Towards paperless transport within the EU and across its borders

- Report -

The Digital Transport and Logistics Forum (DTLF)
Sub-group 1: electronic transport documents

Version 6.0 June 2018
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<tr>
<td>ADR</td>
<td>European Agreement concerning the International Carriage of Dangerous Goods by Road</td>
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<td>AIS</td>
<td>Automatic Identification System</td>
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<td>B2A</td>
<td>Business-to-Administration</td>
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<td>B2B</td>
<td>Business-to-Business</td>
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<td>B2C</td>
<td>Business-to-Consumer</td>
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<td>B2G</td>
<td>Business-to-Government</td>
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<td>BL</td>
<td>Bill of lading</td>
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<tr>
<td>CIM</td>
<td>Contract of International Carriage of Goods by Rail</td>
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<tr>
<td>CIT</td>
<td>International Railway Committee</td>
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<tr>
<td>CITES</td>
<td>Convention on International Trade in Endangered Species of Wild Fauna and Flora</td>
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<td>C-ITS</td>
<td>Cooperative Intelligent Transport Systems</td>
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<td>CM</td>
<td>Consignment note</td>
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<td>CMNI</td>
<td>Convention on the Contract for the Carriage of Goods by Inland Waterway</td>
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<tr>
<td>CMR</td>
<td>Convention on the Contract for the International Carriage of Goods by Road</td>
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<td>CO</td>
<td>Certificate of Origin</td>
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<tr>
<td>COTIF</td>
<td>Convention concerning International Carriage by Rail</td>
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<td>COTS</td>
<td>Commercial Off The Shelve</td>
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<td>DG MOVE</td>
<td>Directorate General for Mobility and Transport</td>
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<td>DID</td>
<td>Distributed IDentity</td>
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<td>DINA</td>
<td>Digital Inland Waterways Activity</td>
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<tr>
<td>DOP</td>
<td>Public Domain Document</td>
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<td>Driver CPC</td>
<td>Driver Certificate of Professional Competence</td>
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<td>DSM</td>
<td>Digital Single Market</td>
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<td>DTLF</td>
<td>Digital Transport and Logistics Forum</td>
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<td>EC</td>
<td>European Commission</td>
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<td>ECDB</td>
<td>European Crew Qualification Database</td>
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<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>ECS</td>
<td>Electronic Consignment Note</td>
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<td>EETS</td>
<td>European Electronic Toll Service</td>
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<td>e-FTD</td>
<td>Electronic freight transport document</td>
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<td>EHDB</td>
<td>European Hull Database</td>
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<tr>
<td>eIDAS</td>
<td>electronic IDentification, Authentication and trust Services</td>
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<td>ERTMS</td>
<td>European Rail Traffic Management System</td>
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<td>EU</td>
<td>European Union</td>
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<td>EUCARIS</td>
<td>European Car and Driving License Information System</td>
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<tr>
<td>EVOA</td>
<td>Regulation 1013/2006 on shipments of waste</td>
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<tr>
<td>FIATA</td>
<td>International Federation of Freight Forwarders Associations</td>
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<tr>
<td>GVA</td>
<td>Gross Value Added</td>
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<tr>
<td>HS-code</td>
<td>Harmonised Systems code</td>
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<td>IATA</td>
<td>International Air Transport Association</td>
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<td>ICC</td>
<td>International Chamber of Commerce</td>
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<td>ICT</td>
<td>Information and Communication Technologies</td>
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<td>IMO</td>
<td>International Maritime Organization</td>
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<td>INCOTERMS</td>
<td>International Commercial Terms</td>
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<td>IPDB</td>
<td>Inter Planetary Data Base</td>
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<td>IRU</td>
<td>International Road Transport Union</td>
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<tr>
<td>ISPM15</td>
<td>International Standards for Phytosanitary Measures Guidelines for Regulating Wood Packaging Material in International Trade</td>
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<tr>
<td>IT</td>
<td>Information Technologies</td>
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<tr>
<td>ITS</td>
<td>Intelligent Transport Systems</td>
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<tr>
<td>IVR</td>
<td>International association for the representation of the mutual interests of the inland shipping and the insurance and for keeping the register of inland vessels in Europe.</td>
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<td>IWT</td>
<td>Inland Waterways Transport</td>
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<td>IWW</td>
<td>Inland waterways</td>
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<td>LBK</td>
<td>Logbook</td>
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<tr>
<td>Acronym</td>
<td>Definition</td>
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<tr>
<td>LSP</td>
<td>Logistics Service Providers</td>
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<td>MDH</td>
<td>Maritime Declaration of Health</td>
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<td>MS</td>
<td>Member State</td>
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<td>MTO</td>
<td>Multimodal Transport Operators</td>
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<td>NCP</td>
<td>National Contact Points</td>
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<td>NHM</td>
<td>Nomenclature Harmonisée des Marchandises</td>
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<td>NLIP</td>
<td>Neutral Logistics Information Platform</td>
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<tr>
<td>OCR</td>
<td>Optical Character Recognition</td>
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<td>OPEX</td>
<td>Operating expenditure</td>
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<td>OTM</td>
<td>Open Trip Model</td>
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<td>PTI</td>
<td>Roadworthiness certificate</td>
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<td>RIS</td>
<td>River Information Services</td>
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<td>RNE TIS</td>
<td>Rail Net Europe Train Information System</td>
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<tr>
<td>SES</td>
<td>Single European Sky</td>
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<td>SESAR</td>
<td>Single European Sky Air Traffic Management Research project</td>
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<td>SG</td>
<td>Sub-group</td>
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<td>SME</td>
<td>Small and Medium sized Enterprise</td>
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<tr>
<td>SRB</td>
<td>Service Record Book</td>
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<tr>
<td>TAF-TSI</td>
<td>Telematic Applications for Freight, Technical Specifications for Interoperability)</td>
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<tr>
<td>TCO</td>
<td>Total Cost of Ownership</td>
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<tr>
<td>TENT-T</td>
<td>Trans-European Transport Networks</td>
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<tr>
<td>TMS</td>
<td>Transport Management Systems</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>UN/CEFACT</td>
<td>United Nations Centre for Trade Facilitation and Electronic Business</td>
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<tr>
<td>UNECE</td>
<td>United Nations Economic Commission for Europe</td>
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<tr>
<td>UN/EDIFACT</td>
<td>United Nations rules for Electronic Data Interchange for Administration, Commerce and Transport</td>
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<tr>
<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
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<td>Acronym</td>
<td>Description</td>
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<tr>
<td>URL</td>
<td>Uniform Resource Location</td>
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<td>VAT</td>
<td>Value-Added Tax</td>
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<td>VCR</td>
<td>Vehicle Registration Certificate</td>
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<tr>
<td>WCO</td>
<td>World Customs Organization</td>
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<tr>
<td>WTO</td>
<td>World Trade Organization</td>
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1. Introduction

This section briefly introduces the present paper, in light of the general policy context and background leading to the establishment of the DTLF and the mandates of its respective sub-groups and teams.

1.1 Understanding the policy context

1.1.1 common EU transport policy

With a Gross Value Added (GVA) at current prices of more than €650 billion (or ~5% of total 2015 GVA in the EU-28), the employment of more than 11 million people (or ~5.2% of the total workforce) and more than €1040 billion spent on personal transport-related items by private households per year (or ~13% of their total consumption), European transport is fundamental to the EU economy\(^1\). It also plays a crucial role in enabling the mobility of goods and persons, as well as connecting other economic actors with each other.

As per Articles 90, 91 and 100 of the Treaty on the Functioning of the European Union, the overarching objectives relating to the sector are pursued within the framework of a common transport policy. In that respect, the European Commission (EC) seeks to develop and support policies striving for an efficient and sustainable transport sector in the EU.

Seeds of European transport policy were sown among the first common policy areas of the European Economic Community, established by the Treaty of Rome. Unclear definition of the term common policy within the Treaty lead to slow progress until the 1980s, due to both, reluctance of national governments in giving up control of their transport networks, and, discrepancies among the regulatory and transport structures in the Member States\(^2\).

In September 1982, the European Parliament sued the Council of the European Union for its failure to act in the field of transport policy\(^3\). Following the decision of the European Court of Justice, a White Paper including transport-related action points supporting the completion of the internal market by 1992 was issued\(^4\). Since then, lots of policy developments have been made in all areas of EU transport that involves all transport modes and hubs interconnecting those transport modes\(^5\). EU transport policy also aims to cover all types of cargo and products with their special logistics requirements, such as dangerous goods, containerised cargo and any combination thereby. The last mile is also being considered (city distribution).

A follow-up White Paper was published in 2011\(^6\), focusing on the remaining developments required for the completion of the Single European Transport Area. The White Paper underlines that while

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\(^1\) European Commission, Statistical Pocketbook: EU Transport, 2017
\(^2\) European Commission, The European Union explained: Transport, 2014
\(^5\) Transport modes are (deep- and short) sea, inland waterways, air, rail, and road. Terminals in a port, inland terminal, railway stations, warehouses and distribution centres are examples of hubs
\(^6\) European Commission, White Paper: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, 2011
some old challenges are still to be tackled, new ones have already arisen. It calls for united action from the EU in order to address remaining barriers while fulfilling citizens’ desires to travel and the economy’s needs for good transportation, as well as bearing environmental constraints in mind.

1.1.2 A common transport policy supporting digitalisation of transport operations

In line with the 2011-White Paper and further with the Juncker Commission’s 2014/15-2019 priorities aimed at the development of the Digital Single Market (DSM), EU transport policies are increasingly focusing on digitalisation of operations.

Indeed, among the strategic guidelines laid out in the White Paper, a significant number relate to research, innovation and deployment of new technologies. Use of information technologies (ICT), or, in other words, digitalisation of transport operations is believed to considerably facilitate the achievement of a more efficient, modern and sustainable European transport system, in a quick and cost-effective manner. It is indeed widely acknowledged that electronic information exchange is an enabler to optimise freight transport efficiency by simplifying administrative procedures, providing for cargo tracking and tracing, and optimising schedules and traffic flows.

In that vein, the White Paper insists on solutions and information systems designed for multimodal transport management that would be interoperable and interconnected, and specifies that ‘Standardisation and interoperability requirements, including at international level, will avoid technological fragmentation and enable European businesses to fully benefit from the entire European transport market, and to create worldwide market opportunities. [...] Their uptake should be encouraged by requiring their deployment on TEN-T infrastructure and a gradual integration of modal systems’.

The European transport sector as a whole, including all its transport modes, would thereby be contributing to two EU priorities: the completion of the internal market on the one hand, and the strengthening of use of digital technologies and services across all sectors of the EU economy, or DSM, on the other hand.

1.1.3 Transport policy developments within modes

The next sections focus on latest transport policy developments at EU level within each transport mode, mainly the efforts made towards a DSM, in which relevant information should be shared amongst stakeholders in a controlled way to be able to:

- reduce costs and prevent errors (efficiency);
- align processes and consequently reduce (unnecessary) waiting times;
- optimise use of available capacity (load factor);
- improve resilience by detecting risks and incidents (effectiveness); and
- allow for innovations like demand and capacity bundling and other innovative IT services.

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8 European Commission, The European Union explained: Transport, 2014
1.1.3.1 Road

Currently, common standards and platforms are being proposed in the area of electronic road tolling (EETS) where national systems in the EU are lacking interoperability. The aim is to cater to the shortcomings of an initial legal act issued in 2004, to facilitate cross-border exchange of information related to road fee payments, and to further define the roles of EETS market players. Other digital initiatives include Intelligent Transport Systems (ITS) and Cooperative-ITS (C-ITS), allowing effective data exchange through wireless technologies for road.

Besides digitalisation efforts above, three pieces of EU legislation are being proposed in other areas of road transport:

- Access to the profession and access to the haulage market;
- Use of hired vehicles in road transport;
- Access to the coach and bus market.

1.1.3.2 Rail

In 2016, the EU adopted the 4th Railway package. The overarching aim of the series of six legislative acts composing a technical and a market pillar is to complete the Single European Railway Area.

The technical pillar adopted in April 2016 seeks to enhance cost-effectiveness and lighten the administrative burden of the sector, thereby enhancing its competitiveness. It includes:

- The establishment of the European Union Agency for Railways, which objective is to “contribute to the further development and effective functioning of a single European railway area without frontiers, by guaranteeing a high level of railway safety and interoperability, while improving the competitive position of the railway sector”;

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• Rules on the interoperability of rail systems\(^{17}\), notably the conditions\(^{18}\) ensuring an optimal level of technical harmonisation, and therefore, overall compatibility of systems in the EU, including among other things
  - the European Rail Traffic Management System (ERTMS) equipment, as well as
  - the Technical Specification related to Telematics Applications for Freight Services (TAF-TSI)
• Provisions on railway safety, notably common safety targets and methods as well as principles for management and supervision of railway safety\(^{19}\).

The market pillar adopted in December, aims to complete the process of gradual market opening. It includes three legislative acts harmonising rules on
• The award of public service contracts for domestic passenger transport services\(^{20}\),
• The opening of the market of domestic passenger transport services and the governance of the railway infrastructure\(^{21}\),
• The normalisation of the accounts of railway undertakings\(^{22}\).

1.1.3.3 Air

The European air space evolves in the framework of the Single European Sky (SES) established in 2004, and further updated in 2009 (SES II). The overarching objective of the SES is to enhance current safety standards and overall efficiency for general air traffic in Europe, to optimise capacity meeting the requirements of all airspace users and to minimise delays\(^{23}\).

More recently, a comprehensive aviation strategy was developed in 2015\(^{24}\), including three key priorities. In line with the wider DSM priority, the second strategic topic “Tackling limits to growth in the air and on the ground, by reducing capacity constraints and improving efficiency and connectivity” relates to enhanced digitalisation. In the context SES, this refers back to its technological pillar: Single European Sky Air Traffic Management (ATM) Research project, or SESAR

\(^{17}\) Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union

\(^{18}\) Conditions concern design, construction, placing in service, upgrading, renewal, operation and maintenance of the parts as well as the professional qualifications of, and health and safety conditions applying to, the staff who contribute to its operation and maintenance.


\(^{23}\) Regulation (EC) No 549/2004 of the European Parliament and of the Council of 10 March 2004 laying down the framework for the creation of the single European sky (the framework Regulation)

set up in 2007. SESAR aims to modernise and harmonise ATM systems through innovative technological and operational solutions in order to improve the traffic management performance. Its deployment was initiated in 2014.

1.1.3.4 Maritime

The EC communication on Strategic goals and recommendations for the EU’s maritime transport policy until 2018 published in 2009 sets the vision and wider policy context for maritime transport. A Working Document was published by the Commission in 2016, reporting on the progress of the strategy’s implementation, main achievements and remaining action points. Focal areas include enhancing safety and security, mitigating environmental impacts, strengthening the global positioning of the sector, raising the profile and qualifications of the personnel as well as digitalisation.

Main digitalisation achievements include notably:

- the SafeSeaNet project establishing an electronic information system for ship movements and cargo in the maritime sector;
- the Reporting Formalities Directive requiring a ‘once only’ reporting of a series of documents by ships to ports and other authorities;
- the Blue Belt initiative reducing the administrative burden and customs formalities on overseas goods.

1.1.3.5 Inland waterways

As far as inland waterways are concerned, the EC seeks to enhance the competitiveness of inland waterways within the EU transport system, and further increase its integration in the logistics chain.

Digitalisation efforts have been undertaken in area of harmonisation of river information services (RIS), providing a traffic management system based on rapid or real-time electronic data transfer and exchange of information in inland waterways.

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25 Council Regulation (EC) No 219/2007 of 27 February 2007 on the establishment of a Joint Undertaking to develop the new generation European air traffic management system (SESAR)
26 Commission Implementing Regulation (EU) No 716/2014 of 27 June 2014 on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan
28 European Commission, COMMISSION STAFF WORKING DOCUMENT on the implementation of the EU Maritime Transport Strategy 2009-2018, SWD(2016) 326 final
In 2013, the NAIADES II Action Plan was launched, part of which is the Integration into multimodal logistics chain with a focus on information exchange and RIS policy review and implementation.

In 2018, the EC released a report as a result of a study on the future digitalisation of inland waterway transport (IWT), Digital Inland Navigation Area (DINA). The study has identified 3 areas where digitalisation is considered critically important:

- Improvement of navigation and management of traffic
- Integration with other modes, especially in multimodal hubs (ports)
- Reduction of administrative burdens by reducing the number of B2A declarations

DINA is expected to build on the existing structure of RIS and aims to add a data platform for business operators. In accordance with Directive 2017/2397 on professional qualifications – delegated act to be adopted by 17/01/2020 a new database is intended to be set up (shall include data on certificates of qualifications, service record book and logbook).

Other initiatives include the harmonisation of the conditions for obtaining national boat masters' certificates for the carriage of goods and passengers.  

1.1.3.6 Multimodal

Following the initiative of the EU Transport Commissioner, Violeta Bulc, the importance of multimodality for the EU transport system will be highlighted throughout 2018, the ‘Year of Multimodality’. In essence, the Commissioner aims to promote integrated multimodal transport operations throughout the EU.

In this respect, new legislative and policy initiatives can be expected during 2018 in the various areas, notably in digitalisation:

- Electronic transport documents proposal,
- Digital corridor information systems, and,
- Multimodal travel information and ticketing;

1.2 The Digital Transport and Logistics Forum (DTLF)

1.2.1 Background and objectives

Digitalisation in transport and logistics is an important driver for efficiency, simplification, lowering costs, and a better use of resources and existing infrastructures. Digitalisation also creates new opportunities for business and has the potential to change the way cargo and traffic flows will be organised and managed in the future.

To reap those benefits transport should become digital by default. Electronic data should flow seamlessly through supply chains including the exchange of data with public authorities and between businesses. Reporting once-only the same information for different purposes should become the rule.

