ECTA UIRR ERFA
Best Practice Guideline:

General principles for standardized digital data sharing in intermodal freight transport

GUIDELINE REVISIONS	VERSION	DATE
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Disclaimer

This document is intended for information only and sets out best practice guidelines for standardized digital data sharing in intermodal freight transport by exchanging transport milestone messages in chemicals supply chain and this in a harmonized, interoperable way amongst different supply chain actors. The information provided in these guidelines is provided in good faith and, while it is accurate as far as the authors are aware, no representations or warranties are made with regards to its completeness. It is not intended to be a comprehensive guide. Each company, based on their individual decision-making process, may apply these guidelines, in full or partly or apply any other adapted measures.

No responsibility will be assumed by the associations ECTA, UIRR, ERFA to the information contained in these Guidelines.

1. Lexicon and list of abbreviations

Actor	A company/stakeholder within the intermodal logistics chain exchanging data of milestone events
API	Application Programming Interface
CTD	Combined Transport Directive
CTO	Combined Transport Operator
DXI	DX Intermodal DX-intermodal.com
ECTA	European Chemical Transport Association ECTA.COM
EDI	Electronic Data Exchange
EDIGES	Electronic Data interchange for Intermodal Global European Standard
eFTI	electronic Freight Transport Information EU eFTI regulation
ERFA	European Rail Freight Association ERFA.EU
ETA	Estimated Time of Arrival
ETP	Estimated Time of Pick-up
GHG	Greenhouse Gas
ILU	Intermodal Loading Unit
IM	Infrastructure Manager
ITO or IO	Intermodal Transport Operator
ITU	Intermodal Transport Unit
LSP	Logistics Service Provider
Milestone event	A node where logistics activities take place within the logistics chain that might impact the the ETA/ETP status or geographic position of a train, wagon set or loading unit in the transport process
OT	Operational Timetable
PDM	Path Detail Message
RSRD	Rolling Stock Reference Database
RU	Railway Undertaking
TAF	Telematics Application for Freight
TO	Terminal Operator
TOS	Terminal Operating System
TRF	Train Running Forecast
TRI	Train Running Information
TSI	Technical Specifications for Interoperability
UIRR	International Union for Road-Rail combined transport UIRR.COM
XML-XSD	XSD (XML Schema Definition) is a World Wide Web Consortium (W3C) recommendation that specifies how to formally describe the elements in an Extensible Markup Language (XML) document.

2. Introduction

Intermodal transport refers to the method of transporting goods using two or more different modes of transportation, such as rail, truck, ship, or airplane, in a single journey without handling the cargo itself when changing modes. The cargo is packed into an Intermodal Loading Unit (ILU) which might be a maritime (tank) container, continental swap body or (craneable) semi-trailer.

Intermodal transport is the key factor to keep rail competitive against pure road transport and to connect most of the European economic areas. Expressed in tonne-kilometres, it grew by almost 9% between 2018 and 2023 to reach 244 billion tkm while total rail freight transport has decreased by over 8% in the same period. The biggest segment in Europe is unaccompanied maritime intermodal transport, which consists of the transport of standardised sea containers (20ft, 30ft, 40ft or45ft) between ports and hinterland hubs and terminals. In 2022, almost 80% of Combined Transport volume by weight was part of this segment.

Intermodal transport plays a crucial role in intra-European transport, global trade, and infrastructure planning and forms a strategic freight solution because of its proven safety and sustainability benefits. Using rail or sea for the long-haul portions of transport reduces carbon emissions and fuel usage compared to relying solely on trucks. Besides, Intermodal transport helps to alleviate road traffic congestion and the standardized ILU's ensure goods are well secured to protect them from damage or theft during transportation.

Despite these strategic benefits, the intermodal volumes have been declining over the last years due to infrastructure disruptions, poor on-time reliability, and higher freight & handling costs compared to road. To make intermodal more competitive within an end-to-end Intra-European supply chain, there is a need for a more open information and data exchange which at the same time might decrease the intermodal freight administration costs.

Although intermodal rail freight has significant energy and GHG efficiency advantages when compared to unimodal road transport, shippers and logistics service providers do not yet shift their transport assignments to intermodal rail freight. The lack of information and service quality are a twin challenge for the competitiveness and the attractiveness of intermodal rail freight services. A more standardised and interoperable digital ecosystem with high-quality data would be a major step towards higher competitiveness for intermodal rail freight and door-to-door Combined Transport as well. An improved data sharing and digital collaboration with the entire supply chain partners (LSPs and consignors and consignees) can foster the willingness of customers to shift freight more easily to Combined Transport with the aim of improving their greening targets but also of contributing to the objectives of the newly adopted Clean Industrial Deal.

