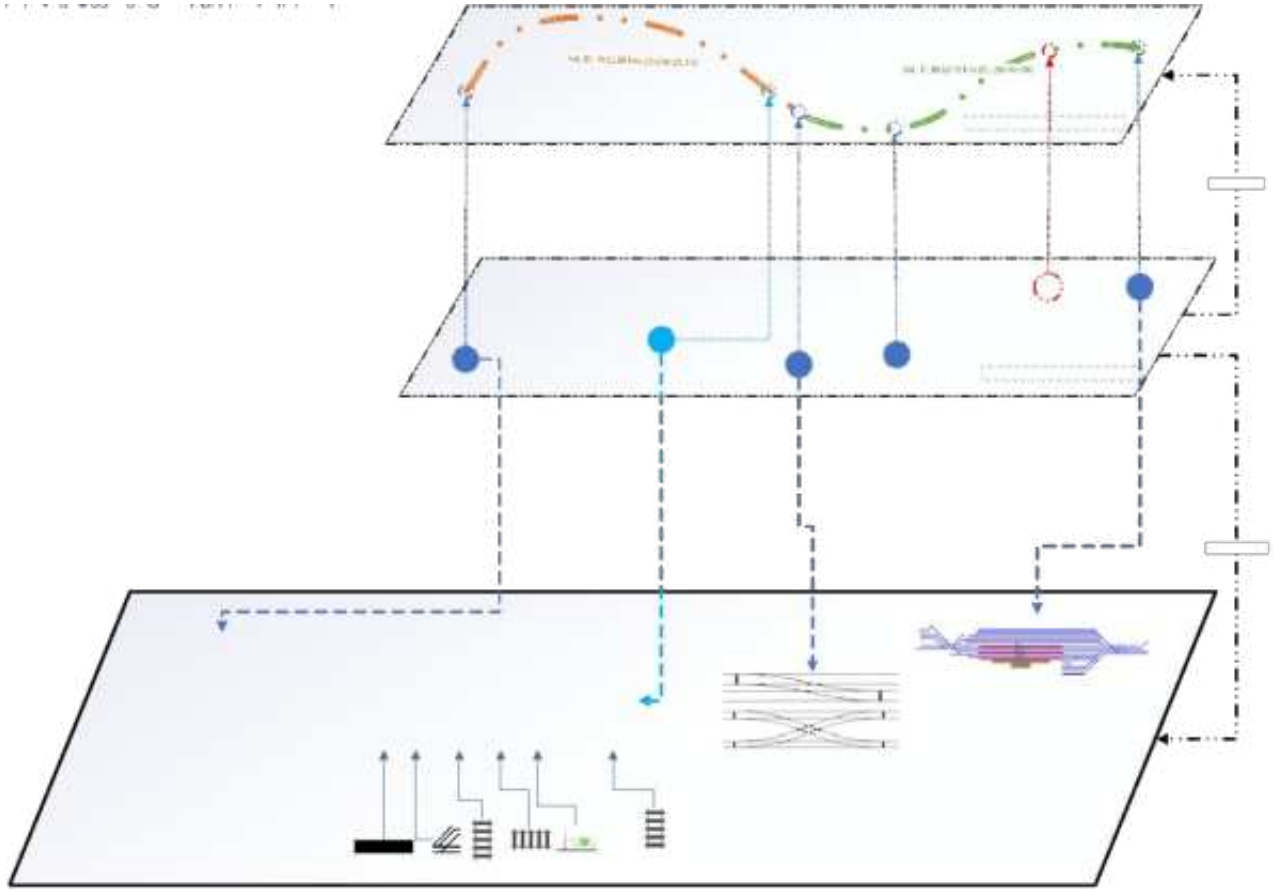
Community Building



SAVE the date 12th 13TH and 14th June 2025!!!!

Micro-level descriptions

Descripciones detalladas a nivel micro



Layered view by Dragos Patru (ERA)

Temporal evolution of RINF data

Evolución temporal de los datos de RINF

AS IS

TO BE

Traceability of changes

Notification of changes

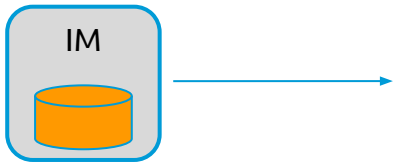
Query of changes

Backup changes

Timestamping data sets and management (Linked data event stream LDES?)