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33 Directive 96/50/EC of 23 July 1996 on the harmonization of the conditions for obtaining national boatmasters’ certificates for the carriage of goods and passengers by inland waterway in the Community
and not remain the exception. Data is available at an unprecedented scale; the difference will be made by using the data to generate added value for business.

To support this process, DG MOVE established the Digital Transport and Logistics Forum (DTLF) in April 2015. The objective of DTLF is to improve interoperability in logistics and freight transport across Europe. The DTLF is a consultative platform for the coordination and cooperation between stakeholders in a cross-modal and cross-sectorial perspective.

As laid down in Article 2(1) of the Commission Decision of 9 April 2015 to set up the DTLF expert group, the task of the Forum is to “assist the Commission in implementing the Union’s activities and programmes aimed at fostering more efficient electronic exchange of information in transport and logistics, with the objective of removing technical, operational and administrative barriers between and within transport modes”.

The Forum is divided into two sub-groups, dealing respectively with the digitalisation and acceptance of transport documents (sub-group 1), and the establishment of digital corridor information and management systems (sub-group 2). Each sub-group is further split into dedicated teams examining specific issues and topics.

Figure 1 – Structure of the Digital Transport and Logistics Forum (DTLF)

DTLF meets in the form of a Plenary, while all the groundwork is carried out by working groups (sub-groups and teams). The activities of the sub-groups are led by Rapporteurs, who stimulate the discussions, coordinate work of the respective Team Leaders, monitor progress and deliverables, and report to the Commission. The Commission maintains the overall oversight and supervision of the Forum and provides a technical secretariat for its operations. The DTLF mandate ends at 30 June 2018.

1.2.2 Sub-groups mandates and activities

This document is produced by the sub-group on electronic transport documents of the DTLF (sub-group 1), based on work done by the different teams of this sub-group. As laid down in the mandate, the objective of this sub-group 1 is to promote and facilitate the use of transport documents in an electronic format. The first specific objective is to propose measures to ensure the acceptance of electronic transport documents by all stakeholders, in particular national authorities. Secondly, the sub-group aims to contribute to better harmonisation of (the data elements used in) transport documents across modes. The third specific objective is to further facilitate the electronic exchange of information in transport in logistics. Therefore, the analysis will be extended to also include other documents that have to be carried during transport (for instance documents concerning the means of transport and the personnel).

Sub-group 2, on the other hand, aims to identify operational obstacles to a smooth flow of cargo along TEN-T transport corridors that could be addressed by better access and availability of information. The second specific objective of sub-group 2 is to identify the technical, legal and administrative barriers limiting such access and availability of information. The third objective is to propose measures (short, medium- and long term) to overcome the identified barriers.

1.2.3 Cooperation between the sub-groups

The primary difference between the two sub-groups of the Forum is a distinction between data represented by documents accompanying goods flows according to an agreed set of legislative provisions and (public or private) rules and data shared in logistics organizational networks to improve business processes, compliant with EU Directives and their national implementation guides.

The work of sub-group 1 focuses on replacing existing paper documents accompanying goods flows with data, with a view to achieve complete paperless logistics. To that end, it has explored the current state of digitalisation and acceptance of electronic transport documents by the EU Member States’ authorities. The working premise is that underlying business processes need not necessarily change, but allow processing of paper or electronic documents as a single process based on data, where the data is already available and (potentially) already shared amongst stakeholders.

Sub-group 2 considers all data sharing relevant to goods flows, with a primary focus on particular trans-European transport corridors, including all stakeholders involved and all modalities. This data sharing may lead to process improvement and optimization, cost reduction, and innovation, e.g. by providing supply chain visibility and support of agility and resilience, compliant with (inter)national regulations. To achieve this objective, sub-group 2 elaborates an innovative approach to data sharing (team 1: conceptual interoperability), supported by IT tools and services utilized by business (team 2: business scenarios and federative infrastructure services and -protocols), and governed by authorities to stimulate the implementation of interoperability by the private sector (team 3: governance and business models).

1.3 Structure of the report

This document gathers the findings of the work of the sub-group's teams and proposes, on this basis, a set of recommendations for follow-up action both at EU policy and at industry level, including in the framework of the DTLF.

In this regard, it should also be mentioned that an early recommendation by the DTLF SG1 has led the Commission to adopt a proposal for a regulation of the European Parliament and of the Council
on electronic freight transport information (eFTI) in May 2018. The proposed regulation for digitally sharing (access to) document data between businesses and authorities specifies that Member States’ competent authorities shall accept regulatory information made available electronically by economic operators concerned.

The report is structured as follows:

- Section 2 aims to provide an overview of the transport documents that may be subject to digitalization;
- Section 3 presents the current state of play of digitization of these documents, based on input from experts and members of the DTLF as well as online surveys carried out in the context of the work of SG1 Team 1 and Team 3;
- Section 4 outlines a proposal for digitally sharing (access to) document data in business-to-authority (B2A) communication and describes options, conditions and requirements for an infrastructure that could support the sharing of (access to) data included in transport documents, including standardization aspects;
- Section 5 concludes the report by summarizing key findings.

The document is complemented by several annexes, emerging from the work of the SG1 teams carried out over the past years. These annexes contain detailed input from DTLF SG1 members and various stakeholders. References to the detailed content in the annexes are included in the various sections of the report. All annexes are listed below:

- Annex A provides a detailed inventory of documents accompanying the goods for each mode of transport;
- Annex B contains an inventory of documents accompanying the means of transport for the different modes;
- Annex C includes an inventory of documents accompanying the personnel for each mode;
- Annex D maps provisions of International Conventions for the Carriage of Goods, with the objective to identify similarities and differences as well as identifying any provision concerning electronic documents;
- Annex E provides an overview of existing standards and standardization bodies;
- Annex F presents a detailed analysis (question per question), of the responses received to the survey on the use of digital transport documents by businesses (SG1 Team 1);
- Annex G includes a detailed analysis (question per question), of responses received to the survey on the use of digital documents related to registration and certification of vehicles (SG1 Team 3);
- Annex H introduces a possible blueprint for IT tools and services supporting sharing of data for transport documents;
- Annex I includes a bibliography, listing the references and sources used to complete this document.

1.4  Disclaimer

The content of this document is based on the work of DTLF sub-group 1 and the input received from various experts and members of the Forum. However well their knowledge and experience and the input from additional sources might be, completeness and correctness might not yet be achieved in this version.

In addition, this report is not intended to reflect the official views and opinions of the European Commission. The information and views expressed in this document pertain to the members of the DTLF as an expert group.
2 Documents used in freight transport: an overview

2.1 A taxonomy

There is a large and widely varied number of transport documents being used in the context of freight logistics operations. These documents are issued either by the businesses, authorities or certification bodies recognised by the authorities, contain information on a variety of aspects and serve a variety of purposes in both business-to-business (B2B) and business-to-administration (B2A) relations. What these documents have in common is that they contain data pertaining to the private sector which either regularly or through spot checks or in accident situations needs to be made available to the authorities in order to provide proof of compliance with applicable regulations, to deal with emergency situations or to fulfil to customs requirements.

In pursuing its tasks, DTLF’s sub-group 1 has used the following working classification of these transport documents (see table 1): documents concerning the goods (freight documents), documents concerning the means of transport, and documents concerning the personnel. The work of the sub-group has focused on assessing the extent to which these documents and/or the data contained therein are available in electronic format and are accepted as functionally and legally equivalent to paper–based documents when submitted to the authorities.

Teams 1 and 2 have focused on goods related documents (freight documents), particularly documents which serve the purpose of contract of carriage (i.e. consignment note, waybills, bills of lading). The contracts of carriage (transport contracts) are the main documents currently used by businesses, and requested by authorities for inspection, to evidence compliance with transport conditions. They contain an important part of the information required by the authorities, and they also constitute proof of the legitimate possession of the goods. Unlike most other documents used to communicate freight transport information, the contracts of carriage are central and indispensable to a transport operation.

Team 1 sought to establish the state of play as regards the use and barriers to use of electronic transport documents, including their acceptance by Member States authorities. Team 2 looked at the data elements of these documents and the standards for their electronic representation, as well as the options for the type of infrastructure required for the exchange of the data with the authorities. Team 3 looked at the documents accompanying the means of transport (e.g. vehicles) and the personnel (e.g. drivers), with a primary focus on the road sector.
| Goods related documents (freight documents) | These documents contain information representing the goods during transport. Among these documents, a main distinction has been made between (freight) documents which serve the purpose of contract of carriage (consignment notes, waybills, bills of lading), and other (freight) documents concerning the goods, serving various other purposes, such as certain customs documents, including certificates of origin, dangerous goods certificates or cleaning reports of containers. |
| Transport means related documents | These documents provide information on the means of transport from a safety perspective, usage and its nationality, certification, registration (Vehicle Registration), insurance, etc. Safety considers both personnel and utilization of the infrastructure. Nationality of a mean of transport refers to the country of origin where approved and registered; there might be specific rules for cargo transport, such as special load sizes, weights or special vehicles. |
| Personnel related documents | These documents contain information on the qualifications (safety perspective) and nationality (movement of persons perspective) of the personnel operating a mean of transport and/or handling the cargo. Qualifications are based on formalities laid down in rules and regulations that can be inspected by authorities. Qualifications might require regular operations of personnel according these rules and regulations, e.g. minimal number of flying hours per year for a pilot qualification, or maximum hours for operating a vehicle with mandatory rest periods. Passports or other formal documents like visa have to prove that a person is allowed to work for an employer and is able to enter or leave a particular country. Mostly, an individual has a document issued by an authority that may have to be renewed regularly (e.g. a passport) and one or more of his employers can prove that the qualification is still applicable. |
The figure below presents a graphical representation of the different categories of transport documents, as well as the terminology used in this report.

Besides the various categories of transport documents, a distinction can be made in how the documents are used or required (e.g. by authorities):

- actual paper documents/certificates;
- digital documents which have to accompany the transport on paper;
- digital documents that still have to be archived on paper;
- documents not required on paper, but nonetheless printed by a shipper, carrier, forwarder.

The table below provides a non-exhaustive overview of documents and procedures for each transport mode.
Table 2 – Non-exhaustive overview of documents and procedures per transport mode

<table>
<thead>
<tr>
<th>Modality</th>
<th>Goods</th>
<th>Transport means</th>
<th>Personnel/operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road</td>
<td>CMR / e-CMR, ADR transport document (if applicable), Notification/Movement document for transboundary movements/shipments of waste (if applicable), Transport document (live animal) (if applicable).</td>
<td>Vehicle Registration Certificate, Roadworthiness certificate (PTI), Community Licence, EC Certificate of Conformity, Certificate of approval (ADR) (if applicable), Certificate of approval (livestock - animal transport; if applicable).</td>
<td>Drivers licence, Tachograph Driver Card, Driver Certificate of Professional Competence (Driver CPC), Niche specific certificates (Crane operations, dangerous goods (ADR), transport of live animal; if applicable), European Health Insurance Card.</td>
</tr>
</tbody>
</table>
| Sea      | Documents to be provided per voyage include:  
  - Bill of Lading  
  - general declaration (IMO FAL form 1)  
  - cargo declaration (IMO FAL form 2)  
  - the ship’s stores declaration (IMO FAL form 3)  
  - the crew’s effects declaration (IMO FAL form 4) | Sea ships (cargo and passengers), related documents include: International Tonnage Certificate and International Load Line Certificate. See annex B for a complete overview. | Distinction is made for Masters/Captains/Deck Officers, Engineering Officers, Electro-Technical Officer / ETO, Deck Rating/ Able Seaman AB / Efficient Deckhand (EDH), Engine Rating/Motormen/Fitter/GP1, Stewards/Pursers, Cooks. |
<table>
<thead>
<tr>
<th>Modality</th>
<th>Goods</th>
<th>Transport means</th>
<th>Personnel/operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• the crew list (IMO FAL form 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• the passenger list (IMO FAL form 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• the registration information of the ship’s passengers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Maritime Declaration of Health (MDH)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rail</td>
<td>Consignment note (with the E-Consignment being currently deployed)</td>
<td>Vehicle identification: A European Vehicle Number is allocated to any railway vehicle running in Europe and marks in a visible manner the vehicle to identify it uniquely in operation (by means of the vehicle registers)</td>
<td>“Driver’s License” and “Driver’s Safety Certificates”: According to the current Train Drivers Directive, all train drivers will have to detain a License and a Certificate, the details of which are detained in digital format by the NSA and the Train Operator.</td>
</tr>
<tr>
<td>Inland waterways</td>
<td>CMNI Transport Document ADN transport document (if applicable) EVOA waste transport document (EEC Regulation 1013/2006; if applicable))</td>
<td>Vessel identification: Based upon the technical Directive (EU) 2016/162936 and/or national legislation issuing a unique vessel identification number by the national authority in which the owner has its seat and registered in the European Hull Database.</td>
<td>Service books based on the various qualifications on board a vessel. Directive 2017/2397 on professional qualifications aims to establish a new system of qualifications and attestation of the crew members including a new database of e-service record books and logbooks.</td>
</tr>
</tbody>
</table>

2.2 Documents concerning the goods (freight documents)

Documents concerning the goods, or freight documents, contain information representing the goods during transport. For the purposes of its work, the DTLF has used the following main distinction between documents which serve the purpose of contract of carriage (waybills, consignment notes, bills of lading) and other freight documents, which serve various other purposes, such as customs declarations\(^{37}\), certificates of origin, dangerous goods certificates or cleaning reports of, for instance, containers.

In general, these (other) freight documents can be categorized depending on a variety of factors, such as:

- type of goods (e.g. live animals, oversized load, excise goods etc.);
- origin and or destination of the goods (export/import licenses, certificates of origin);
- (customs) status of the goods (in transit, to be exported, temporary import);
- logistics or commercial factors (invoice, packing list, printed barcodes, LC’s);
- the possibility and use of certain simplifications (for example certain customs or trade simplifications, which make any document (electronic or on paper) unnecessary.

Following this taxonomy, the next sections provide an overview of the transport documents used in each mode of transport in Europe, along with an explanation on their use and the information that needs to be indicated. Also the applicable legal regime is discussed. A detailed mapping of the documents accompanying the goods, per mode, is provided in Annex A.

2.2.1 Documents evidencing contract of carriage

The transport contracts (waybills, consignment notes, bills of lading) are the main documents currently used by businesses, and requested by authorities for inspection, to evidence compliance with transport conditions. They contain an important part of the information required by the authorities, and they also constitute proof of the legitimate possession of the goods. Unlike most other documents used to communicate freight transport information, the contracts of carriage are central and indispensable to a transport operation.

Transport contracts are one of the results of the agreement between two parties to transport goods. These freight documents, evidencing contract of carriage, are issued by transport operators (such as road haulage companies, rail operators, shipping lines and airlines), freight forwarders, logistics service providers and/or shippers. They provide an accounting record of the transaction, instructions on where and how to ship the goods and a statement giving instructions for handling the shipment.

A contract of carriage is defined as ‘any contract, of any kind, whereby a carrier undertakes against payment of freight to carry goods\(^{38}\)’ by different modes of transport. A consignment note (CM) also serves as proof of a contract of carriage, the content and applicable regime of which is prescribed in specific international conventions, distinct for each transport mode. The consignment notes are

\(^{37}\) Movements of goods between Member States do not require any customs documents. Customs documents are required for movements of goods to/from non-EU Member States that can be reached via road, rail, or inland waterways (e.g. Russia and Turkey).

\(^{38}\) Definitions of contracts of carriage can be found in International Conventions for the Carriage of Goods. See for example Article 1 number 1 of the Budapest Convention on the Contract for the Carriage of Goods by Inland Waterway (CMNI).
based on a uniform model and signed by both the consignor and the carrier. Some of the international conventions foresee that the consignment note “shall” or “must” be issued, however the absence, irregularity or loss of the consignment note does not affect the existence or validity of the contract.

The consignment note inks the shipper or consignor, the freight forwarder, the transport operator and the carrier. It serves as a contract that is used not only as a confirmation that goods were accepted or loaded, but also as a commitment that they were or will be delivered. Therefore, it is an important part of a transport contract that can exist independently from the contract itself.

2.2.1.1 Legal framework

The current legal framework applicable to freight documents (documents evidencing contract of carriage and other freight documents) is dispersed, as it consists of EU legislation, national legislation by EU Member States and international conventions.

2.2.1.1.1 EU Legislation

There are currently no specific EU laws applicable to contracts for the carriage of goods. Recent research into the state of play and barriers to the use of electronic transport documents for freight transport, commissioned by the European Commission, made clear that there are also no EU rules determining how enforcement authorities of Member States should inspect these freight documents. Sector-specific rules exist, but none of these do require enforcement authorities to accept some or all freight documents in an electronic way. Some legislative proposals contain provisions that will oblige authorities to accept electronic transport documents, but these proposals are limited in scope and therefore will not entirely solve the lack of acceptance issue.

The eIDAS Regulation provides that an electronic document shall not be denied legal effect and admissibility as evidence in legal proceedings solely on the grounds that it is in electronic form. However, the eIDAS Regulation does not oblige Member States to accept electronic documents or information therein as evidence in other cases than in legal proceedings.

The only uniform law applicable is the framework of international carriage conventions.

2.2.1.1.2 International conventions on the carriage of goods

The international carriage conventions currently in force are mode specific, governing the contract of carriage of goods the transport of goods in a single transport mode. All these conventions include a
section on the freight documents that can serve as evidence for a contract of carriage. The applicable international conventions are listed in the following table\textsuperscript{44}.