This best practice guideline is a joint initiative of three major associations (ECTA, ERFA and UIRR) active in freight with the objective to promote the modal shift of chemical substances from road to rail. It serves as a general introductory guideline, outlining the fundamental principles for standardized digital data sharing in intermodal freight transport, and aims to pave the way towards an integrated and standardized digital ecosystem in this sector. Subsequent intermodal freight digital guidelines will further zoom in on specific freight flows as for example the gate in/gate out terminal flows or specific digital collaboration flows between Railways Undertakings, Combined transport Operators and Terminal Operators.

3. Scope and objectives

This best practice guideline aims to define and establish comprehensive standards for the seamless exchange of data related to Road & Rail freight transportation.

It is designed to facilitate efficient communication and interoperability among freight forwarding companies and multimodal tank providers.

Scope Coverage: The standards outlined in this document will cover the following:

- Data Formats: Specifications for uniform data formats to ensure compatibility across IT systems.
- Roles and Responsibilities: Defined roles for all stakeholders in data exchange processes.
- Compliance and Validation: Criteria for ensuring adherence to the standards.
- Change Management: Guidelines for updating and maintaining standards over time.

Exclusions: This document will not cover:

- Non-rail modes of transport.
- Internal data management processes of individual companies.
- Detailed description of data fields – Data field descriptions are outside the scope of this document and will not be addressed within these guidelines. However, they will be comprehensively covered in a separate, related guideline document.

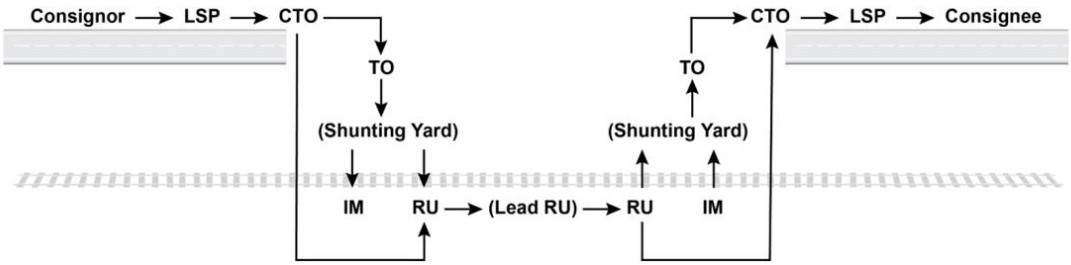

Figure 1 - The intermodal stakeholders

Stakeholders: The primary stakeholders include:

1. Shipper (consignor and consignee/receiver)
2. Logistics Service Providers (LSP) & Freight Forwarders
3. Terminal Operators (TO)
4. Combined Transport / Intermodal Operators (CTO)
5. Railway Undertakings (RU)
6. Infrastructure Managers (IM)

The overall objectives of the guideline are to:

- To create more standardized data exchange protocols for road & rail data exchange
- To enhance the accuracy and consistency of shared information.
- To improve collaboration and transparency between stakeholders.
- To support digitalization efforts in the freight forwarding and tank logistics sectors.
- To align with ECTA's broader mission of operational excellence through innovation.

The ultimate goal of these standards is to significantly improve competitiveness of intermodal freight in Europe. This will be achieved through stakeholder adoption and the referred benefits of these standards.

- Higher reliability & resilience of integrations – dedicated supported platform
- Real Time visibility of shipments – will allow for pro-active customer communication and reduce incurred costs for storage early/late transits
- Reduced complexity and efforts to transform data at source/destination.
- Reduced re-work with removal of errors introduced through manual entry.
- Efficiencies which will have a positive quality & service impact towards end customer consignees and reduce the overall intermodal overhead costs

4. Challenges of digital data sharing in intermodal freight transport

Intermodal freight transport, which involves the use of multiple transport modes to move goods, faces significant challenges in digital data sharing. Effective digital sharing is crucial for enhancing efficiency, reducing costs, and improving service quality. While data sharing and digital collaboration amongst logistics stakeholders seems evident for a high-quality business, this chapter explores the challenges that the sector needs to overcome to get all stakeholders on board.