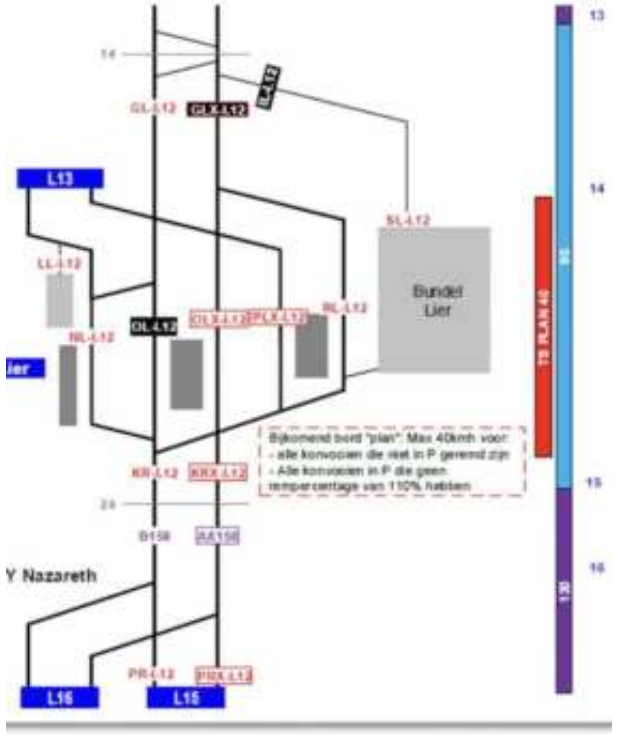
Routebook

Libro de ruta



Agency's
Knowledge Graph

RU



EUROPEAN UNION AGENCY FOR RAILWAYS

RINF - Register of Infrastructure

05 Reflexiones y oportunidades

Reflexiones y oportunidades

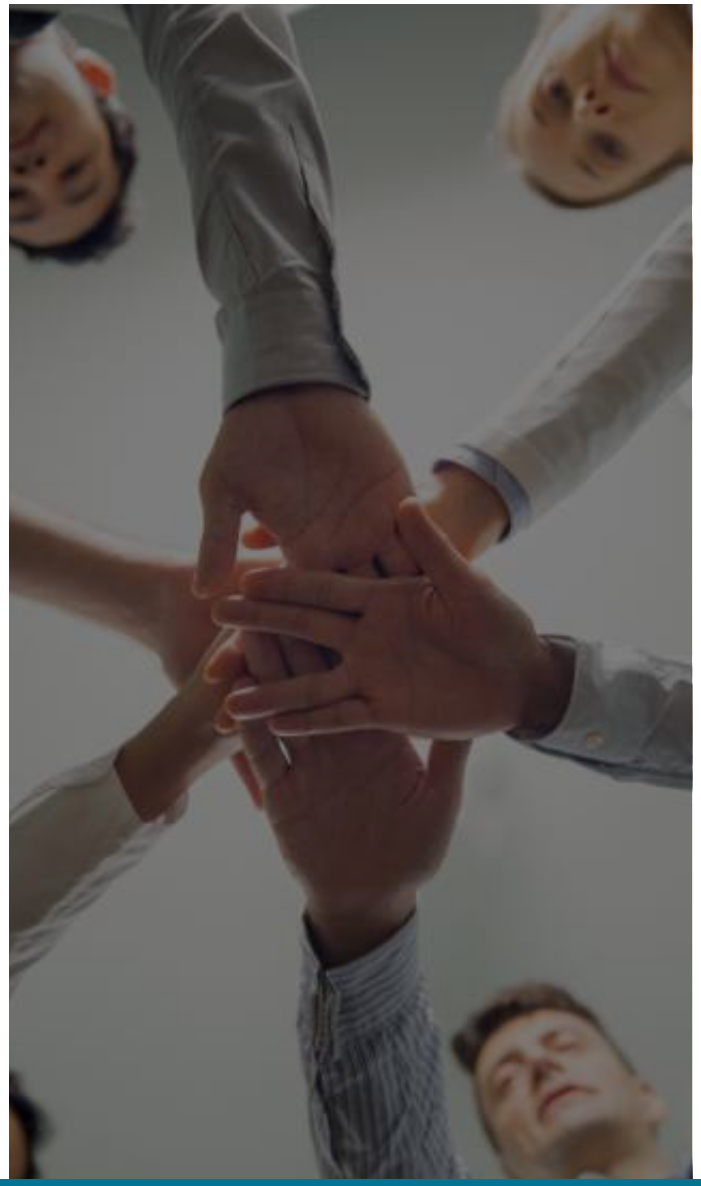
¡No todo es técnico!

La importancia del contexto legal (la inclusión de la referencia a la ontología en los textos legales) motiva el cambio organizativo.

Por eso los espacios de datos no pueden estar únicamente basados en innovaciones técnicas (recordemos lo que pasó con datos abiertos al principio).

Procesos (inversiones) de medio-largo plazo. No se trata de un “low-hanging fruit”.

Alineamiento de artefactos técnicos y legales/normativos (creación de guía de aplicación a partir de la ontología) – Law as Code.



06 Agradecimientos

Colaboradores

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Dragos Patru, (ERA)
Julián Rojas, (Ghent University - imec)
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Dylan Van Assche, (Ghent University - imec)
Polymnia Vasilopoulou, (ERA)
Ivo Velitchkov, (DG DIGIT)

Operational Data Unit (OPD)

Christopher Carr

The "Operational Data Unit" (OPD) is the Unit that brings together the Agency's work on Data, supporting the successful functioning of the Single European Railway Area. In particular the team leads on the work for the development and implementation of the TAF/TAP TSIs, the Agency's Registers and the work to migrate the tools to a datacentric approach, developing and publishing a controlled vocabulary to support the FAIR (Findable, Accessible, Interoperable and Reusable) implementation of railway data. To support this, the Unit also chairs the Data & IT Governance Steering Committee, ensuring a coherent approach to data management and providing expert advice to the Management Team.

Currently the team has developed the railway infrastructure database as a knowledge graph, has developed and published a controlled vocabulary to support this and is working on the gradual evolution of the other systems

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