\textbf{Table 3 – Applicable international conventions governing the contract of the carriage of goods}

<table>
<thead>
<tr>
<th>Mode</th>
<th>Convention</th>
</tr>
</thead>
</table>
| Road              | • Convention on the Contract for the International carriage of Goods by Road (CMR) (1956)  
                    • E-CMR Protocol (2008)                                                      |
| Air               | • Montreal Convention (1999)                                                
                    • IATA Resolution 672 (Multilateral e-AWB Agreement: makes references to other relevant resolutions) |
| Sea\textsuperscript{45} | • International Convention for the Unification of Certain Rules of Law relating to Bills of Lading ("Hague Rules") (1924), as amended by the two protocols from 1968 ("Visby Rules") and 1979 ("SDR Protocol"), together known as the "Hague Rules"  
                    • Hamburg Rules (1978)                                                      
                    • Rotterdam Rules (2008)\textsuperscript{46}                               |

Whether a mode of transport is covered by a convention or not is systematically determined by the convention’s scope of application\textsuperscript{47}. In addition to the abovementioned unimodal regimes, an attempt was made to draft a multimodal convention, the United Nations Convention on the Multimodal Transportation of Goods in 1980. Attempts to create uniform law for multimodal carriage have not been successful until now. However, international transport organisations have

\textsuperscript{44} The list of conventions still in force can be found in Annex D.
\textsuperscript{46} The Rotterdam Rules also cover multimodal transport including a sea leg. However, up until today, the Rotterdam Rules have not yet entered into force.
\textsuperscript{47} Art. 1 of the Montreal Convention (Air), Art. 2 of the Budapest Convention CMNI (IWT), Art. 2 of the Hamburg Rules (Maritime), Art. 1 of the CIM (Rail) and Art. 1 of the CMR (Road)
facilitated multimodal trade by creating standard documents and their electronic equivalent for freight forwarders, such as the negotiable FIATA Multimodal Transport Bill of Lading and the non-negotiable FIATA Multimodal Transport Waybill. The following specific elements of the international conventions are mapped in the table in annex D:

- The definition and functionality of the documents governed by the convention, such as the evidentiary value of the contract of carriage, the acceptance of the goods and the conditions of the goods upon acceptance;
- Data to be contained in the consignment note/freight document, identifying the parties to the contract and related to the cargo and its carriage;
- Responsibilities and liability of the parties to the contract (consignor, carrier and consignee);
- Provisions related to combined carriage, specifying the applicability of transport conventions on distinct legs within the same journey;
- Provisions related to electronic format.

From the list above and from annex D it can be concluded that some international conventions include provisions concerning the use of electronic documents. It should be noted that that these conventions do not necessarily require the national authorities of Member States to accept electronic transport documents when performing enforcement tasks, as the conventions regulate the relationships between the commercial parties involved.

A brief elaboration on the freight documents (evidencing contract of carriage) and required format, as provided in international conventions, per transport mode, is presented below. A further elaboration on the documents accompanying the goods for the different modes of transport can be found in annex A of this report.

2.2.1.1.2.1 Road

The Convention on the Contract for the International Carriage of Goods by Road (CMR), a United Nations Convention that was signed in Geneva on 19 May 1956, is a consignment note with a standard set of transport and liability conditions that replaces individual businesses terms and conditions. All EU Member States have signed, accessed or ratified the Convention.

In 2008, an additional protocol to the CMR was signed, enabling the CMR consignment note to be made out by electronic communication. A so-called “e-CMR”, if compliant with the provisions of the Protocol, is considered equivalent to (with the same evidentiary value as) the regular CMR consignment note. Currently 12 Member States have ratified or acceded to the protocol.

2.2.1.1.2.2 Rail

The transportation of goods by rail requires a rail consignment note. There are several types of rail consignment notes, depending on the origin and destination of the goods. A majority of the EU Member States use the CIM consignment note for transportation of goods by rail. CIM belongs to

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and is regulated by the COTIF Protocol (Convention concerning International Carriage by Rail). A rail transport document prepared according to Appendix B of the COTIF Convention is called a CIM Rail Consignment Note. The International Railway Committee (CIT) has defined the functional and legal specifications for the Electronic CIM/SMGS Consignment Note.

2.2.1.2.3 Air

The Air Waybill (AWB) is the document that constitutes the contract of carriage between the shipper and the carrier (airline) in air cargo transport. The AWB is the most important (non-negotiable) transport document in air cargo transportation. IATA, together with the industry, developed a “multilateral” e-AWB Agreement as new IATA Resolution 672. The e-Air Waybill (e-AWB) is an electronic cargo contract that replaces the paper AWB.

Moreover, various other documents accompanying air cargo transport are digitalized and accepted under the Montreal Convention. This Convention has been ratified by most states.

2.2.1.2.4 Maritime

The standard transport document in the maritime sector is the bill of lading. There are various rules defining the (core) functions that an electronic bill of lading must fulfil in order to replace a paper bill of lading. The Hamburg Rules contain a provision that the signature on a bill of lading may be made by electronic means, but only if this is not inconsistent with the law of the country where the bill of lading is issued.

2.2.1.2.5 Inland waterway

International inland waterway transport is governed by the Budapest Convention on the Contract for the Carriage of Goods (CMNI). The CMNI transport document governs the contractual relationship between the contracting parties, but can also be used for other purposes. According to the CMNI Convention, the transport document may be issued electronically (article 1.8).

2.2.1.3 National legislation

The international conventions governing the contract of the carriage of goods, as uniform law, prevail over national law. In the context of transport law, the international conventions are adopted upon formal signature and ratification by countries agreeing on their provisions. To date, most EU Member States and Switzerland have ratified (or are in the process of ratifying) international conventions for air, rail and road.

In addition to these international conventions, specific laws at national level govern the carriage of goods. The research into the state of play and barriers to the use of electronic transport documents for freight transport, commissioned by the European Commission, concluded that the national legislative framework applicable to transport documents is fragmented. Transport documents are controlled for multiple purposes, by different authorities. The way the transport documents are controlled varies per transport mode, per Member State, per inspection purpose and per authority involved. These conditions also influence the requirements set to the (acceptance of) transport documents.

The outcomes of the legal survey showed clear that none of the Member States that had provided information for the survey has a general rule that requires enforcement authorities to accept electronic transport documents used in all transport modes. When a legal framework does exist, it concerns rules on the acceptance of for instance the electronic consignment note (France and
Belgium), the electronic airway bill (Luxembourg) or the electronic consignment note in the rail sector (Bulgaria).

Only in a limited number of Member States (e.g. Sweden and the Netherlands) there is a general "rule" that electronic transport documents can in principle be accepted by enforcement authorities. In some Member States (e.g. Germany), general rules on the acceptance of electronic documents are deemed applicable to transport documents, thus allowing authorities to accept transport documents in an electronic way. But even in these countries, some authorities still require paper transport documents. And also in Austria and Italy, for instance, paper documents are still required at roadside checks, since both countries have not ratified the e-CMR Protocol.

In addition, there are multiple Member States where submission of transport documents in paper format is the general rule, as the national legislation requires the transport documents to contain handwritten signatures (e.g. Slovenia, Spain and Italy) or handwritten signatures and stamps (e.g. Slovenia, on rail consignment notes).

Apart from transport documents, authorities also inspect other freight documents, for instance waste or dangerous goods declarations. Similar to what was found before, the legal landscape concerning acceptance of other freight documents in electronic format is fragmented across Europe. The study into the state of play and barriers to the use of electronic transport documents for freight transport did not identify any Member State where general rules apply as regards the acceptance of other freight documents in an electronic way. However, different Member States have adopted initiatives aimed to promote the use of electronic freight documents, for instance by implementing ratified conventions (e.g. ratification of e-CMR Protocol) or by participating in bilateral or multilateral agreements (e.g. BENELUX e-CMR Pilot).

Depending on the country concerned, there are specific laws ruling national consignment notes by road. For example in France and Spain, although CMR can be used for national transport of goods by road, road transport companies are using a specific national consignment note for internal transport.

In France, the content of the consignment note, whether national or international, is ruled by a legal decree written by the French Ministry of Transport (dated 9 November 1999). This decree lists all the mandatory information items that must be indicated in the document, and also indicates that the consignment note and the eventual packing list could be issued electronically. The decree, that was revised in December 2017 in order to clarify the original text\(^ {49}\), clearly states that the issuer of a consignment note can choose to issue the document on paper or electronically. If the consignment note is issued electronically, the enforcement authority is only entitled to ask for the presentation of the document by the driver in an electronic way, using a smartphone, tablet or any other on-board computer device. In this case, no paper is required anymore. The text also says that the consignment

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2.2.1.2 Functionality of contract of carriage freight transport document

A freight (accompanying) transport document fulfils three main (legally prescribed) functions: evidencing the contract of carriage with responsibilities, proving ownership of the goods and providing a description of the cargo and its route. A freight document reflects the following aspects of logistics activities:

- The status of the process. A shipper and carrier (or their agents) have agreed on the goods that are transported, for instance during or after loading.
- Cargo information. All relevant information regarding the cargo, like its temperature setting (in case of temperature controlled cargo), dangerous cargo details, handling instructions, and pick up and drop off locations (also be known as place of acceptance/delivery).
- Any conditions valid for transport, like CMR conditions and delivery conditions like INCOTERMS.
- Any relevant parties to allow for handling of the cargo at their destination (payment of transport charges, on-carriage to the final destination, etc.).

The analysis of the way of use and functions performed by the freight documents (and transport documents in general) is central to any reflection on their potential digitalisation. The electronic version of (a solution for) transport documents has to consider these aspects and specify how these different functions are fulfilled. In chapter 1, it was mentioned that digitalisation in transport and logistics is an important driver for efficiency, simplification, lowering of costs, and a better use of resources and existing infrastructures. However, when digitalising transport documents, the focus should not be on simply replacing paper documents with a digital equivalent, which would just lead to the continuation of the exact same processes with very limited efficiency benefits.

In order to maximise the benefits from the potential of electronic freight documents, the concept of a document accompanying the goods should be reconsidered. The paper document used to be, and still is simply an instrument to exchange data, not a goal in itself. Modern technologies allow for different ways to exchange data and these possibilities should be explored. Only by doing so, real future-proof and efficiency-achieving procedures can be created. Therefore, in order to maximise benefits for all parties involved, analysing the functions (instead of the past and current processes) of the documents is essential. In the sections below, the Business-to-Business (B2B) and Business-to-Authority (B2A) functions of (contract of carriage) freight transport documents are discussed.

2.2.1.2.1 B2B functions

As derived from the provisions of the governing international conventions, a (contract of carriage) freight transport document can combine various functions: evidencing the contract of carriage with responsibilities, proving ownership of the goods and providing a description of the cargo and its route.

Contract of carriage. First and foremost, the freight transport document has evidentiary value of the existence of a contract of carriage between the consignor and the carrier for a specific set of goods. It therefore can prove the agreed conditions regarding the responsibility and liability of the carrier during transport. By its lay-out and type, a document refers to standard conditions like CMR for road
transport. In air transport, conditions are on the back of the paper form which reflects the industry resolution as agreed through IATA\textsuperscript{50}. When there is an electronic air waybill, terms and conditions are defined in a multilateral e-air waybill agreement, which is signed once by each airline and forwarder. Subsequent exchange of e-air waybill messages (electronic documents) is fully governed by that multilateral agreement.

In other occasions, responsibility and liability is flexible and can be mentioned on the document. Additionally, there can be document independent regulations for sharing data, for instance Rotterdam Rules for access to cargo details in sea transport.

Ownership of the goods. Some of the transport documents also constitute an ownership title over the goods being transported. The enterprise that owns the original waybill is the owner of the goods. A Bill of Lading is such a document, mostly used when goods are traded during transport (e.g. commodity trading of bulk cargo).

In air transport, there is no such document: the air waybill is not negotiable and does not represent a title of ownership.

Confirmation of acceptance of goods. A contract of carriage and/or their respective consignment note\textsuperscript{51} in many cases also provides proof of acceptance of the goods, upon signature by the carrier. In air transport, acceptance of goods is provided by sending a “Ready For Carriage” message from the carrier to the forwarder (when using electronic documents).

The consignment note constitutes a crucial document of evidence in case of existing claims by the sender, the receiver and the carrier within the carriage contract. Moreover, the consignment note plays a facilitating role in supporting such claims, as the document could be used to prove establishment and content of the carriage contract, unless proved otherwise. When cargo is lost or damaged, this is included in the remarks section of the document when handing over the cargo. For the evidentiary function of a consignment note to take effect, a version signed by the sender and carrier must be available.

Freight transport documents can also give certain rights to consignees. For example, according to the CMR, consignees have the right of disposal of the transported goods when they are in possession of the second copy of a consignment note, in addition to their own copy\textsuperscript{52}.

Description of the cargo and its route. A third function of the freight transport document is describing the content of a contract of carriage. It describes the cargo (number and type of packages, weights, dimensions, etc.), the place where the contract starts (Place of Acceptance where the cargo is taken over by a carrier) and the place where the contract (is expected to) end (Place of Delivery). The Place of Delivery might change, which results in a change of contract (not changed in the document, but given by means of remarks). It is up to a carrier to arrange transport between the two

\textsuperscript{50} That same resolution backs the electronic version of the air waybill

\textsuperscript{51} The consignment note is not a contract \textit{per se}, from a private, business (B2B) perspective. The non-existence of a consignment note does not interfere with the existence of a contract. Public law and international conventions contain provisions on this (for example, Art. 4 of the CMR)

\textsuperscript{52} See Article 12 § 2 of the CMR
places. Cargo can for instance be transported by air between two airports and by road to its expected place of delivery, as mentioned in the Airway bill.

All functions mentioned above are the basic and original functions of contract of carriage freight documents. Electronic solutions for (the data included in) these documents have to consider these aspects and specify how these different functions are fulfilled. When setting up specific rules for the acceptance of (data included in) electronic freight documents, authorities must keep in mind that those functions should remain the same.

The transport process does often not coincide with the collection and exchange of data. It may also be the case that details change during transport. Take the example of air transport where a part is completed by road or the actual details mentioned in a waybill have to be changed at the point of acceptance by a carrier (e.g. the actual number of packages is not the same as the number mentioned in a waybill or the weight differs from the original weight provided by a shipper or LSP). These circumstances require changes to waybill data, where these changes have to be agreed by a customer and service provider. Moreover, also an authority or the next leg in a transport chain (i.e. the consignee) needs to trust that these changes have been authorized. Locations, dates and time, and goods items (or the equipment in case of containerized cargo) represent the details of the contract of carriage with a reference to conditions and triggering payment according to agreed charges.

Physical documents have a ‘remarks’ section that can be used for making changes. Electronic documents solutions will need to find ways to cater for this type of requirements. In air transport, in addition to the freight documents, so-called status messages are used to allow for interaction between parties concerning the status of transport and documents. These messages replace the process of phone calls and manual annotations and changes on paper, as electronic documents may be updated through the exchange of status messages that contain the updated data, but also the acknowledgement by both airline and forwarder.

2.2.1.2.2 B2A use

The (contract of carriage) freight transport documents and the other freight documents (see section 2.2.2 below) – as well as the data contained in these documents - are also used for B2A purposes.

Governance and inspection. First of all, the (data of the) freight document is used to comply with governance and inspection purposes. Authorities are allowed to halt a transport means and inspect them (and the required documentation) for certain purposes laid down in legislation. The CMR for road is used in these circumstances, which has to contain additional details for the transport of dangerous cargo. Other modalities like sea, rail, and inland waterways have separate declarations to report to authorities or other businesses for regulatory compliance and insurance purposes. Examples are dangerous goods declarations to infrastructure managers like port authorities and rail infrastructure managers.

Governance and inspection procedures are mode specific, different per law applicable and the mandate of the respective authority, and differently implemented by each Member State. Some data sets are agreed upon per modality or cross-modality (e.g. dangerous goods specifications for road and sea are identical, but the specifications for sea and rail are different). This relates to the different safety regimes of each modality.

In air transport, some activities that could be carried out by government agencies or authorities are delegated to the carrier as a responsibility. For example, dangerous goods acceptance and security
compliance are ensured by the carrier. The carrier will retain their internal inspection documents for verification by authorities, if required.

There are different ways the authorities can - if based on a legal provision- assess the data included in freight documents. The most common ones currently implemented are:

- **Halting and inspection** – a freight document is handed over at inspection to an officer upon request of that officer. This procedure is currently applied in road- and inland waterway transport. A police officer can for instance halt a truck and request the freight documents (and transport documents in general). The document is also required from a cabotage perspective in road transport.

- **Declaration and pre-arrival notice** – authorities receive all relevant data by formal declarations. This procedure is implemented by for instance customs authorities for security, infrastructure managers like port authorities in port areas, authorities responsible for inland waterways, and rail infrastructure managers for safety. Most paper-based declarations are already replaced by electronic solutions.

- **Subscription** – an authority publishes the type of data for which it requires a subscription. Each time a movement meeting this requirement takes place, the authority automatically receives a notification. The notification can contain a link to a document providing additional information required by an authority. There are some examples of the implementation of this procedure, e.g. Dutch Customs Authority is experimenting with the procedure in the context of implementing the so-called data pipeline to improve data quality.

- **Search** – an officer has the ability to search the network of collaborating carriers and LSPs, for instance to investigate dangerous cargo transport in a particular area at a certain point in time. This procedure might be a (future) requirement for infrastructure managers in for instance highly populated (city) areas or infrastructure managers from a safety perspective on for instance roads. There are already initiatives for searches based on position data, for instance the position data of vessels and barges based on AIS.

Authorities put the onus on the carrier to produce the required documentation. In case of electronic documents, this principle remains the same. Provided that the authorities accept electronic documents, it is for the carrier to (re)produce them on a screen or in printed form.