- **Data & systems interoperability:** Different data policies, systems and platforms used by the various intermodal stakeholders often lead to data silos and inefficiencies due to different data definitions. With data sharing, we can improve significantly, but without standardizing data definitions, formats and protocols, the complexity, cost and lead time to develop digital solutions is increasing drastically. Standardized formats and alignment between data policies are essential to ensure seamless and reusable data exchanges between multiple partners across the intermodal chain.
- **Trust**: Collaboration among stakeholders is often limited due to competitive interests, lack of trust, and differing priorities. Effective collaboration requires a willingness to share data, align objectives, and work towards common goals.
- **Working together as individual companies.** The lack of common business interests and financial incentives for stakeholders to work together with a common goal and co-invest in digital sharing solutions is another significant challenge. Because of the lack of standardized data sharing solutions, lots of individual company project initiatives are taken what makes all separate business cases difficult to substantiate. Different stakeholders have varying needs and requirements, making it even more difficult to develop a common business case for digitalization. Providing financial incentives, regulatory support, and demonstrating the long-term benefits of digital sharing can encourage stakeholders to adopt digital solutions.
- **Respect for data ownership and purpose:** While accurate data can only come from the data source, data sharing within an “end to end” communication chain of intermodal stakeholders, can only happen when parties respect data ownership and the data owner does not get the feel of losing control of the shared data. Therefore, clear data governance rules are required and there should be a clear common purpose why certain data sets need to be shared.
- **People:** While data sharing using common data standards and interfaces might technically be possible, a digital collaboration intermodal project requires a different, collective mindset and the solution needs to gain acceptance across all stakeholders before working seamlessly.

Addressing these challenges requires concerted efforts from policymakers, industry associations, and all intermodal stakeholders to develop standardized data formats, synchronized systems and interfaces, collaborative frameworks, and financial incentives. By overcoming these obstacles, the intermodal freight transport sector can achieve greater efficiency, reliability, and competitiveness.

5. Intermodal door-to-door digital process flow

A successful digital transformation of the intermodal freight sector would be the result of a smart and cooperative integration of all stakeholders into one collectively defined digital freight ecosystem with data as its lubricant. This ecosystem must be built around jointly developed concepts, processes, shared data hubs or platforms, as well as digital solutions (e.g. assets, transport data records, data messages, registers).

Today's intermodal freight transport ecosystem is composed by interdependent elements that are significantly impacted by developments of (1) physical assets (infrastructure, wagons, terminals, intermodal loading units, type of goods), (2) stakeholders (infrastructure managers, railway undertakings, CT operators, terminal managers, trucking companies, logistics companies, shippers), (3) authorities (policy-makers, customs authorities, regulators) and (4) information processing capabilities and digital data flows covering the entire physical process from booking to the execution of the order (see figure 2).

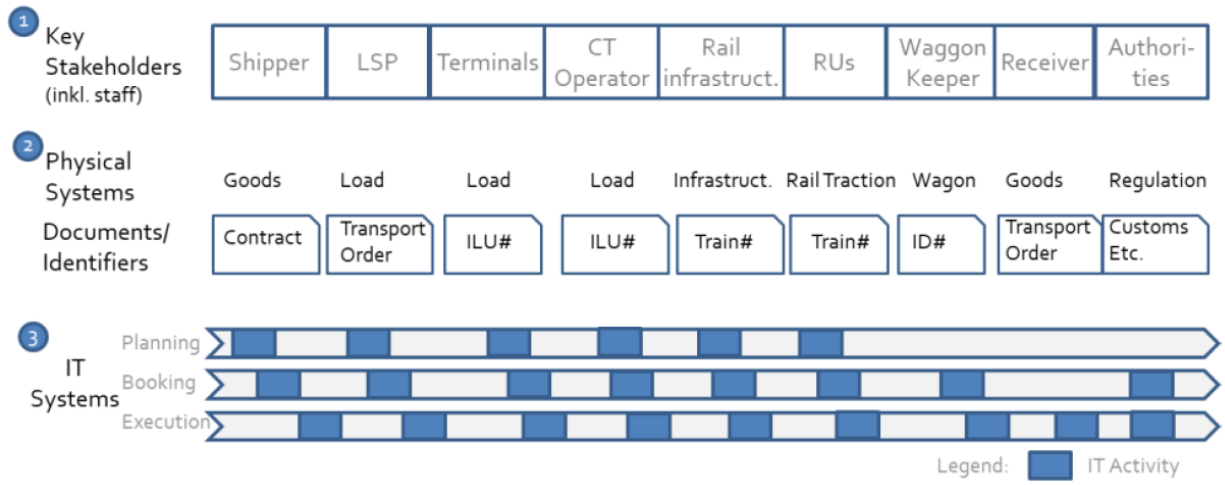

Figure 2 - The intermodal chain

The process analysis will be focused on the unaccompanied intermodal transport of ILUs in which only the loading units are transferred from one transport mode to another. Intermodal freight transport based on rail uses the terms initial and final legs on road, transshipment and main legs.

- **The initial road leg** describes the first part of the transportation of the loading unit(s) holding the goods from one or more shippers to a terminal by road. In intermodal transport, the loading unit holding the cargo of the consignor (shipper) is usually brought to a terminal by truck in order to be transported from there onto the rail that performs the main leg of the journey. The final road leg describes the transport of the loading unit(s) from the receiving terminal to the final destination (consignee / shipper).