Another way of using a transport document relates to VAT compliance. The document serves as a proof that the goods are actually delivered to the consignee. In case this consignee is in another EU Member State than the shipper, the shipper can proof that the goods are actually delivered to the consignee, where the latter has to pay VAT.

There are some initiatives at a European level for a single window environment. The Proposal for a European Maritime Single Window environment\(^5\) adopted by the European Commission in May 2018 aims to facilitate electronic transmission of information relating to ships arriving and departure from ports in the EU. The new European Commission draft Directive on port reception facilities for

the delivery of waste from ships (2018/0012/EC) also aims at furthering the use of electronic reporting methods.

Due to the fact that intra EU maritime traffic requires vessels to almost always leave the territorial waters of the EU, customs formalities have a much larger impact than in many other transport modes. The digitalisation of customs formalities is a central element of the new Union Customs Code (952/2013) alongside a maximum, harmonised set of data requirements. The implementation of the UCC through its work programme foresees the deployment of extensive national and trans-European IT systems for the fulfilment of customs formalities.

DG TAXUD has also just recently (May 2018) published an Inception Impact Assessment\(^{54}\) aimed at facilitating digital based fulfilment of multiple non-customs formalities and certificate management requirements (veterinary, sanitary, phytosanitary, agricultural, fisheries, environmental, etc.) that are often still encountered by maritime carriers in the form of paper document requirements. The proposed measures consider simplifying customs clearance through automated controls on supporting documents, integrating EU and national certificate databases and offering a single electronic interface for traders.

Also at Member State level, single windows are initiated and used. In France, French Customs launched a national single window to make sure that all administrations which may be involved in an international transport will be connected in order to take away the need for paper documents\(^{55}\). More than 50 different documents or forms are necessary for the customs clearance of goods; 30 of which are known as Public Domain Document (or DOP in French). Those DOP are delivered by at least 15 different administrations according to the national, European or international conventions’ rules and regulations, like CITES for example. The production of those DOP (including the visas and their allocation by custom authorities to each operation) is generating high costs for the international operators. At the same time it compromises the operational capacity of the custom services who are obliged to control 100% of the international flows accompanied by DOP.

With the national single window, the objective is to balance these constraints for global protection with the interests of the international trading companies. As such, the national single window would guarantee a better fluidity of the logistic flows, and therefore participate to the preservation of their competitive capacity.

Thanks to the GUN, companies no longer need to travel to obtain validation of authorizations, licenses or certificates required by 15 public administrations at the time of customs release for goods subject to special regulations (strategic goods, products of animal origin, seeds etc.). The interconnection between customs and public administrations applications allows for complete dematerialization of customs clearance formalities. The interoperability of the information systems will simplify customs’ formalities, and will help businesses save time and optimize their cash flow while securing their procedures.

\(^{54}\) See http://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-2382035

\(^{55}\) Le guichet unique national du dédouanement (GUN), http://www.douane.gouv.fr/articles/a12557-le-guichet-unique-national-du-dedouanement-gun
Other uses of freight documents include other business communication and use for administration and quality of services improvement purposes.

2.2.2 Other documents accompanying the goods during transport

In addition to the freight document evidencing the contract of carriage, there are other documents which need to accompany the goods during transport. These formal documents are produced by enterprises, but need a formal signature of an authority, or a release indication. These documents contain to some extent similar data as included in the contract of carriage freight transport document, potentially completed with other data (e.g. customs value of the goods) and another codification of the goods (e.g. Harmonized Systems code/HS-code for customs declaration).

Depending on the type of goods (e.g. dangerous goods or waste), accompanying freight transport documents are required. In the event of cross-border transport of waste, for instance, the sender is subject to EEC Regulation 1013/2006 on shipments of waste (EVOA). This regulation contains the procedures to be complied with if one wishes to import waste from, export waste to or transport waste through a European Union member state, or if one wishes to export waste to a state outside the EU. Containers also need to be accompanied by documents, for which at this stage the authorities need printed documents on board based on Regulation EEC 1960/1156 57.

Most of the other freight documents are now digitalized in almost every country (especially the transit document), but some countries have not yet integrated all digital procedures. Moreover, as discussed before, the legal framework concerning acceptance of other freight documents by authorities in electronic format is fragmented. Legal provisions do not always allow, but at least not always guarantee, acceptance of other freight documents in an electronic way. As a result, paper documents still remain in force, at least for B2A purposes. However, in this regard it should be noted that there are also (legal) provisions that explicitly allow operators to present documents in electronic format, for instance regulation (EU) 2017/625 on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products58.

The list below includes a non-exhaustive list of freight documents (not including documents evidencing contract of carriage) accompanying the goods during transport:

- Certificate of Insurance: insurance certificates are used to assure the consignee that insurance will cover the loss of or damage to the cargo during transit.

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56 Regulation No 11 concerning the abolition of discrimination in transport rates and conditions, in implementation of Art. 79(3) of the Treaty establishing the European Economic Community.
57 Based on this regulation, which in general applies to all modes, mainly container transports (but not only) are expected to be accompanied by printed documents for control purposes of the cargo.
International commercial invoice: the International Commercial Invoice is an administrative document which contains all the information about the international sale.

Pro-forma Invoice: a pro forma invoice is an invoice prepared by the exporter before shipping the goods, informing the buyer of the goods to be sent, their value, and other key specifications.

Packing List: the Packing List is a more detailed version of the commercial invoice, but without price information.

Delivery note: a Delivery Note is one of the transport documents accompanying the shipment of goods that list the description and quantity of goods delivered.

Export License: an export license is a government document that authorizes the export of specific goods in specific quantities to a particular destination.

Import License: import licenses are the responsibility of the importer and vary depending upon destination and product.

Certificate of origin: the Certificate of Origin (CO) is required by some countries for all or only certain products.

ATA carnets: an ATA Carnet, or “Merchandise Passport”, is a document that facilitates the temporary importation of products into foreign countries by eliminating tariffs and value-added taxes (VAT) or the posting of a security deposit normally required at the time of importation.

Certificate of analysis: a certificate of analysis can be required for seeds, grain, health foods, dietary supplements, fruits and vegetables, and pharmaceutical products.

Certificate of free sale: certificate of free sale may be issued for biologics, food, drugs, medical devices and veterinary medicine.

Dangerous Goods Declaration: exports submitted for handling by air carriers and air freight forwarders classified as dangerous goods need to be accompanied by the Shipper’s Declaration for Dangerous Goods required by the International Air Transport Association (IATA).

Fumigation certificate: the Fumigation Certificate provides evidence of the fumigation of exported goods (especially agricultural products, used clothing, etc.).

Health certificate: for shipment of live animals and animal products (processed foodstuffs, poultry, meat, fish, seafood, dairy products, and eggs and egg products). Note: some countries require that health certificates be notarized or certified by a chamber and legalized by a consulate.

Pre-shipment inspection: the governments of a number of countries have contracts with international inspection companies to verify the quantity, quality, and price of shipments imported into their countries.

Phytosanitary certificate: all shipments of fresh fruits and vegetables, seeds, nuts, flour, rice, grains, lumber, plants, and plant materials require a federal phytosanitary certificate.

Consular invoice: required in some countries, a consular invoice describes the shipment of goods and shows information such as the consignor, consignee, and value of the shipment.
• Dock/Warehouse receipt: a dock receipt and warehouse receipt are used to transfer accountability when the export item is moved by the domestic carrier to the port of embarkation and left with the ship line for export.

• ISPM15 (wood packaging marking): the International Standards for Phytosanitary Measures Guidelines for Regulating Wood Packaging Material in International Trade (ISPM15) is one of several International Standards for Phytosanitary Measures adopted by the International Plant Protection Convention (IPPC)

• Shipper’s letter of instruction: the shipper’s letter of instruction is issued by the exporter to the forwarding agent and includes shipping instructions for air or ocean shipment.

• Transit Custom Document: shipping as yet uncleared goods from third countries and goods that are subject to customs monitoring is usually carried out with T1/T2 customs transit to the designated customs office destinations in Europe for the relevant final customs clearance. These customs transit documents are prepared in the international electronic NCTS system. An accompanying certificate is used here for national customs transit in Switzerland. Alternatively, a TIR Carnet can also be used for customs transit.

• TIR CARNET: goods move from a customs office of departure in one country to a customs office of destination in another country under cover of an internationally accepted customs transit document, the TIR carnet, which also provides a financial guarantee for the payment of the suspended duties and taxes. The guarantee system is managed by an international organisation, which is currently the IRU.

• FIATA FCR (Forwarder Certificate of Receipt): the FIATA FCR document enables the freight forwarder to provide the consignor with a special document as an official acknowledgement that he has assumed responsibility over the goods. By completing the FIATA FCR, the freight forwarder certifies that he is in possession of a specific consignment with irrevocable instructions for despatch to the consignee shown in the document or to keep it at his disposal. These instructions may only be cancelled if the original FIATA FCR document is handed over to the issuing freight forwarder and only if he is in a position to comply with such cancellation or alternation.

• FIATA FCT (Forwarders Certificate of Transport): by issuing a FIATA FCT document to the consignor, the freight forwarder assumes the obligation to deliver the goods at destination through the medium of an agent appointed by him.

• FIATA BL (Bill of Lading): the FIATA Multimodal Transport Bill of Lading (FBL) is a carrier-type transport document set up by FIATA for the use by freight forwarders acting as multimodal transport operators (MTO). The FBL can also be issued as a marine bill of lading. The document is negotiable unless marked “non-negotiable”. It has been deemed by the International Chamber of Commerce (ICC) to be in conformity with the UNCTAD/ICC Rules for Multimodal Transport Documents published by ICC.

2.3 Documents concerning the means of transport

Documents concerning the means of transport reflect the status of a mean of transport and indicate the country of origin where the respective means of transport is approved and registered. This information is required from a safety perspective, for instance, but also to verify compliance with
specific rules for international cargo transport (e.g. cabotage) or security risks related to the country of origin of the transport means (e.g. customs perspective).

The status of a transport mean can be inspected regularly or through spot checks by an authority leading to a formal safety statement of the transport means or fines. For instance, barges and vessels need to be regularly inspected and have a formal document on board, where trucks are inspected both at periodical technical inspections and sporadic roadside checks. Airplanes are inspected on a regular basis by their owner/operator; inspection reports have to be accessible to authorities in case of accidents and airports require statements of inspection to allow arrival and departure of airplanes.

Details are provided below for some of these documents, for road, rail and inland waterways transport.

2.3.1 Road transport

Before a vehicle (truck and/or trailer) can be put into service, it has to be type-approved in accordance with Directive 2007/46/EC (Framework Directive)\(^59\). Type approval describes the process applied by national authorities to certify that a model of a vehicle meets all EU safety, environmental and conformity of production requirements before authorising it to be placed on the EU market. The manufacturer makes available pre-production vehicles that are equal to the final product. These prototypes are used to test compliance with EU safety rules (installation of lights, braking performance, stability control, crash tests with dummies), noise and emissions limits as well as production requirements (of individual parts and components, such as seats or steering wheel airbags etc.). If all relevant requirements are met, the national authority delivers an EU vehicle type approval to the manufacturer authorising the sale of the vehicle type in the EU. The system is based on the mutual recognition of approvals granted by Member States (certified once, accepted everywhere in the EU).

Every individual vehicle produced is then accompanied by a certificate of conformity, in which the manufacturer certifies that the vehicle corresponds to the approved type. On the basis of this document, the vehicle can be registered anywhere in Europe. In some cases (most common for trucks, trailers and bus/coach) registration requires a final technical inspection, in the member state where the vehicle has to be put in to service, before registration. When approved, a vehicle Registration Certificate, in accordance with Directive 1999/37/EC, is issued. Additionally, in the majority of EU member states, the vehicle obtains a registration number/plate for identification purposes, in accordance with Council Regulation (EC) No 2411/98 (not mandatory).

The Vehicle Registration Certificate is an official document providing proof of the registration of a vehicle. It is issued primarily by governmental organisations as a proof of the registration. It is the primary document to identify a vehicle in international traffic by enforcement bodies and other authorities (e.g. at roadside checks). Its purpose is also to facilitate the change of ownership in cross-border purchase and re-registration cases.

If a vehicle is to be used for transport of certain special types of goods (e.g. dangerous goods, food stock, livestock/animals, abnormal transports, wide load or heavy load etc.), it requires approval of

\(^{59}\) Data requirements for the EU Certificate of Conformity Directive 2007/46/EC (Framework Directive) and other documents accompanying vehicles for road transport are mapped in the inventory in Annex B.
fulfilling specific relevant specifications and needed equipment. The requirements and their certification are specified in various directives, regulations etc., such as:

- ATP - Certificate of Compliance of equipment (Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be used for such Carriage (UN))

All heavy goods vehicles, busses and coaches are obliged to undergo periodic technical inspection to certify the compliance to safety-, environmental- and technical standards and their roadworthiness in general (Directive 2014/45/EU on periodic roadworthiness tests for motor vehicles and their trailers (EU)).

A roadworthiness certificate should be issued after each test. This should include, inter alia, information concerning the identity of the vehicle and the results of the test. The test results should be made available electronically to the inspector of the next test. With a view to ensuring a proper follow-up of roadworthiness tests, Member States can collect and retain such information in a database (although this is not an obligation), in particular for the purposes of analysis of the results of the periodic roadworthiness tests (Directive 2014/45/EU). Several member states require that a Roadworthiness Certificate is carried along the transport for roadside inspection purposes (Roadworthiness Certificate (Periodic Technical Inspection)).

The findings of Team 3, as a result of the surveys done by DTLF, and research and interviews with authorities, have shown that the data contained in the documents listed above are already stored in different national databases (whether it is the case in all Member States is to be verified). That means they are digitalised today, but only accessible via individual, mostly national access points and often not with tools that are at hand at the roadside. Due to regulations set out in relevant directives, regulations, et cetera, paper or card versions are still mandatory when carrying out transport.

### 2.3.2 Rail transport

After a rail vehicle (locomotives or wagons) has received the authorisation to be placed on the market in accordance with Interoperability Directive (EU) 2016/797\(^6\), and before it is used for the first time, it has to be registered in the National Vehicle Register at the request of the keeper. All Member States operate such a national and fully digitalised Vehicle Register. A European Vehicle Number is allocated to any railway vehicle running in Europe. It allows tracing of vehicles and enables responsible national safety authorities to receive the information necessary for their supervision.

\(^6\) Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union
Train operators have to carry information regarding the rail vehicles in printed (paper) format while driving. Also the information exchange between railway undertakings and national safety authorities and other B2A communication is still based on physical (paper-based) flows.

### 2.3.3 Air

In air transport, multiple documents are needed concerning the means of transport. In accordance with the Chicago Convention, all civil aircrafts must be registered by the Civil Aviation Authority in a certain country. All registered aircrafts get a unique alphanumeric string for identification purposes. This identification string also includes the country of registration of an aircraft. When operating an aircraft, several documents are required, such as the Certificate of Airworthiness and the Certificate of Registration. These are issued on paper by the Civil Aviation Authority in the country where the aircraft is registered.

Any situation that would render these documents invalid would be centrally reported. Although the pilot will have access to these documents when required, there is considered to be no need for a DTLF process to strive for electronic versions of and associated processes for these documents.

### 2.3.4 Inland waterways transport

Inland waterway vessels need to fulfil the criteria of the Directive (EU) 2016/1629 of the European Parliament and of the Council of 14 September 2016 laying down technical requirements for inland waterway vessels, amending Directive 2009/100/EC and repealing Directive 2006/87/EC, with regard to safety. As referred to in this Directive, the vessels are certified by the national authorities. As proof of certification, a physical (paper) Vessel Certificate is issued, which has to be carried by the vessel operator.

### 2.4 Documents concerning the personnel

Documents concerning the personnel contain information on the qualifications (safety perspective) and nationality (movement of persons perspective) of the personnel operating a means of transport and/or the personnel handling the cargo. Qualifications are based on formalities laid down in rules and legislation that can be inspected by authorities. Qualifications might require regular operations of personnel according these rules and legislations (e.g. minimal number of flying hours per year for a pilot qualification, or maximum hours for operating a transport means with rest times). In road and air transport, these requirements are implemented by digital solutions. Passports or other formal documents like visa\textsuperscript{61} have to prove that a person is allowed to work for an employer and is able to enter or leave a particular country. Mostly, an individual has a document issued by an authority that may have to be renewed regularly (e.g. a passport) and one or more of his employers can prove that the qualification is still applicable.

Details are provided below for some of these documents, for road, rail and inland waterway transport. Due to the specificities of air and maritime transport with regards to documents

\textsuperscript{61} It should be noted that a wide range of documents (information) has to be provided to authorities to proof regulatory compliance. Documents like passports and visa are presented here for the sake of completeness, but DTLF is by no means looking into and/or considering recommendations in this area.
concerning the personal and/or the fact that such topics have been addressed in other research (Reporting Formalities Directive revisions), these two modes are not elaborated in the sub-sections below.

2.4.1 Road transport

A driver has to be qualified for driving the type of vehicle/vehicle combination used for the transport. When driving, the driver has to carry along:

- A Drivers Licence, qualifying for the actual vehicle/vehicle combination, issued according to Council and Parliament Directive 2006/126/EC on driving licences, with relevant amendments;
- A Driver Qualification Card according to Council and Parliament Directive 2003/59/EC on the initial qualification and periodic training of drivers of certain road vehicles for the carriage of goods or passengers, with relevant amendments;
- A Driver Card (Tachograph Card) according to Council Regulation No 2135/98 (EC) amending Regulation (EEC) No 3821/85 on recording equipment in road transport.