- The change of mode between road and rail is called **transshipment**. A loading unit (container, swap body or semi-trailer) is transshipped from one mode of transport to another. Intermodal transport chains always include transshipment and the use of multiple modes of transport. The main terminal processes are (1) check-in & check-out procedures, (2) the loading procedures, and (3) the train closure. The check-in procedures must be respected in case of a truck driver delivering a loading unit. The truck driver arrives at the gate-in with a booking confirmation for a specific loading unit. In case of check-out procedures, the driver must present to the terminal agency the pick-up order (number) received from the CT operator.
- The **main leg** refers to the transportation of the loading units from the transshipment node nearest to the consignor to the transshipment node closest to the consignee. In case of a standard shuttle train between two terminals without marshalling yards, the main processes can be listed as follows: (1) train path & terminal slot, (2) train preparation & train ready to start at departure terminal, (3) train running on the infrastructure and (4) train arrival at destination terminal.

For each of the above-described processes, a digital flow is initiated based on an (automated) sequence of tasks aiming at seamless movement or process of digital information, tasks, or experiences (see appendix 1 for a details process flow). A typical process flow in intermodal road-rail freight transport includes the following physical and digital process elements:

- **Booking order**: a booking order supported by an EDI message is initiated by the LSP and transmitted to the CTO. This booking order is based upon the transport order from the shipper which includes a requested date of arrival at the final destination.
- **Delivery of the ILU and loading on wagon**: the trucking company, delivers the unit at the departure terminal. An EDI message initiated by the TO is sent to the CTO with the status 'Gated In'. The TO also exchanges with the CTO a message when the unit is loaded on the wagon.
- **Departure / arrival of the train**: when the train departs from the terminal facility, the CTO informs the LSP on all train running status (current position, disruption information and the estimated time of pick-up at the final destination terminal).
- **Ready for pick-up**: when the loading units have arrived at the destination terminal, the CTO sends a ready for pick-up information to the LSP.
- **Pick-up of the ILU and gate out**: the trucking company picks up the loading unit. The TO sends a 'picked up' status and a 'gated-out' message to the CTO.

6. Overview of existing digital standards and reference files

In order to achieve complete transparency across the intermodal supply chain, it is essential that information can be exchanged between all parties involved in a standardized manner. Today, there are already several standard data models and formats for exchanging information. Since it requires not only common digital standards but also a shared understanding of the exchanged content, reference data is used to ensure this. The following chapter presents the most common digital standards (data models and exchange formats) for different intermodal business use cases in the first part and outlines usual reference data in the second.

6.1 Data Models and Exchange Formats

Data models give all parties a blueprint to organize and represent data. It defines how information is structured and related to another and outlines the type and length of every field used in the model. In the context of intermodal freight transport, a data model would specify how the data elements such as the container ID, its contents, origin, and destination would be structured. Exchange formats are standard formats or protocols used to share information between different systems or parties. It defines how the data structured by the data model is packaged and transmitted. Table 1 provides a list of data models and exchange formats relevant to intermodal freight transport.

Name	Data Model	Data exchange format
eFTI	**x**	
EDIGES	**x**	**x**
TAF TSI	**x**	**x**
UN/CEFACT	**x**	

Table 1 – The various data models and exchange formats in intermodal transport

6.1.1 eFTI messaging & data elements

The eFTI Regulation (Regulation (EU) 2020/1056) introduces a harmonised legal framework for the electronic exchange of freight transport information across all modes, becoming mandatory for operators when requested by public authorities. Its implementation is guided by the Digital Transport and Logistics Forum (DTLF) and aims to simplify administrative procedures by enabling authorities to access required documents or human readable data sets electronically. For combined transport, the eFTI framework ensures compatibility with existing systems such as TAF TSI, encouraging interoperability and standardisation across the sector. Operators will be required to exchange structured data sets covering essential shipment and cargo information.

6.1.2 TAF TSI message

The TAF TSI Regulation (Commission Implementing Regulation 2021/541) updates Regulation (EU) No 1305/2014 to improve data exchange and process efficiency in the telematics applications subsystem for freight. It streamlines real-time monitoring, train planning, invoicing, and intermodal coordination by defining ten standard message types across planning, operational, and post-operational phases. It involves key actors such as railway undertakings, infrastructure managers, terminal operators, and freight customers, and highlights the importance of common reference files such as the Rolling Stock Reference Database (RSRD). Table 2 provides a list of all main TAF TSI message types.