For the carriage of special types of goods (e.g. dangerous goods, livestock/animals, etc.), additional education is required. The driver then has to hold specific certificates proving that he/she is allowed to carry the actual type of goods on board the vehicle or vehicle combination. The educational requirements and their certification is specified in legislation, such as:

- Certificate of Professional Competence in Road Haulage/Passenger Transport (operator licence) is to be carried along in general (Council Regulation No 1071/2009 (EC) or Council Regulation No 1/2005 (EC) on the protection of animals during transport and related operations, article 17(2));
- ADR - Certificate of approval for vehicles carrying certain dangerous goods (ADR Convention chapters 8.2 and 9.1.3 (UN)).

The findings of Team 3, as a result of the surveys done by DTLF, the research performed and interviews held with authorities, indicate that the data contained in the certificates and licences listed above are already stored in different national databases. That means they are today digitalised but only accessible via individual, mostly national access points and often not with tools that are at hand at the roadside. Due to regulations set out legislation, paper or card versions are still mandatory when carrying out transport.

2.4.2 Rail transport


The EU certification scheme is composed of two parts: one licence, issued by national competent authorities and containing information about medical/psychological fitness and general professional competence; one or more complementary certificates issued by the railway undertakings or infrastructure managers and certifying the driver’s language knowledge and more specific professional competence, i.e. knowledge of specific infrastructure and rolling stock. These (physical) licence and certificates should be taken by the train driver during operation.
Implementing Commission Regulation (EU) No 36/2010 of 3 December 2009 defines “community models for train driving licenses, complementary certificates, certified copies of complementary certificates and application forms for train driving licenses”.

2.4.3 Inland Waterway Transport

3 Digitalisation: state of play

3.1 Documents related to goods

This section presents the outcome of surveys carried out in the context of the activities of the sub-group 1. The survey outcomes are followed by an overview of available electronic documents solutions.

3.1.1 Use and barriers to use of electronic freight documents

Responses to a survey launched in the context of the work of Team 1 of sub-group 1 provide useful insight into the use of electronic freight documents, for each mode, within the EU.

The survey covered all documents that contain information related to the cargo which need to be transferred between the actors and/or shown to the public authorities for inspection along the transport and logistics chain. This therefore includes the two following types of documents:

- Documents which are used as evidence of contractual relationship between shipper and carrier and which are covered by respective international conventions (for instance CMR, CIM/SMGS consignment notes, air waybill, bill of loading)
- Other documents accompanying the goods as evidence of ownership, certificates of origin, phytosanitary certificates, dangerous goods certificates and the like

In line with the definition used before (section 2.2), the text below will refer to this combined set of documents as "freight (transport) documents" (or: documents concerning the goods). As the survey concentrated on the use of freight documents in electronic format, also "electronic freight (transport) documents" (or: e-fTD) is used.

The survey gathered replies from 106 respondents in 18 Member States. Germany, France and Spain are the most represented countries, with 19, 11 and 11 replies respectively. Forwarders and logistic service providers are the most represented type of organisation with 26% of replies to the survey. Shippers and consignees come second, with 18% of replies. It should also be noted that 21% of replies fall into the ‘Other’ category62. A wide majority of respondents (58%) represent organisations with international or cross-border operations63, while 26% operate both at national and international or cross-border level. Regarding their expertise in terms of transport-mode, 24% focuses on road, 20% on multimodal and 19% on maritime transport.

Responses received to the questionnaire reveal that electronic freight transport documents are most used for cross-border operations in air transport, with 50% of the respondents mentioning they use electronic freight transport document (e-fTD) in cross-border operations, followed by maritime transport. Inland waterways and road transport appear to be transport modes in which electronic documents are less used, based on responses received to the survey (figure 2).

62 The ‘other’ category includes: Public Body, Member State, Consultants, Inland waterway manager, Cargo Handling Agent for Airlines, Consignor, Truck and railcar loading facility, Producer, Research Institute, Non-governmental organisation, Customs Broker / Customs Software, Port Authority, Telematics solution provider.

63 Please note that for the purposes of this survey, by international/cross-border transport is primarily understood a transport operation that crosses at least one border between the EU Member States.
For those that do not currently use electronic freight transport documents, reasons are predominantly related to general uptake (clients/business partners not using e-fTD), but also to the acceptance of such electronic documents by authorities. The table below provides an overview of the top 5 reasons for not using electronic freight transport documents (per transport mode), selected by the survey respondents.

<table>
<thead>
<tr>
<th>Road</th>
<th>Rail</th>
<th>Air</th>
<th>Maritime</th>
<th>Inland waterways</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-fTD are not accepted by the relevant authorities in other EU countries</td>
<td>I prefer paper</td>
<td>My clients/business partners do not use e-fTD</td>
<td>My clients/business partners do not use e-fTD</td>
<td>My clients/business partners do not use e-fTD</td>
</tr>
<tr>
<td>e-fTD are not accepted by the relevant authorities in my country</td>
<td>e-fTD are not accepted by the relevant authorities in other EU countries</td>
<td>My clients/business partners have different e-fTD solutions</td>
<td>e-fTD are not accepted by the banks and insurance companies with which I work</td>
<td>I consider that the benefits of using e-fTD are still too low compared to the investment in the needed IT solution(s)</td>
</tr>
<tr>
<td>My clients/business partners do not use e-fTD</td>
<td>e-fTD are not accepted by the relevant authorities in my country</td>
<td>I consider that the benefits of using e-fTD are still too low compared to the investment in the needed IT solution(s)</td>
<td>There are no e-fTD solutions available in my country</td>
<td>I’m not issuing any transport document</td>
</tr>
<tr>
<td>I am not aware of the existence/use of e-fTD solutions</td>
<td>I cannot afford the costs of the technical support (hardware and software) for an e-fTD solution</td>
<td>I am not aware of the existence/use of e-fTD solutions</td>
<td>e-fTD are not accepted by the relevant authorities in other EU countries</td>
<td>e-fTD are not accepted by the banks and insurance companies with which I work</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in my country</td>
<td>There are no e-fTD solutions available in my country</td>
<td>e-fTD are not accepted by the relevant authorities in other EU countries</td>
<td>e-fTD are not accepted by the relevant authorities in my country</td>
<td>e-fTD are not accepted by courts and in procedures in front of courts in other EU countries</td>
</tr>
</tbody>
</table>

While the main reasons for not using electronic freight transport documents vary, there is a consensus across all modes of transport that it is necessary to move towards a digital, paperless freight transport environment. For those respondents already using electronic freight transport documents, this has already brought numerous benefits, with improved (paperless) administrative
processes being the most cited benefits across all modes of transport. Less paperwork and faster administration of affairs is the most cited benefit of e-FTD according to the overall respondents of the survey (cited 29 times as a significant benefit). Respondents believe that fewer benefits will be gained in the area of settlement of insurance issues (figure 3).

Figure 3 - Benefits experienced by users of e-FTD instead of paper documents in current business. (SG1 T1 survey)

When looking into benefits experienced per type of stakeholder, it is apparent that both associations and shipper/consignees are most positive about the reduced paperwork and faster administration of affairs and minimised archival requirements. Carriers experience most benefits in terms of reduced paperwork and operational times as well as higher data quality and data reuse possibilities. Forwarders and logistics service providers are most positive about reduced paperwork and operational times as well as possibilities of reusing data.

The use of electronic freight transport documents is expected to bring more benefits. In general, expected benefits from the use of electronic freight transport documents range from process improvements to cost savings. According to the overall respondents of the survey, simplified business processes is the most important benefit (cited 33 times) of e-FTD becoming the main means of communicating information during transport operation. Respondents believe that fewer benefits will be gained in the area of implementation of cabotage rules (figure 4).
In particular, from the respondents’ point of view, current barriers to the acceptance and use of electronic freight transport documents are predominantly legal and regulatory (46%), procedural and organisational (35%) as well as security and technical/technological related (33 and 32% respectively). The least mentioned issue by the respondents is interest of business and stakeholders (figure 5).

Survey participants see an important role for intervention at EU level to facilitate and ensure acceptance of electronic freight transport documents by Member States’ authorities, courts and more widespread by all transport and logistics companies (figure 6). The adoption of measures to ensure harmonisation of data requirements for solutions accepted by Member States as well as the adoption of measures to ensure trust, confidentiality and data security between different solutions is considered most needed.
3.1.2 Current solutions for electronic freight documents

An overview of current solutions for the electronic exchange of freight transport documents (waybills) is provided below.

### 3.1.2.1 Road

Following the signing of the e-CMR Protocol in 2008, different commercial systems/solutions that can create an e-CMR are currently in development or already available on the market. Moreover, UN/CEFACT and IRU carried out a project that was aimed at standardising and harmonising the electronic consignment note message to be exchanged between carrier, shipper and receiver of the goods. They have published a standard for e-CMR that is based on a core component library of definitions that is also used for the World Customs Organization (WCO), e-Certificates, e-TIR and EU Customs data models.

The currently available commercial solutions comply with or are in the process of confirming full compliance with the applicable e-CMR additional Protocol. Some of the available systems provide a full interoperable solution by integrating the electronic consignment note with the main onboard computer solutions or Transportation Management Systems (TMS). But also small and medium size enterprises which may not have such an onboard system could benefit from the use of electronic consignment notes, as some systems provide a standalone solution that can be used independent of other (onboard) solutions.

### 3.1.2.2 Rail

Apart from physical paper consignment notes, the Electronic Consignment Note (ECN) as defined by the International Railway Committee (CIT) can be used for the transportation of goods by rail.
RAILDATA, the international organisation of European cargo Railway Undertakings, developed ORFEUS (Open Rail Freight EDI User System), which ensures the exchange of CIM consignment notes data between the co-operating railway undertakings.

3.1.2.3 Air

The International Air Transport Association (IATA) adopted the industry-wide “e-AWB” initiative to describe the interchange of electronic data (EDI) message and to replace the paper AWB. The e-AWB initiative is part of a broader e-freight initiative. More recently, based on the foundations of the e-freight initiative, IATA launched its "One Record" initiative, eventually aiming for an end-to-end digital logistics and transport supply chain where data is transparently and easily exchanged in a digital ecosystem of air cargo stakeholders, communities and data platforms.

This aim includes much more than just the introduction of the e-AWB. In addition to the e-AWB, the following air cargo transport accompanying documents are already digitalised and supported by XML standards and accepted under the Montreal Convention:

- Air waybill
- Flight manifest
- House waybill
- House manifest
- Freight booked list
- Customs status notification
- Shippers declaration for dangerous goods
- Invoice
- Packing list
- Certificate of origin
- Shipper’s letter of instruction

The penetration of usage of the electronic version of these documents varies. The most used is the electronic air waybill which is used for 51% of all shipments.

3.1.2.4 Maritime

As briefly mentioned in chapter 2 of this report, the European Commission recently (May 2018) adopted a proposal for a European Maritime Single Window environment that aims to facilitate electronic transmission of information relating to ships arriving and departure from ports in the EU. To do so, it seeks to establish a framework for a harmonised and interoperable European Maritime Single Window environment (EMSWe) through the creation of common datasets and databases based on international and EU reporting obligations.

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64 Established as special group of the International Union of Railways (UIC)
3.1.2.5  Inland waterways
IVR has elaborated a model of an electronic CMNI transport document.

3.1.2.6  Multimodal
There are also multimodal transport data/information sharing platforms such as Port- and Airport Cargo Community Systems.

3.2  Documents related to the means of transport
An overview of the use of the different documents concerning the means of transport in digital format, along with some existing solutions, is provided below.

Due to the specificities of air transport with regards to documents concerning the means of transport, air transport will not be covered in the below. Indeed, documents related to aircrafts are typically centrally registered with the appropriate government agency, such as the Civil Aviation Authority. Any situation that would render these documents invalid would be centrally reported. There is no need for a DTLF process for electronic versions and associated processes for these documents (see above, section 2.3).

3.2.1  Road
The DTLF Team 3 Online Survey (hereafter ‘the survey’) gathered replies from 29 respondents in 12 Member States. Germany, Bulgaria and Spain are the most represented countries, with five, four and four replies respectively. Forwarders and logistic service providers are the most represented type of organisation with 24% of replies to the survey. Fleet owners and managers come second, with 17% of replies. It should also be noted that 21% of replies fall into the ‘Other’ category.

Results of the survey suggest that in many Member States, Vehicle Registration Certificates (VRCs) are stored digitally in a centralised national database (59% of positive replies), to which mainly police (cited 16 times), administrations (cited 10 times) and roadside inspectors (cited 9 times) seem to have access.

Figure 7 – Need to move towards digital storage, management and access of vehicle data, certification, documentation of approval, and the like (SG1 T3 survey)

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65 The ‘other’ category includes: Member State, port authority, research institute, telematics service provider and transport consultant.
Despite the seemingly broad use of digital storage, it appears from the survey that national legislations still make it mandatory to carry a hardcopy of the VRC (in the form of a paper or smartcard) on board the vehicle when driving\(^66\). The survey results also suggest that there is a need to move towards digital storage, management and access of vehicle data, certification and documentation of approval (62% of positive replies; figure 7). This feeling appears to be the strongest for freight forwarders and logistics service providers: 86% of them replied positively to the question. Associations, authority representatives and carriers followed, with 67% of each category replying positively to the question too. The two respondents who felt paper works well enough include an authority representative (roadside inspector, police, etc.) from Bulgaria.

On-line access, in the respondents’ experience, leads to simplified processes (including reduced administrative burden) as well as rapid access to information and reduced operational time. Besides these benefits, cost reduction, including decreasing administrative costs, is regarded as another important benefit of online data accessibility. The table below includes the top three replies among respondents, per type of organization:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Association</th>
<th>Authority representative</th>
<th>Carrier</th>
<th>Fleet owner</th>
<th>Forwarder, Logistic Service Provider</th>
<th>Shipper, Consignee</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Association</td>
<td>Cost reduction, including administrative costs</td>
<td>Simplified processes, including reduced administrative burden</td>
<td>Cost reduction, including administrative costs</td>
<td>Cost reduction, including administrative costs</td>
<td>Rapid access to information, reduced operational time</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>Simplified processes, including reduced administrative burden</td>
<td>Rapid access to information, reduced operational time</td>
<td>Simplified processes, including reduced administrative burden</td>
<td>Simplified processes, including reduced administrative burden</td>
<td>Cost reduction, including administrative costs</td>
<td>N/A</td>
<td>Cost reduction, including administrative costs</td>
</tr>
<tr>
<td>3</td>
<td>Rapid access to information, reduced operational time</td>
<td>Increased quality, accuracy and reliability of data</td>
<td>Rapid access to information, reduced operational time</td>
<td>Rapid access to information, reduced operational time</td>
<td>Simplified processes, including reduced administrative burden</td>
<td>N/A</td>
<td>Simplified processes, including reduced administrative burden</td>
</tr>
</tbody>
</table>

It has to be noted that many respondents are currently not aware of how to access information when stored digitally (41% overall). This is especially the case for respondents representing carriers (67% of them), forwarders and logistics service providers (57% of them) and fleet owners (40% of them), some of them who also felt it is necessary to move towards digital storage of vehicle data, as mentioned above.

More than half of the respondents believe that centralization of access into one “one single data entry point”\(^67\) is either absolutely needed or very important. All authority representatives who participated in the survey replied positively, and 67% of both association and carrier representatives

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\(^{66}\) This obligation is set out by Article 35 (1)a of the Vienna Convention on Road Traffic.

\(^{67}\) Establishment of a “one single data entry point” or “national single window”; single access points for all national authorities that need to have access to data contained in vehicle registration and certification-related documents (for instance fiscal authorities for VAT calculation/payment).
confirmed that this is important as well. Only 20% of the respondents representing fleet owners, and 57% of the forwarder and logistic services providers, thought centralisation of access is a necessity.

Overall, the respondents participating in the survey suggest that the most important benefits of digitalised vehicle-related data are related to faster inspection of documents by enforcement authorities and to increased efficiency of operations at access checks. The table below highlights the ranking of most important benefit areas expected by each type of respondent:

**Table 6 – Benefits areas of digital storage, management and access of vehicle data (SG1 T3 survey)**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Authority representative</th>
<th>Carrier</th>
<th>Fleet owner</th>
<th>Forwarder, Logistic Service Provider</th>
<th>Shipper, Consignee</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Faster inspection of documents by enforcement authorities</td>
<td>Increased efficiency of operations at access checks</td>
<td>Simplified communication with administration authorities</td>
<td>Reduced cost, including administrative costs</td>
<td>Faster inspection of documents by enforcement authorities</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>Simplified communication with administration authorities</td>
<td>Faster inspection of documents by enforcement authorities</td>
<td>Reduced cost, including administrative costs</td>
<td>Faster inspection of documents by enforcement authorities</td>
<td>Simplified communication with administration authorities</td>
<td>N/A</td>
</tr>
<tr>
<td>3</td>
<td>Reduced cost, including administrative costs</td>
<td>Simplified communication with administration authorities</td>
<td>Faster inspection of documents by enforcement authorities</td>
<td>Increased efficiency of operations at access checks</td>
<td>Increased efficiency of operations at access checks</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Finally, the survey results show that mainly legal and regulatory barriers are considered to be currently hindering the achievement of the identified benefits (figure 8). These barriers are notably:

- Different national regulations;
- The lack of appropriate national-based legislative framework;
- The non-application of existing legislative framework at national level.

Legal and regulatory barriers are underlined by respondents of the ‘Other’ category (83% of them), the forwarders and logistic services providers (71% of them) as well as associations and authorities (67% of respondents of both categories).

Similarly, but to a lesser extent, procedural and organisational barriers are believed to limit the acceptance and therefore, the use of digital vehicle documentation data. The fact that EU or third countries' national authorities still request a paper copy for verification purposes (as discussed above) is regarded as the main issue in that respect.

Procedural and organisational barriers are especially pointed out by authorities (100% of them), respondents falling into the ‘Other’ category (83% of them) and the forwarders and logistic service providers (57% of them).
An example of a digital solution for the exchange of information on vehicles and drivers is the European Car and Driving License Information System (EUCARIS). This is a European information exchange mechanism, based on decentral cooperation between registration authorities in Europe. Regarding drivers licenses, EUCARIS is connected to RESPER (a telematic network to be established across the EU). EUCARIS was initially an initiative of five EU vehicle registration authorities to prevent fraud on vehicles and driving license. The cooperation is currently much broader and includes authorities from all Member States, following the EU Directive on cross-border exchange of information on road safety related traffic offense (‘Cross-Border Enforcement Directive’).

The legal basis for the EUCARIS system is the EUCARIS Treaty about the exchange of vehicle and driving license information. Since then further applications for the exchange of different type of data have been developed, which are based on European legislation, and international and bilateral agreements.

eCall is a recent project of EUCARIS, ensuring cross-border exchanges of information in emergency calls for accidents. Automatic emergency messages can be triggered by the VIN (Vehicle Registration Number). New topic within eCall: data for commercial vehicles, especially for dangerous goods, for which data availability is through the freight registers in NCP. The IRU is piloting an eCall on dangerous goods and livestock with EUCARIS.

3.2.2 Rail

Digitalisation in the field of means of transport for the railway sector, including the needs regarding cross-border information exchange on railway vehicles, is fully covered by the Interoperability Directive (EU) 2016/797 (under the 4th Railway Package). Part of the Interoperability Directive is the European Vehicle Register. The current centralised National Vehicle Registers operated by authorities in all EU Member States contain information on for example the Member State where the vehicles

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Figure 8 – Issues currently limiting the acceptance and hindering the use of digital instead of paper vehicle documentation data (SG1 T3 survey)
were originally registered, the Member State where the vehicles are authorised and details on the owner and keeper of the vehicles. As from 16 June 2021, all National Vehicle Registers will be grouped into the centralised European Vehicle Register, under the responsibility of the European Railway Agency. The European Vehicle Register will contain the following information items for each railway vehicle:

- Unique Vehicle Identification Number
- Member State of Registration
- Member States where the vehicle is authorised
- Manufacturing
- References to EC Declarations of verification
- EC declaration of verification issuing body (the applicant)
- Owner
- Keeper
- ECM
- Registration status
- Authorisations for placing on the market
- Conditions for use of the vehicle and other restrictions on how the vehicle may be used

Both the (current) National Vehicle Registers and the (future) European Vehicle Register are fully digitalised. Moreover, as of January 2016, all National Vehicle Registers are connected to the fully digitalised European Centralised Virtual Vehicle Register (ECVVR). Also the European Register of Authorised Types of Vehicles (ERATV), the Vehicle Keeper Marking Register (VKMR) and Certified ECMs (Entity in Charge of Maintenance) are digitalised, but these are not yet fully linked to each other. Synergies with the European Vehicle Register (EVR) described in the 4th Railway Package will be taken in account to elaborate a solution.

3.2.3 Maritime

The previously introduced European Maritime Single Window proposal, which aims to facilitate electronic transmission of information relating to ships arrival and departure from ports in the EU, will also cover electronic reporting of information concerning the vessel. Relevant data elements based on international and EU reporting obligations, will be part of the common datasets and databases.

Work is also being carried out in the context of the Once-Only Principle Project (TOOP) on digital ship and crew certificates, following the once-only principle. In 2017, the European Commission launched the Once-Only Principe Project (TOOP) which is set to explore and demonstrate the once-only principle across borders. This eventually has to improve the exchange of business related data or documents with and between public administrations. One of the TOOP pilot projects is on "Online Ship and Crew Certificates". These certificates are currently issues and maintained in paper format and stored by national Maritime Administrations.
As can be found on the TOOP project website, one of the goals is to connect the individual databases of national Maritime Authorities and to make relevant information available to authorised parties (e.g. port authorities and police and border control officers). The deliverables of the TOOP project are available online\(^6\). Work to establish a global framework for electronic ship certificates is also underway at the International Maritime Organisation under the auspices of the IMO FAL Convention Committee.

### 3.2.4 Inland waterway

Information on all certified inland waterway vessels is centrally kept in the European Hull Database (EHDB), which facilitates electronic data storage and exchange of vessel information between authorised authorities and Member States. The EHDB includes the following information items:

- Name and unique vessel ID
- Name and address owner
- And a set of additional characteristics of the vessel
- Main characteristics of the vessel
- Area of sailing

RIS (River Information Services)\(^7\) is used to electronically share information on dangerous goods with authorities and parties involved in the chain. RIS also supports other uses of electronic cross-border information exchange or at least is intended to do so.

Furthermore, the European Commission launched the Digital Inland Waterways Activity (DINA) initiative in 2015 with the objective to digitalise information flows on infrastructure, people, operations, fleet and cargo in the inland waterway transport sector and to allow seamless integration of inland waterway transport in multimodal transport chains by connecting this information with other transport modes\(^8\). Currently several digital tools exist or are being developed to support these information flows.

### 3.3 Documents related to the personnel

An overview of the digital solutions that are currently being used to exchange information on the personnel operating the means of transport is provided below.

#### 3.3.1 Road

As explained in detail in section 3.2.1 above, an example of a digital solution for the exchange of information on vehicles and drivers is the European Car and Driving License Information System (EUCARIS).

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\(^6\) See [http://www.toop.eu/deliverables](http://www.toop.eu/deliverables)


\(^8\) European Commission, Digital Inland Waterway Area: Towards a Digital Inland Waterway Area and Digital Multimodal Nodes, October 2017.
3.3.2 Rail

In the rail sector, the Train Drivers Directive 2007/59/EC of 23 October 2007 mandates that the following electronic registers have to be established:

- National Registers of Train Driving Licenses. These registers are kept by the national competent authorities.
- Register of Complementary Certificates. These registers are kept by railway undertakings and infrastructure managers.

The European Commission adopted basic parameters for the above-mentioned registers, via its Decision 2010/17/EC of 29 October 2009. For both categories of register, the Commission Decision defines the data to be collected, their format, access rights of different authorities, criteria for data exchange, and data retention limits.

It is important to note that the Directive is currently subject to a thorough evaluation process by DG MOVE, which shall lead to a revision of the Directive. DG MOVE is expected to publish the result of the evaluation and outline of the revision in the coming months. The EU Agency for Railways (ERA) contributed to the evaluation process via a task force comprising sector stakeholders. Notably, the task force considered in its final report (ref: ERA/ADV/2014-17) that, among other aspects, the layout of the complementary certificate should be subject to revision, also with a view to its digitisation.

3.3.3 Maritime

The TOOP pilot project on ship and crew certificates, as introduced in section 3.2.3, is an example of a potential solution that contributes to the electronic exchange of information on the personnel operating on maritime vessels.

Moreover, the European Maritime Single Window should be mentioned here again, as the proposal will also cover electronic reporting of information concerning the personnel.

3.3.4 Inland waterway

Directive (EU) 2017/2392 on the recognition of professional qualifications in inland navigation foresees that each Member State will keep electronic registers for all Union (and recognised equivalent) certificates of qualification, service record books (SRBs) and logbooks (LBKs) issued under their authority. Moreover, the directive provides that Member States’ authorities shall record reliably and without delay in a database maintained by the Commission data related to the certificates of qualifications, service record books and logbooks.

In line with the European Hull Database that was mentioned in section 3.2.4, a central registry for the professional qualifications of all EU crew members is foreseen. This European Crew Qualifications Database (ECQD) will not only support the implementation, enforcement and evaluation of Directive (EU) 2017/2392, but it will also allow for the exchange of information between Member States’

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72 European Commission (Joint Research Council (JRC), e-IWT Digital tools for IWT e-Governance, Working Draft, July 2017
authorities, thereby easing the navigation on inland waterways and consequently improving the safety.

The national electronic registers to be kept by Member States should include, at minimum:

- All data appearing on the Union certificates and the issuing authority;
- For SRBs specifically, the SRB identification number, the name of the holder, date of issuance and the issuing authority;
- For LBKs in particular, the European Vessel Identification Number (ENI number), the name of the craft, the LBK identification number, date of issuance and the issuing authority.

4 Looking forward: digital blueprints

The previous section presented an analysis of the state of play of digitalisation of (information included in) transport documents for different modalities. This section analyses how an infrastructure for sharing (access to) data of transport documents can operate, both for the private and the public sector. In this respect, the term ‘eTransport Document’ is data of any document accompanying transport, not necessarily only data of a document like an eCMR for road, electronic Bill of Lading (eB/L) for sea, e-AWB for air and ECN (Electronic Consignment Note) for railways. The generalisation is based on the assumption that documents are carriers of data, while IT systems that store this data are able to produce various types of documents.

The focus of this section is on documents accompanying goods. Firstly, this section elaborates the data aspect of eTransport Documents. Secondly, relevant shortcomings for implementation of standards are presented. Annex E to this document provides an overview of relevant standards and standardisation bodies. Thirdly, the means to represent documents are analysed and finally different ways for authorities to access data are presented.

4.1 Documents versus data

A document that accompanies transport (or any other logistics operation) is a carrier of data. There are different types of documents required, each from their own perspective, that partly contain the same data.

Instead of an electronic document approach, which is considered too rigid, a data centric approach (to allow defining “data sets”) and business process driven artefacts is considered highly desirable and will thus be taken.

It appears that the “electronic document” is becoming outdated and old-fashioned in view of the rapidly evolving technologies and the need for flexibility, interoperability, portability and availability of accurate and up-to-date data at any time and any point in the international supply chain. Electronic documents must respond to and fulfil the needs of international and European businesses alike, in light of increased coherence and harmonization between global and European business spheres, but also for security purposes, legal acceptance as well as other potential benefits.

In other words, the digital business should apply innovative solutions and provide openness today and for the future. Instead of an electronic document approach, which is considered too rigid, a data centric approach (to allow defining “data sets”) will be followed. In this respect, many open (and defacto) standards have been developed by for instance UN/CEFACT and the World Customs
Organization (WCO). Standards and technology will support the sharing of data of various documents in an open way, allowing all relevant stakeholders to utilise a solution of their choice. This will be discussed in further detail in this section. Additionally, new technology like blockchain is introduced to support for instance the sharing of data included in:

- **Permits** required for performing particular logistics operations.
- **Certificates** confirming that the state of a transport means or any other asset used during transportation is according to prescribed rules and directives.
- **Qualification certificates** of personnel operating a transport means, e.g. a truck driver.
- **Transport related documents** representing logistics movements. These documents describe the cargo on-board and their pickup and drop off locations.

It should be noted that there may be additional documents required for transportation. Examples of other documents concerning the goods, vehicles and personnel were presented in chapter 2 of this report. Annexes A, B and C elaborate on the variety of transport documents in much more detail. Permits, inspection reports and qualifications of personnel are issued by national authorities or recognized bodies. Transport related documents are issued by for instance a carrier (or his agent) or a shipper (or a forwarder acting as his agent).

Data of the cargo and the conditions of transport are shared between a customer (like a shipper or consignee) and his service provider (like a carrier). A shipper may have a framework contract with a carrier stating the conditions; transport orders or shipping instructions are used to share relevant cargo data and parties involved in a particular shipment. In most cases, this data is stored in internal IT systems of either the shipper or the carrier, or both. These IT systems produce the relevant transport documents triggered by a status in the process. Transport Management Systems (TMS) and Manifest systems are examples of such IT systems. The Statistics office in the Netherlands already collects trip data from TMS.

Not all companies, especially not all SMEs, will have an IT back office system like a TMS. In those cases, a shipper will store the relevant data for production of a consignment note. In case of parcel distribution networks, shippers have to provide or upload data of a shipment that is stored in the IT back office system of a parcel carrier. The information stored in these IT systems is used to produce all types of documents and complete formal procedures of authorities. These data formats are formulated by the authority requiring the data, for instance customs or food inspection authority, and might differ from the data formats utilized by enterprises. There will be overlap in data sets, but semantics may differ, although data elements have the same name.

The data on the goods movement can be re-used and complemented to produce different documents and support various formalities, such as customs declarations and certificates of origin. The data formats required by procedures are formulated by the authority requiring the data, for e.g. customs or food inspection authority, and might differ from the data formats utilized by enterprises. Transport data re-use by customs can be complex, since customs utilizes a specific coding system for goods, the Harmonised Systems code (HS-code). Data re-use stems from the United Nations Lay-out Key for documents (UN Lay-out Key). It is a generic document with common data fields that has served as a template for other documents and thus enables data re-use.

In a similar way, data of for instance dangerous cargo can be shared between carriers and infrastructure managers. For instance, a port authority requires a dangerous cargo declaration of a
vessel and a rail infrastructure manager of the wagons in a train. Infrastructure managers may also require the position of transport means to optimally control traffic in a particular area. Police officers may issue a formal request for halting and inspecting trucks.

Another example is road transport following air transport from the destination airport where the airplane has landed, as mentioned in an Airway Bill. Currently, the Airway Bill can be used for this purpose, applying the contract of carriage for air to road transport. Its application is accepted by authorities from a governance and inspection perspective. No separate CMR needs to be produced. Electronic transport documents should cater for this situation, accepted by authorities from their governance and inspection perspective.

Re-use of the same data stored by an IT back office system is facilitated by utilizing common formats, semantics, and code values for elements. A data dictionary is an example that contains these types of commonalities. Agreement on a common data dictionary would facilitate transport (see further).

4.2 Shortcomings of implementation of open (or defacto) standards

As highlighted in chapter 3, there is currently a wide variety of solutions available for eTransport Documents, in all transport modes, depending on the technology available for producing and assessing electronic documents. These solutions support for instance SMEs in producing and storing eTransport Documents like eCMRs and all other types of documents. The current solutions have two shortcomings, leading to closed, competing solutions. First, each solution provides its particular implementation guides of (open or defacto) standards to their users. Secondly, each solution has its own governance model.

DTLF Sub Group 2 – corridor information systems – analysed the shortcomings of implementation of standards (section 2 of the final report of SG2, but see also annex E of this document providing an overview of existing standards and their implementation and relevant standardization bodies). The main conclusion of SG2 in this respect is as follows:

| There is a lack of commonality for implementing standards and services provided by platforms, which leads to high operational costs for organizations and a potential lock-in. |

This conclusion is based on analysis of the large variety of business scenarios that needs to be supported and the current way of implementing open standards. Additionally, the large number of stakeholders requiring implementation of these standards needs to be considered. The objective is to make them digital by default via a commodity for logistics data sharing, constructed as a federation of platforms. The same approach is required for data of eTransport documents; on-boarding of stakeholders needs to be less time consuming, with lower operational costs.

4.3 Sharing eTransport data - options

There are different options for sharing (access to) data of eTransport Documents for the various modalities. In this section, various options are presented. Developing an eTransport Document that covers more than one transport leg is outside the scope, since each leg is provided by one carrier with its specific contract of carriage (including specific details of the cargo and the leg).

DTLF sub-group 2 has developed a conceptual approach for interoperability and on-boarding of stakeholders to a federation of platforms. This same approach is applicable to the sharing of data of
eTransport documents. This section will argue why this approach is required and how it can be applied to eTransport documents.

This section will also provide and analyse various options for sharing (access to) data of eTransport Documents in a federative network of platforms or briefly federative platforms (DTLF SG2), thereby addressing the shortcomings identified in the previous section. The following options are explored:

- Unstructured data data sets of eTransport Documents.
- Structured data sets of eTransport Documents based on open standards.
- Logistics Services with Logistics Core Components for interoperability (see also sub-group 2 for additional details).

The following table presents an overview of the proposed options and their pros and cons. These options are discussed in more detail hereafter.

**Table 7 – Overview of options for sharing eTransport Document data**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Pro</th>
<th>Con</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstructured (e.g. PDF)</td>
<td>Documents are shared as PDFs with additional meta-data to identify a proper document.</td>
<td>Ease of use, ease of implementation.</td>
<td>Limited search capabilities. Individual data items only readable by OCR (Optical Character Recognition).</td>
</tr>
<tr>
<td>Structured – standards</td>
<td>Implementation of standards to support all modalities (UN/CEFACT).</td>
<td>Well known Fits with existing solutions</td>
<td>Does not solve the challenge of different Implementation Guides. Only supports cargo aspects (e.g. not permits or others). Support of push mechanism (messaging).</td>
</tr>
<tr>
<td>Logistics Services and Logistics Core Components (DTLF SG2)</td>
<td>Generic mechanism to specify data requirements at business (logistics service) level, supported by generic semantic specifications of re-usable logistics concepts like physical objects (container, truck, ...). Developed by DTLF sub-group 2.</td>
<td>No implementation guides required. Plug-and-play (register and connect) option, like for the Internet.</td>
<td>Not used and not supported.</td>
</tr>
</tbody>
</table>

4.3.1 **Unstructured data sets of eTransport Document**

There are different ways to represent and share data, ranging from a PDF to fully structured data. Structured data is considered in the next section, this section considers sharing of unstructured data. Unstructured data can be produced from IT systems that re-use data to produce different waybills and other relevant documents. Unstructured data can be viewed by utilizing standard hardware and
free available software like PDF viewers. PDF is the most common format for representing unstructured data, where particular PDF tools can be used to annotate documents, e.g. by providing damage remarks on an eCMR when accepting goods. In case a PDF is based on a structured document, OCR (Optical Character Recognition) technology can be applied to convert data into structured data.

Unstructured electronic documents can also be annotated with metadata, where these metadata provide an index to search for a particular document. Examples of metadata are the provision of shipper, consignee, carrier, truck licence plate, and indication of dangerous cargo, which allows an authority to search for particular shipments.