No.	Message type	Purpose/Function
1	**Train Running Information (TRI)**	Shares real-time data on train positions and delays.
2	**Train Composition Message (TCM)**	Provides details on the train's composition
3	**Path Request**	Requests a train path allocation from the IM

4	**Path Allocation**	Confirms the allocated train path and schedule.
5	**Train Preparation Message (TPM)**	Communicates preparation status and readiness of the train.
6	**Wagon Event Message**	Updates wagon status for tracking and tracing purposes.
7	**Reference File Message**	Shares updates to reference files
8	**Consignment Note**	Details the freight contract and shipment specifications.
9	**Train Running Forecast Message**	Provides predicted arrival and departure times at locations.
10	**Service Disruption Message**	Informs stakeholders of delays, diversions, or disruptions

Table 2 - The main TAF TSI message types

6.1.3 EDIGES message

EDIGES stands for Electronic Data Interchange for Intermodal Global European Standard. It is managed and developed by the EDIGES Consortium, which includes intermodal operators such as Kombiverkehr, Hupac, and Mercitalia Intermodal.

The goal of EDIGES is to create a standardized system for data exchange that integrates all actors in the intermodal logistics chain and provides information related to every single process. The processes covered by EDIGES include booking, first/last mile road operations, terminal activities, and train running information, including Estimated Time of Departure/Arrival and Estimated Time of Pick-up. More than 30 status messages have been defined, along with messaging to exchange commercial/operational timetables and information about train/network disruptions (see appendix 2 for the complete list of milestones and status messages). The technical handbooks are available under following link: https://www.uirr.com/services/ediges.

EDIGES i.e. uses information codification tables managed by UIRR for i.e. terminals, customers, damages, ILU codes to ensure a common understanding (see chapter 6.1.3.). An overview of EDIGES messages can be found in Appendix 2.

6.1.4 UN/CEFACT

The UN/CEFACT Multimodal Transport Reference Data Model (MMT RDM) is a comprehensive framework developed by the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT). It aims to standardize and facilitate the digitalization of intermodal transport data exchanges to support global supply chain cargo movements. This model is part of the broader effort by the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) to support global supply chain cargo movements.

In 2022 UN/CEFACT introduced a set of harmonized standards aimed at digitalizing intermodal transport data exchanges and reducing the need for person-to-person contact in the supply chain. The standards cover essential documents that accompany goods transported through the five main modes of transport, such as consignment notes and bills of lading. Standards include technical specifications and supporting tools, for example data subsets of the UN/CEFACT Multimodal

Transport Reference Data Model (MMT RDM), XSD schemas, and data structures. Included data exchange structures for cargo movements on the five main transport modes are aligned with each other by each being a subset of the UN/CEFACT Multimodal reference data model (MMT). The MMT itself is a part of the UN/CEFACT global supply chain semantic reference data model (BSP RDM).

6.2 Reference data

In EDI data exchange, reference data is a set of static, unchanging values or codes used to provide context and meaning to other data in various systems and applications. It acts as a foundational reference point, ensuring consistency and accuracy in data interpretation and analysis. In intermodal freight transport, static reference data may include codes for countries, customer and location identification, types of goods and equipment.

6.2.1 UIRR Code Management (UIRR CDM)

UIRR has designed a one-stop-shop interface (http://cdm.uirr.com) compiling a series of standardised codes useful in daily digital exchanges. These codes are either directly managed by the association (customers, terminals, damages, delays causes) or are master data that are legally mandatory (dangerous goods, waste, customs). All these codes have to be used when implementing the EDIGES data exchange format (see chapter 6.1.3). The application is open to any interested parties.

6.2.2 Register of Infrastructure (RINF)

RINF (https://data-interop.era.europa.eu/) is a European database containing detailed information about the railway infrastructure of in the European Union. It was created to support interoperability between national railway networks — meaning trains from one country should be able to run in another without problems. It includes data like track gauges, electrification systems, maximum train speeds, station facilities, tunnel and bridge details. Infrastructure managers are required to update it with changes, so the stakeholders can plan international journeys safely and efficiently. For intermodal freight transport, the RINF data are useful to railway undertakings to fulfil their obligations to perform the railway gauge check when transporting non-ISO loading units and/or (craneable) semi-trailers. For intermodal operators it would support the planning and preparation of the freight trains. RINF should compile all intermodal railway gauges for all lines allowing the transport of intermodal loading units.

7. Overview of existing digital platforms and data hubs

Digital exchange platforms in intermodal freight transport are solutions aiming at facilitating the matching of supply and demand for transport services, optimising logistics efficiency and streamlining communication between the intermodal stakeholders.

7.1 The inventory of relevant platforms

The following section provides an overview of the main digital exchange platforms and data hubs shaping the intermodal freight transport landscape.

- **Trimble-Transporeon** platform is a SaaS-based transport management solution with a focus area on LSPs and shippers, streamlining freight procurement, load tracking and performance analysis. Its high interoperability with other platforms facilitates a rich exchange of information, improving the coordination of logistics flows across different transport modes.
- **4PL Intermodal**'s IMSLOT digital platform covers shippers with assets in intermodal rail, road and barge transport. Its network includes not only forwarders and deep-sea shipping lines, but also container depots, CTOs for both inland and maritime transport. By managing multiple processes that enhance supply chain visibility and facilitate free capacity matching, the platform actively promotes the modal shift toward rail and waterways.
- **CESAR Next** streamlines booking processes and tracking and tracing of shipments facilitating communication between LSPs and CTOs. In terms of functionality, the integration of the first and last mile legs is performed, and the information exchange with LSPs on estimated time of arrival and pick up is enhanced, making intermodal freight operations more predictable and efficient for the end customers.
- **Hacon** specialises in end-to-end tracking with its AX4 platform, which provides comprehensive visibility over complex supply chain networks. The focus area is visibility and ETA management for intermodal transport supported by a set of different applications, including fleet management, data compatibility, schedule creation, transport management, real-time data management, track work coordination, disruption management and capacity planning.
- **Catkin**'s platform adopts a communication-focused approach to freight logistics, ensuring that all information is centrally maintained and shared with the relevant intermodal stakeholders. It enables authorised representatives to process business orders efficiently while allowing seamless tracking and tracing. The key focus area includes the ordering of rail or intermodal transport shipments originating from port terminals and status feedback.
- **Rail-Flow** evolved from a matchmaking and ordering service towards a Transport Management System (TMS) that offers supply chain visibility and transaction functionalities for intermodal stakeholders. This shift reflects the broader industry trend of digital platforms transitioning from simple freight matching tools to comprehensive logistics management solutions.
- On the infrastructure managers' side, **RailNetEurope**'s Train Information System (RNE TIS) plays a vital role in monitoring international and domestic train movements, supporting real-time tracking and performance reporting. By standardising data exchange from infrastructure managers and railways undertakings, TIS enhances the efficiency and reliability of cross-border

rail freight operations. The relevant data is obtained directly from the infrastructure managers' systems.

- **Railvis**' digital platform specialises in demand-supply matching for railway assets. Serving railway carriers, rental companies for railway assets, forwarders, industrial companies and freight rate requests, the platform helps to identify and to allocate underutilised rail capacity.
- **RSRD²** is a central database regularly updated by the wagon keepers for the storage of wagon data granting access to the RUs according to the TAF TSI specifications.

7.2 The KV4.0 data hub

Having considered the existing digital freight exchange platforms, the following section focuses on data hubs. A data hub acts as a central mediation point between data sources and data consumers, functioning like a transit station on a rail network. It serves as a single point of access for various users, enabling efficient data management, centralised governance and controlled data flow. By enhancing speed, cybersecurity, scale and agility, the data hub optimises data exchanges without serving as an endpoint destination like a data warehouse or data lake.

As a best practice example, the KV 4.0 data hub, developed by the company DXI, is illustrated. DX Intermodal GmbH (DXI) is a joint venture of companies with many years of experience in intermodal transport:

- Hoyer Group and Paneuropa Transport as logistics service providers,
- Hupac and Kombiverkehr as intermodal operators,
- KTL and Lokomotion as a terminal operator and a railway company respectively.

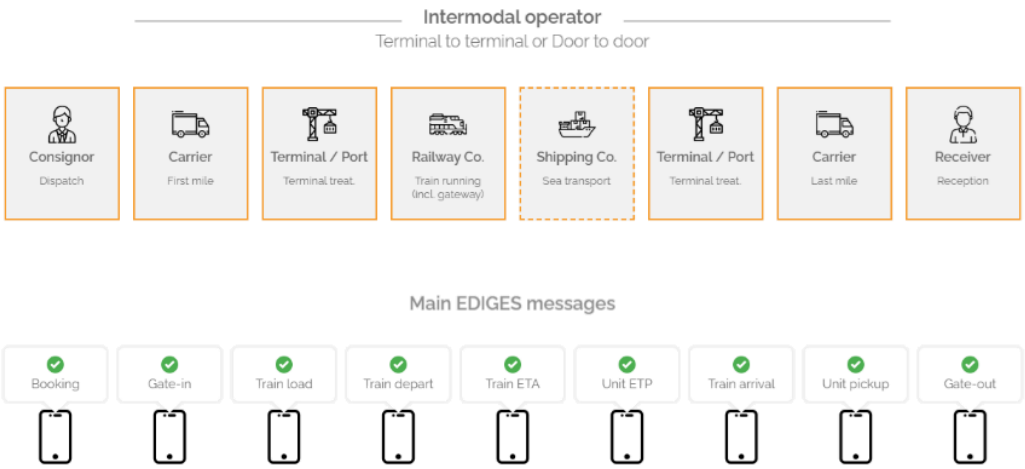

Figure 3 - KV4.0 data hub - main milestones

DXI supports supply chain visibility by providing a data hub (KV4.0) for data exchange between all parties involved in intermodal transport via standard interfaces (APIs).