4.3.2 **Structured data sets of eTransport Document with standards**

The development of an eTransport Document requires a framework or UNSM addressing data requirements of contracts of carriage of all modalities. It means that all mode specific dictionaries with relevant data elements of a transport document need to be harmonized. UN/CEFACT Multi-Modal Transport Reference Data Model (MMT) is an example of a structured eTransport Document. This standard is the basis for an electronic standard of the CMR, the so-called eCMR data structure, also developed by UN/CEFACT. However, UN/CEFACT MMT does not support data of all required documents like identified in section 4.1, since it only supports cargo data. There may also be an overlap with existing standards used by for instance inland waterways and rail for dangerous cargo declaration (note that the inland waterways and rail standards differ, as these are based on RIS (River Information Systems) and TAF TSI (Telematic Applications for Freight, Technical Specifications for Interoperability) respectively) and reporting to customs authorities using the WCO data model.

This option is preferable if and only if the federative platforms provided by many systems and solutions implement the complete eTransport Document and provide ‘plug-and-play’ functionality to its end-users (see sub-group 2). Alternatively, the federative platforms should clearly state which part enterprises have to implement (e.g. a particular focus on road transport, air transport or on liquid bulk) and provide functionality for connecting to systems of users to prevent closed solutions with their specific implementation guidelines.

4.3.3 **Applying DTLF SG2 concepts to eTransport documents**

DTLF sub-group 2, which focusses on interoperability for all logistics stakeholders, law enforcement agencies and supply and logistics processes, has not only concluded that interoperability requires development of Logistics Core Components, as an extension to the library of UN/CEFACT Core Components with logistics ones (data set specifications of for instance ‘container’, ‘truck’, ‘vessel’, and ‘dry bulk’), but also introduced the concept of conceptual interoperability based on a business perspective of logistics services (see section 3.2 of the final report of SG2). Furthermore, DTLF SG2 has endorsed a methodology for distributed development and implementation by enterprises and authorities of these concepts and models (section 3.3 of the final report of SG2).

The following figure shows how this methodology can be applied to eTransport documents, illustrated by a specific example of the eCMR.
The figure illustrates that an open standard for eTransport documents, like the UN/CEFACT MMT and the eCMR that is based on the MMT, is input to the Logistics Model. To speed up the development process, the first version of a Logistics Model might only address the eCMR requirements, which is up for further discussion. Secondly, the knowledge of the members of UN/CEFACT that have developed the eCMR can be used to develop the eCMR Data Set Model.

DTLF SG2 describes the components of this Logistics Model (section 3.3): logistics services, interaction patterns, and a semantic model supporting logistics services and interaction patterns. In the case of the eCMR example, it can be constructed as a view of the semantic model of the Logistics Model, with the following constraints with respect to the interaction patterns, as specified for the UN/CEFACT eCMR:

- **Creation**: an eCMR data set can be created either by a carrier or his customer before actual hand over of the cargo to the carrier. In case it is created after hand over, it actually reflects the cargo for which the carrier takes responsibility;
- **Update**: in case an eCMR data set is created before actual hand over, it may be updated to reflect the actual cargo for which the carrier takes responsibility. At that moment, both parties agree on the data represented by the eCMR. A next update of the data may take place at the time a carrier hands over the cargo to the consignee. Again both parties agree on the cargo (and its condition) and the consignee takes over responsibility. This update may trigger billing and payment.

Normally, the eCMR data set re-uses the data set of a transport order. Similar to the eCMR data set model, data set models of other eTransport documents can be created. The figure above also shows that the eCMR data set model can be used to develop subsector data set models, like specific for
container transport, bulk cargo, etc. An enterprise may provide logistics services in one or more subsector(s) and can use these ‘templates’ to develop its interface (see annex H).

In May 2018, the European Commission adopted a proposal for a regulation of the European Parliament and of the Council on electronic freight transport information (eFTI). The proposal specifies that Member States' competent authorities shall accept regulatory information made available electronically by economic operators concerned. The Commission proposes that a common eFTI data set and subsets in relation to the respective regulatory information requirements will be specified by implementing act. These data sets and subsets should eventually be implemented by enterprises and (commercial) service providers when developing their own services and interfaces, if they want to use the respective solution to make regulatory information available to the competent authorities.

4.3.4 Concluding remarks

Different options for sharing (access to) data of eTransport Documents have been assessed. The preferred option is to utilize and apply the concepts and methodology endorsed by DTLF SG2. It implies that a structured data set is the preferred option, where enterprises and authorities are supported by models and tools of their choice to develop their requirements and interfaces to a platform of choice. Authorities still have other options with respect to retrieving (pull) or getting (push) data, depending on inspection regimes. These choices are discussed hereafter.

4.4 Options for authorities to federative platforms for eTransport Document data

Member State authorities will have various requirements regarding a solution for sharing (access to) data of eTransport Documents. First, the solution has to fit a particular inspection regime and secondly it has to provide a guaranteed data quality. There are also particular archiving laws to consider in this respect. Administrative burden should not increase, which means that the once-only principle has to be obeyed.

The requirements listed here are not only applicable for B2A sharing and accessibility of data, possibly represented by eTransport Documents, but also for B2B. Insurance companies, for instance, have particular requirements for the functioning of the infrastructure.

4.4.1 The once-only principle

The once-only principle is that (access to) relevant transport data is provided by a data owner once to authorised end-users that require the data to perform their tasks, either from a legal or commercial perspective. Data is provided either by pushing this data by a message with several functions to authorities or by providing a link to authorities to relevant data stored in for instance a solution of an external provider. There are three rules underpinning the once-only principle (note: this differs from a single window perspective that can encompass various other issues like data structures and systems used to lodge data):

1. There is always one unique identifiable endpoint (e.g. a Uniform Resource Location (URL)) that can be used to share (access to) data. It could be an endpoint in the authority domain, in which case the data needs to be pushed to the authority, or in the private domain, in which case an authority can collect the data.
2. All end-users, including authorities, have access to or receive relevant data that is used for the production of transport documents, but always refer to the endpoint (URL) where the original data is stored.

3. End-users have a freedom of choice for implementing their endpoint. Depending on the nature of trade, e.g. commodities switch ownership during transport based on a Bill of Lading, data of transport documents may switch from one endpoint to another.

In case transport data is electronically stored in the public domain, an authority should provide authorised access to an enterprise to obey to the once-only principle. It means that an authority would compete with commercial - or community solutions, which is not considered desirable. In case transport data is stored in the private domain, authorities might still require storage of (copies of) electronic transport data, based on for instance laws implemented by declaration procedures or serving as audit trail and log on when particular decisions have been taken, for instance after inspection of goods or imposing of fines.

The once-only-principle needs to reflect the fact that data of an eWaybill is originally provided by a customer (shipper, forwarder, etc.) to a carrier, where the data can be amended to reflect the actual state of the cargo for which the carrier takes responsibility. In paper based situations, a customer might already provide a document that needs to be amended by the carrier, using for instance the remarks field. Data of eWaybills is able to reflect the actual cargo details and thus introduction of eWaybills may lead to process changes.

The once-only principle potentially provides many advantages to the public and private sector, but it also requires implementation of additional functionality to assure for instance performance and availability of (access to) data and to implement access control mechanisms linked to identity and authentication (trust). These aspects will not be elaborated further in this report.

4.4.2 Authority requirements to solutions - data

Authorities require data in accordance with current and potentially future inspection - and safety procedures implementations. Potential procedures are:

- **Random inspections** – physical inspection of transport means and/or cargo. Access to data is required. These inspections might be based on random sampling and/or data driven sampling.
- **Risk based inspection** – data is collected for risk analysis, selecting transport means and/or cargo to be inspected. Logistics stakeholders need to provide data to an authority.
- **Period inspections** – periodic inspection of logistics stakeholders with respect to particular procedures. The inspection can be of a physical asset, like a truck, or the administration. Periodic inspections may be combined with periodic (e.g. monthly) declarations.
- **Source inspections** – the source of particular goods flows is inspected, especially in the case of packaging of dangerous cargo.

There seems to be a general tendency of inspection authorities to implement data driven inspections. This implies that they require (access to) data of logistics stakeholders.

Infrastructure managers require data to safeguard the safety of the infrastructure they govern. The data on for instance dangerous cargo needs to be submitted by logistics stakeholders to rail and inland waterway infrastructure manager; road infrastructure managers are currently only able to assess dangerous cargo data at spot checks. In those cases, inspection procedures like random-, periodic-, and source inspection can be implemented to prevent dangerous situations.
Each of these procedures requires a particular mechanism. For instance, random inspections can be supported by on request access to data, while risk based inspections require access to data, either pushed (declarations) or retrieved-based (by receiving links, subscriptions). To support the various inspection procedures, chapter 2 already introduced a number of mechanisms:

- **On request** – data is available to an authority upon request. It implies that authorities submit a request to a logistics stakeholder, for instance during a random spot inspection.
- **Declaration** – data needs to be duplicated to the domain of an authority. Messaging can be applied.
- **Search** – an authority has an overview of relevant stakeholders, based on for instance particular permits, and collects data from the private domain. A search can be performed on a periodical basis, supported by so-called data crawlers.
- **Subscription** – an authority is informed of an event that will take or has taken place and is able to access additional data from the private domain.

The following table shows how various data formats could reflect on the mechanisms mentioned above. One has to bear in mind that a solution will only fit if there is a system producing the document from data.

*Table 8 – Overview of data formats and mechanisms of data sharing between enterprises and authorities*

<table>
<thead>
<tr>
<th></th>
<th>On request</th>
<th>Declaration</th>
<th>Search</th>
<th>Subscription</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PDF</strong></td>
<td>√ (with a PDF viewer or printer)</td>
<td>-</td>
<td>-</td>
<td>√ (reference to PDF)</td>
</tr>
<tr>
<td><strong>PDF with metadata</strong></td>
<td>√ (with a PDF viewer or printer)</td>
<td>-</td>
<td>√ (search on metadata, accessibility, and registry)</td>
<td>√ (reference to the PDF)</td>
</tr>
<tr>
<td><strong>Structured data requirements of authorities</strong></td>
<td>√ (requires an application and accessibility)</td>
<td>√ (as in most current declaration systems)</td>
<td>√ (including accessibility and a registry)</td>
<td>√ (reference to data)</td>
</tr>
<tr>
<td><strong>Harmonized data sets of mode specific waybill</strong></td>
<td>√ (requires an application and accessibility)</td>
<td>-</td>
<td>√ (including accessibility and a registry)</td>
<td>√ (reference to data)</td>
</tr>
<tr>
<td><strong>Harmonized, multimodal waybill</strong></td>
<td>√ (requires an application and accessibility)</td>
<td>-</td>
<td>√ (including accessibility and a registry)</td>
<td>√ (reference to data)</td>
</tr>
<tr>
<td><strong>DTLF SG2 methodology</strong></td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>
The table shows the particular requirements authorities have regarding whether data is provided in an unstructured or structured way, depending on the mechanism. Based on the vision of authorities on how an eTransport Document infrastructure should be accessible, the required format has to be provided by the infrastructure. It also potentially requires additional development efforts by authorities. If for instance all eTransport Document data is pushed only once to authorities, they should implement a mechanism to distribute, store, and archive the data in accordance with (inter)national laws. However, if the authorities require access to data with a search mechanism, they need a copying mechanism to store the data in case of detecting irregularities.

4.4.3 Required functionality of an IT infrastructure for eTransport document data

The table provided in section 4.4.2 above presented an overview of data formats and mechanisms for data sharing between enterprises and authorities. The table also indicated a number of additional functionalities required for the implementation of particular solutions. These required functionalities are further discussed below, per data sharing mechanism:

- **On-request** – a logistics stakeholder should present the data direct on its own device, e-mail the data to the relevant authority (or person representing the authority and requesting the data) or provide a link (URI – Uniform Resource Identifier) to the (person representing the) authority. Moreover, an authority could apply a search (see further). A link could be used to directly assess the data, where a logistics stakeholder can impose the particular access control mechanisms.

  To be able to select one of the options and to enable a logistics stakeholder to prepare for spot checks, the authority has to provide:

  - The data set (and its structure) required;
  - The structure (syntax) by which the data needs to become available;
  - The technical mechanism (presentation on a device, by mail or link, or printed).

- **Declaration** – a logistics stakeholder requires the following information:

  - The data set (and its structure) required. The data set could be applicable to multiple authorities (once-only principle), with a relevant milestone at which the data needs to be available to each of the authorities;
  - The structure (syntax) by which the data needs to become available;
  - The Authority Endpoint to which the data needs to be submitted, e.g. a Single Window, etc.

- **Search** – different types of searches can be foreseen, for instance based on geo-fencing, time period, and/or individual cargo items or transport means. These searches can provide results like dangerous cargo, route or trip information of a transport means, statistical details, etc. Authorities will have to specify these search structures en-result results in more detail as part of their data set supporting the regulation for freight transport information. To be able to perform a search for data, certain registries (like the ones for transport means and ownership (e.g. national vehicle registries for trucks and the European Hull Data Base for inland waterways)) need to be put in place, on top of structuring of the data. Searches for particular cargo items, e.g. containers or pallets, require the implementation of Visibility Services (DTLF SG2, section 4).

- **Subscription** – logistics stakeholders inform authorities that particular data is available by sending a link to the data (URI). The link is used in the same way as in the option to make data available upon request and/or a search based mechanism.
Annex H of this document provides additional details on a potential federative platform supporting this functionality. It conceptualizes an infrastructure by distinguishing for instance end-users, registries and platforms, where these platforms can each have their data model (commercial, community, or stakeholder owned). The annex also illustrates how the federative platforms can be implemented for road transport, supporting random spot inspections with on request data availability.

4.4.4 Authority requirements to solutions – data quality

From a conceptual point of view, the on request, search and subscription to events mechanisms with links to data of electronic Waybills are identical. Whereas the risk based inspection is mostly assumed to be implemented by a declaration mechanism, the other three mechanisms require a change by private and/or public organizations to support sharing (access to) data. In complete electronic procedures, data can be changed after responsibility for carriage has been taken over by a LSP. Data printed on documents cannot be changed, unless the original document is replaced. The person, as representative of the responsible carrier, handing over the document is held responsible by an inspection officer in case of irregularities.

In this particular context, it is necessary to introduce data quality and – integrity. Data quality can be specified as follows:

- **Completeness.** The data represents all details relevant for goods movements. From an authority’s perspective, data completeness can be provided by more than one enterprise depending on the organization of a logistics chain (e.g. an airline providing data of air transport and a road carrier the data of the final leg to the airport of destination).
- **Consistency.** Data of two sources reflecting the same physical situation needs to be identical (e.g. weights of containers provided by a stevedore should be identical to weights of the same container provided by a pre-carrier or shipper).
- **Unambiguous.** Data can only be interpreted in one way (e.g. unit specifiers of weights, currencies of monetary values and time zone indicators for a date/time).
- **Correctness.** The data reflects a real-world situation of goods movements and parties involved, and are legally correct. Reflection of the real-world situation leads to (at least) two constraints: a physical object like cargo or transport means can be at only one location at a given time and capacity of those objects (expressed in for instance maximal weight or volume of the cargo) can only be used once during a time interval. Legally correct means that data suits the relevant directive or regulation and, in case it does not reflect the real-world situation, might trigger inspections based on risk analysis by an authority. Legal correctness is not considered at this moment. It assumes that traders (or their representatives) comply with the proper legal requirements.

Data integrity is the assurance of the accuracy (correctness and completeness) and consistency of data over its life cycle. Therefore data quality and – integrity are closely related.

Data quality and -integrity impose particular requirements to platforms providing data sets for eTransport documents. These platforms need to be resistant to passive-, active- and cyber-attacks to ensure data quality and -integrity, not only from an authority perspective, but also from the perspective of private enterprises utilizing these platforms. The attacks are formulated as:
• Interception of sensitive data (passive attack) – only authorized users have access to the data, since data is considered to be economically sensitive. This particular type of attack is especially relevant to enterprises, whereas these enterprises also require a guarantee of authorized access by an authority/civil servant.

• Manipulation of the content or forgery (active attack) – only authorized users are able to change the data according predefined rules.

• Resilience to cyber-attacks – data is available at all times to authorised user like authorities, i.e. unauthorised users are not able to erase from a (sub)system. This is a special form of active attack, not necessarily focussed on a particular data set, e.g. particular waybills.

The latter implies that a platform also require particular quality of service like availability, performance, number of concurrent transactions with the tool at the same time at any place to an authorized user. ‘Any place’ imposes requirements with respect to a communication infrastructure; there are still parts of the EU that are not fully covered by mobile networks (e.g. particular parts where the river Danube is the boundary between two Member States). These requirements are not further elaborated in this document.

To be resistant to the attacks mentioned above, platforms can implement certain instruments. It should be considered that the same data of an electronic waybill can be stored by multiple platforms, which means that instruments have to be applicable to each individual platform. For instance, blockchain technology consists of many storage platforms. Data encryption, hashing, identification and authentication, and distribution of data to different stores are potential solutions. In addition to these instruments, instruments to validate data quality and – integrity can be implemented. Examples of these instruments are validation of the data scheme (e.g. XML Schema Definition or XSD) and semantic integrity of the data (i.e. can the data be mapped to a semantic model).

In current inspection procedures enterprises can obtain permits for particular activities. These permits might also specify integrity and quality of internal procedures and IT systems of an enterprise, for instance for Authorised Economic Operator (AEO). These permits can be inspected periodically. In view of federative platforms for eTransport document data, platforms used by an enterprise to provide (access to) data to an authority can also be certified with respect to the implementation of instruments to maximize data quality and – integrity. Such a certificate should be renewed periodically to address any changes, either in procedures, IT functionality, or external requirements.

4.4.5 Concluding remarks

Federative platforms for sharing (access to) data of eTransport Documents with authorities needs to support the inspection regimes of those authorities, with the appropriate technical mechanism and components like registries and platforms. Authorities themselves need to specify the required data sets, syntax and mechanisms.