The KV4.0 Data Hub is the outcome of the KV4.0 Project, successfully implemented between 2017 and 2021 with funding from the German Ministry of Transport. Designed to enhance transparency across the entire intermodal transport chain, the Data Hub integrates all relevant intermodal stakeholders, including

LSPs, Intermodal Operators, Terminals and Railway Undertakings. To ensure its efficient management, the DXI company was founded in 2022 with the specific purpose of overseeing the KV4.0 Data Hub. Participating partners provide the relevant booking and transport-related data covering the entire process – from the initial electronic booking with the intermodal operator to real-time train run information and the final collection of the loading unit at the terminal.

The KV4.0 Data Hub operates as an electronic data hub and is not a digital web-based application: it serves as the central distributor for all messages exchanged within the intermodal supply chain. Communication with the hub is facilitated through a standard REST API, utilising URL, user authentication, password and token access. Data exchange follows a PUSH procedure for delivering information to the hub and a PULL procedure for retrieving messages. The system ensures uniformity by adhering to the EDIGES 4.1 XML standard (see chapter 6 for more details) with built-in validation rules to maintain compliance with the latest format. Importantly, only the sender determines the recipients of the data and no information is stored on the hub itself, ensuring security and data integrity.

The KV4.0 Data Hub foresees a technical document that provides all the necessary details for connecting to the system. This document covers the endpoints, technical specifications, and standards to be followed – including detailed information on header requirements, validation rules, and both push and pull message specifications.

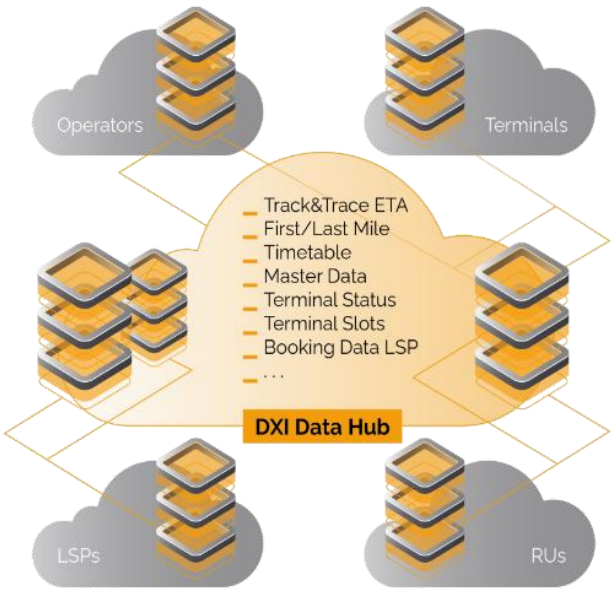

Figure 4 - The KV4.0 data hub - main functionalities

In conclusion, the KV4.0 Data Hub represents a significant advancement in intermodal freight transport, offering a centralised, interoperable and secure solution for efficient data exchange across the entire supply chain and with respect for data ownership. By facilitating seamless communication between diverse intermodal stakeholders, the hub enhances transparency and operational efficiency.

8. Contact Lists and WG participants

Christophe Buchner
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Thorben Lohse
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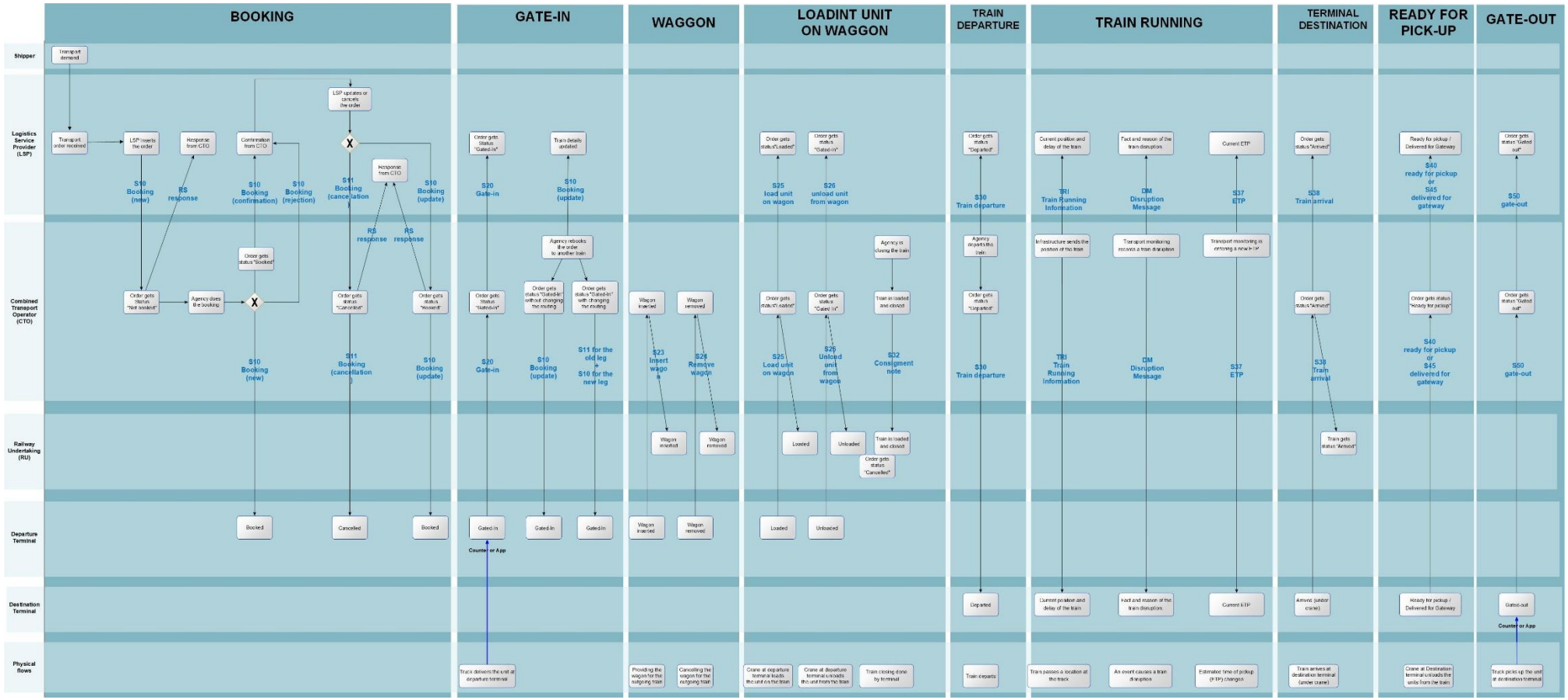
9. Appendices

9.1 Appendix 1 – Detailed process flow in intermodal freight transport (focus on Road-Rail combination)



9.2 Appendix 2 – EDIGES status messages

Status mesasge	Description	Flow
10/11	Transport Booking from Customer to Operator	Customer LSP → Intermodal Operator → Terminal
20/21	Delivery of unit at departure terminal (Gate-in)	Terminal → Intermodal Operator
23/24	Wagon in train composition	Terminal → Intermodal Operator
25/26	Loading of unit on wagon	Terminal → Intermodal Operator
27	Consignment note generation	Terminal → Intermodal Operator -> RU
30/31	Train departure from departure terminal (Departed)	Terminal → Intermodal Operator
32	Consignment note exchanged at train closure	Intermodal Operator → RU
34	Train/Wagon transit control	RU → Intermodal Operator
35	Transport information update	Intermodal Operator ← → Terminal
36	Train ETA / Terminal forecast unit ready for pickup	RU → Intermodal Operator
37	Unit ETP expected time of pick-up at arrival terminal	Intermodal Operator → Customer LSP
38/39	Train arrival and content verification, wagons/units	Terminal → Intermodal Operator
40/41	ITU ready for pick-up by road or for re-expedition by train	Terminal → Intermodal Operator
50/51	Picking-up of the ITU (Pick-up)	Terminal → Intermodal Operator
13	Pre-carriage	Customer LSP → Intermodal Operator → Terminal
18	Terminal lead time	Terminal → Intermodal Operator → Others
43	Post-carriage	Customer LSP → Intermodal Operator → Terminal
70/71	HLR	Terminal → Intermodal Operator → RU
72/73	MAD RU	Terminal → Intermodal Operator → RU
74/75	Transfer of liability from the RU to the terminal	Terminal → RU
60	Item position	Terminal → Intermodal Operator
80	Terminal slot data	Terminal → Intermodal Operator → Others
82	Terminal info	Terminal → Intermodal Operator → Others
88	Pin code	Intermodal Operator → *
99	Generic Message	Intermodal Operator → *
RS	Response message	Intermodal Operator → *
CT	Timetable commercial	Intermodal Operator → Customer LSP
OT	Timetable operational	RU → Intermodal Operator
PT	Public timetable	Intermodal Operator → Customer LSP
TM	Terminal master data	Terminal → *
TD	Train disruption	RU → Intermodal Operator
ND	Network disruption	RU → Intermodal Operator
DM	Disruption message	Intermodal Operator → *, RU → *, TE → *