4.5 Concluding remarks

This chapter has analysed the functionality and use of transport documents by considering a data perspective for (especially) B2A data sharing. It has concluded that the current way of implementing standards of data sets for eTransport documents could be supported by the concepts and mechanisms endorsed by DTLF SG2. Authorities should specify their data requirements and the underlying technology supporting their inspection regimes. A solution for sharing (access to) data of
eTransport Documents could be supported by a federative network of platforms (see DTLF SG2). Examples of such an infrastructure and its conceptualization are presented in annex H.
5 Next steps: conclusions and recommendations

5.1 Conclusions

Based on the developments presented in this report, the following main conclusions, including on necessary next steps, can be drawn.

A. A wide variety of documents are currently used in relation to the transport of goods. Their common denominator is that they are required to be available for inspection for authorities, to present proof of compliance with various legal requirements in place. A certain subset of these documents, namely those that represent the contract of carriage, perform also a central business-to-business role, as they reflect both the responsibilities and liabilities of the parties and record evidence of the completion of these responsibilities.

B. Moving towards a digital, paperless freight transport environment is necessary and beneficial for the EU logistics and transport sector as a whole. Stakeholders identify current legal and administrative barriers as the main bottleneck on the way to paperless logistics.
   a. Stakeholders perceive increased efficiency, through improved, paperless and therefore faster administrative processes, as the main benefit of digitalisation.
   b. Current solutions for the electronic exchange of freight transport documents (waybills), per transport mode, exist and used by transport companies. Similarly, multiple documents concerning the means of transport, or the data included in these documents, are also digitalised and stored in national registries. Current mode-specific possibilities are in place as well for the electronic cross-border information exchange of information related to the personnel.
   c. The dispersed legal framework composed of international, EU and national legislation, establishing mostly mode-specific rules, as well as divergences at national-level around the acceptance of electronic documents hinder the effective implementation of digitalisation of transport documents in the EU.
   d. In sum, EU-wide alignment on the formal acceptance of electronic documents is a pre-requisite for digitalisation. In this regard, stakeholders see a significant role for the EU institutions in facilitating and ensuring the acceptance of electronic transport documents by Member States’ authorities, courts and more widely all economic operators.

C. Provisions in the current legal framework on the electronic format of the documents used in freight transport and the extent to which common rules for their electronic exchange are applied across the EU depend on the type of document.
   a. For the documents accompanying the goods, no common rules apply at EU-level to date. In fact, in addition to international conventions and EU legislation provisions, specific laws at national level also impact the extent to which electronic documents could be used.
   b. For the documents concerning the means of transport, mode-specific EU legislation containing provisions on the use of the electronic format is either already applicable or will come into force in the near future. However, not all relevant EU legislation currently contain such provisions, and national legislation in certain Member States still requires the use of paper documents.
c. For the documents concerning the personnel, beyond the EU rules governing the movement of persons, and which fall beyond the scope of this report, a number of mode-specific EU developments have been or are being undertaken. However, not all relevant EU legislation contains such provisions, and national legislation in certain Member States still requires the use of paper documents.

d. Consequently, further initiatives at legislative level appear to be needed, at EU and, potentially, national level, in order to remove current legislative and related administrative barriers to the use of electronic transport documents, particularly as regards the interaction with the authorities, for regulatory compliance purposes.

D. Essentially, however, digitalisation is not about the documents in themselves, but about ensuring electronic sharing of the information these documents carry. EU-wide digital platforms for storage, management and inspection of data of transport documents should guarantee data interoperability between enterprises and aligned with authority requirements, for all modes.

a. Agreeing on data semantics for the information contained in the transport documents is a pre-requisite for further development of EU-wide digital platforms for sharing data of transport documents. Indeed, irrespective of a platform, data concerns around quality, security and trust will be of particular importance for both authorities and enterprises. Encryption, data access control, identification and authentication, and engagement rules for participation are examples of mechanisms and procedures that will ensure trust.

b. Some mode-specific EU platforms already exist, or are under development. These platforms need to be interoperable to create a single point of entry for both authorities and enterprises, thus reducing interoperability costs. The single point of entry for authorities needs to integrate with existing systems of authorities to re-use data already stored by these systems (e.g. licence registrations, Hull database). Platforms should create a federative network that supports sharing of multimodal transport document data.

c. As the implementation of open standards usually leads to solutions that require additional investment to become interoperable, the challenge is to develop a federative network of platforms (DTLF SG2), which all stakeholders, including authorities, can adopt and deploy without increasing the administrative burden. Creating a new platform is not the solution, but rather making use of existing ones, each with their governance and business model.

d. Adoption and implementation of these by individual stakeholders (enterprises and authorities) may lead to additional investments to adjust internal business processes and back office IT systems. These would be compensated in turn by reduced interoperability costs, improved data quality leading to increased efficiency, and decrease of administrative burden.

5.2 Recommendations

The recommendations below build on the above conclusions and have as overall aim reaching the main objective laid down for DTLF, namely fostering more efficient electronic exchange of information in transport and logistics, with the objective of removing technical, operational and administrative barriers between and within transport modes. In particular, these
recommendations point to necessary action that would still need to be undertaken to fulfil the mandate that had been given to sub-group 1 in the following three focus areas: acceptance of electronic transport documents by all stakeholders, and particularly by national authorities; the possible harmonisation of these documents at data elements level and across all transport modes, and of contract of carriage transport documents in particular; and the development of possible common IT infrastructures/environments to support the electronic exchange of this data, both among the private stakeholders and, in particular, with the authorities.

Recommendation no. 1: Work needs to continue towards further digitalisation of the exchange (business-to-administration/B2A), reuse (administration-to-administration/A2A) and acceptance (administration-to-business/A2B) of information for the purposes of regulatory compliance in transport and logistics. In particular, follow-up efforts are necessary in order to:

- further identify barriers and propose relevant solutions to ensure full digital exchange of regulatory information related to goods, means of transport and personnel;
- further explore, develop and test options for IT infrastructure concepts for the exchange (B2A), reuse (A2A) and acceptance (A2B) of information for the purposes of regulatory compliance in transport and logistics;
- work on proposals for legislative action and soft measures to speed up the uptake of the IT infrastructure concepts. The soft measures may include funding of initiatives/projects, communication activities, consensus building and creating communities, awareness raising and identification of relevant adoption instruments (e.g. best practices, roadmaps, guidelines for implementation, etc.);
- initiate and/or contribute to the development of the specifications of the interfaces between the IT infrastructure concepts (services and protocols);
- collaborate and synchronise with current and future projects/initiatives and other privately and publicly funded developments that strive to develop and implement (part of) these IT infrastructure concepts;
- collaborate with all relevant private and governmental stakeholders in transport and logistics, including standardization bodies, to establish the necessary IT infrastructure;
- further investigate the need and form for appropriate governance structures for the systems and cooperation necessary to ensure the secure digital exchange, reuse and acceptance of information required for regulatory compliance in transport and logistics.

Recommendation no. 2: To facilitate such efforts, the European Commission should renew the mandate for DTLF. The DTLF allows a unique opportunity for public administrations (such as transport administrations and customs), business and science to meet, discuss and engage in exploring various opportunities to make optimal use of the digitalisation in the supply and logistics chain for the all stakeholders.

Recommendation no. 3: The next DTLF should have sufficient knowledge, skills and expertise to complete the various tasks it will be mandated to carry out, based both on active members’ contribution and on external experts supporting DTLF for specific topics.

Recommendation no. 4: The work program of DTLF should focus on well-defined deliverables in the areas identified under Recommendations 1 and 2. In particular, the immediate focus should be on deliverables aimed at assisting the Commission in the preparatory work for the implementation of the eFTI Regulation.
ANNEX A – Inventory of documents accompanying the goods, per mode.

Annex A provides a detailed listing and description of documents accompanying the goods for the different modes of transport.

A.1. Road transport

The consignment note (CM) is in general evidence of the acceptance of goods that have been transferred or are about to, and are in good shape. The consignment note links the shipper or consignor, the freight forwarder, the transport operator and the carrier. It serves as a contract that is used not only as the confirmation that goods were loaded, but also as a commitment that they will be delivered. Therefore, it represents a transport contract for the goods that exists independently from the document itself.

The CM must be issued prior to the beginning of the physical transport operation. The consignment note is not however a “document of title”. When the duration of carriage is short, it is generally considered unnecessary to give the CM the function of representing the goods. As the rights of the consignee are arranged separately from the rights of the sender, the possession of the goods may be transferred without the consignment. The absence, irregularity or loss of the CM shall therefore not affect the existence or the validity of the contract of carriage. The transfer of the CM does not imply the transfer of the title of the goods and the right to ask for the delivery of the goods is not bound to the CM. The drafting of the consignment note can be done by any company who is part of the transport contract, even if, in practice it is the carrier who drafts it, based upon the CM printed carnets.

The consignment note constitutes a crucial document of evidence in the case of existing claims by both the sender and the carrier within the carriage contract. Moreover, the CM plays a facilitating role for proving such claims. This is due to the fact that the CM serves to prove establishment and content of the carriage contract, unless proved otherwise. For the evidentiary function of a consignment note to take effect, a CM signed by the sender and the carrier must be available. For example, the failure to provide a consignment note in France, during a control by enforcement bodies, is subject to a fine of 1500, 00€. Although there are no statutory obligations for a minimum number of copies to be provided, it is customary that the CM is issued in 3 copies: one for the shipper, one for the carrier and the last one for the consignee. The carriers’ copy must be on board the truck in case of a road control.

The mandatory information which must be indicated in a CM is:

- The date on which the document is established
- Name, address and company registration number (if applicable) or UE identification
- Number of the carrier
- Pick Up date
- Nature and quantity, or weight, or volume of the goods for consolidated cargo
- Name of the shipper or instructing party
- Full loading address
- Name and address for the consignee
The consignment note has a very important role in its evidentiary function regarding liability of the parties and guarding the interests of the parties of a contract of carriage.

There are 3 types of consignment notes depending on the type of transport and depending the member states.

1. The CMR
2. The National Consignment Note
3. The Mixed Consignment Note

Each of these is detailed below.

1. The CMR

The Convention on the Contract for the International Carriage of Goods by Road (CMR) is a United Nations Convention that was signed in Geneva on 19 May 1956. This convention stipulates that a CMR must be issued if the departing country, the destination country or both countries had ratified the said convention. So far it has been ratified by 55 UN member states.

The CMR is a consignment note with a standard set of transport and liability conditions that replace individual businesses terms and conditions. It confirms that the carrier (i.e. the road haulage company) has received the goods and that a contract of carriage exists between the trader and the carrier. A CMR is not a document of title nor a declaration, although some member states regard it as such. It does not necessarily give its holder and/or the carrier, rights of ownership or possession of the goods.

The CMR is therefore a contractual document that aims to harmonize the general conditions for international road transport of goods while taking into account the carrier’s responsibilities.

The CMR is a non-negotiable document. Although no particular format of consignment note is required by the CMR, a format has been drawn up by the International Road Union (IRU). A range of information needs to be covered in the CMR, including:

- The date and place at which the CMR note has been completed.
- The name and address of sender, carrier(s) and consignee (the person to whom the goods are going).
- The truck plate number (and the tractor plate number if different)
- A description of the goods and their method of packing. The description should be acceptable to the consignor and consignee. For security reasons, you do not always want the carrier to be able to identify valuable goods.
- The weight of the goods.
- Any charges related to the goods, such as customs duties or carriage charges.
- Instructions for customs and any other formalities such as dangerous goods information.

While the carrier is liable for any loss, damage or delay to a consignment until it is delivered, the trader is responsible for any loss or damage the carrier suffers resulting from incorrect details having been provided in the CMR note.

In February 2008, a protocol was added to the CMR Convention, which requested that CMR could be managed electronically, via “e-CMR”. This protocol entered into force on 5 June 2011, and to date, twelve countries have acceded to e-CMR, with Slovenia being the most recent European country acceding in August 2017, joining a growing number of countries paving the way towards fully digital road transport operations: Bulgaria, Czech Republic, Denmark, Estonia, Latvia, Lithuania, France, Netherlands, Slovakia, Spain and Switzerland.

Several other countries initiated the process to ratify the e-CMR Convention.

Below, a timeline of the evolution of the Convention as it has recently developed:

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956</td>
<td>CMR Convention adopted</td>
</tr>
<tr>
<td>1976</td>
<td>Model CMR consignment note developed by IRU, in cooperation with International Chamber of Commerce</td>
</tr>
<tr>
<td>2007</td>
<td>Model CMR Consignment Note updated by IRU, now used by most, if not all, parties to contracts in CMR contracting countries</td>
</tr>
<tr>
<td>2008</td>
<td>Additional Protocol to the CMR concerning the Electronic Consignment Note (e-CMR)</td>
</tr>
<tr>
<td>2011</td>
<td>e-CMR entered into force</td>
</tr>
<tr>
<td>2017</td>
<td>e-CMR officially launched with first ever border crossing using electronic consignment notes</td>
</tr>
</tbody>
</table>

2. The National Consignment Note

The national consignment note is, exclusively used for national transport of goods by Road, but plays the same part as the CMR in the relationships between a shipper, a carrier and a consignee. National consignment notes are used for 65 percent of the nearly two billion tonne-kilometres performed by European hauliers each year across Europe.

3. The Mixed Consignment Note

This document is a mix between the CMR and the national consignment note. By ticking a box, the user can define whether it will used under the CMR convention or the national regulations in force. This document can also be handled electronically depending on the Member State’s regulations.
A.2. Rail transport

There are different types of documents that are required for transportation of goods by rail. A key document that provides information about transported goods, their description, weight, origin and destination etc. is the rail freight bill or rail consignment note. For cross-border transportation of goods by rail, customs documents are required which are provided by the shipper. Another set of documents that are required are the documents that inform about technical conditions of wagons and tractions.

1. Rail consignment note

A rail consignment note is required for transportation of any type of goods by rail. There are several types of freight bill, depending on the origin and destination of goods:

1. CIM consignment note is used in international traffic among railways who are the members of the CIM-COTIF agreement.
2. SMGS consignment note is used in former soviet countries, plus additionally in China, Iran and Mongolia among countries that are member of the SMGS agreement. Some EU countries such as Poland, Latvia, Lithuania and Estonia use both CIM and SMGS documents for international rail transportation.
4. National freight bill used only for domestic transportations.

Each of these consignment notes are described below.

One consignment note must be prepared for each wagon. The exception to this rule is one consignment note for the wagons that are forwarded in a block train, or a group of wagons (usually min. 10 wagons), or a UTI (Intermodal Transport Unit). If several wagons or if three or more UTI are consigned with a single consignment note, then the number of wagon lists required must be shown on the consignment note and the wagon lists attached to it. A wagon list then forms an integral part of the consignment note. For SWL each wagon needs to be accompanied by an individual consignment note.

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73 The International Rail Transport Committee (CIT) is an association of some 216 railway undertakings and shipping companies which provide international passenger and/or freight services. 126 organisations are members in their own right, 80 organisations are linked indirectly by being members of CIT associate members. It has prepared several types of
If a train is forwarded by state company then it also needs a preliminary permission for using one consignment note for more than one wagon.

### 1.1 CIM consignment note

Railway contract law ensures legal certainty by defining liability regimes in international traffic. A majority of the EU Member States use the CIM consignment note for transportation of goods by rail. CIM belongs to and is regulated by the COTIF Protocol\(^{74}\) (Convention concerning International Carriage by Rail). The COTIF Protocol was signed by OTIF\(^{75}\) members in 9 June 1999, Vilnius. The Protocol contains seven Appendices. A rail transport document prepared according to Appendix B of the COTIF Convention is called a **CIM Rail Consignment Note**. In 2011, the European Union accepted COTIF 1999.\(^{76}\) There are 7 appendices of the COTIF Protocol, where Appendix B provides rules for the CIM consignment note:

- **Appendix A**: Uniform Rules concerning the Contract for International Carriage of Passengers by Rail (CIV)
- **Appendix B**: Uniform Rules concerning the Contract of International Carriage of Goods by Rail (CIM)
- **Appendix C**: Regulation concerning the International Carriage of Dangerous Goods by Rail (RID)
- **Appendix D**: Uniform Rules concerning the Contract of use of vehicles in international rail traffic (CUV)
- **Appendix E**: Uniform Rules concerning the Contract of use of infrastructure in international rail traffic (CUI)
- **Appendix F**: Uniform Rules concerning the Validity of Technical Standards and Adoption of Uniform Technical Prescriptions applicable to Railway Material intended to be used in International Traffic (APTU)
- **Appendix G**: Uniform Rules concerning the Technical Admission of Railway Material used in International Traffic (ATMF).

A document prepared in accordance with the requirement of Appendix B is called a “CIM consignment note” (green colour) and it certifies that the rail carrier has received the goods and that a contract of carriage exists between consignor and carrier. This document does not give its holder rights of ownership or possession of the goods. A CIM consignment note is to be completed in one or more languages of which one must be English, French or German.

The key information that is included in CIM:

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\(^{74}\) Intergovernmental Organisation for International Carriage by Rail (OTIF), COTIF 1999 Convention concerning International Carriage by Rail as amended by the Vilnius Protocol in force from 1.7. 2006, applicable from 01.12.2010.

\(^{75}\) The Intergovernmental Organisation for International Carriage by Rail (OTIF) was set up on 1 May 1985. 48 States are Members of OTIF at the present time (Europe, Asia and North Africa) and one State is an Associate Member (Jordan). OTIF has developed the uniform systems of law which apply to freight in international through traffic by rail. These systems of law are known as the Convention concerning International Carriage by Rail (COTIF) of 9 May 1980 (1999 Protocol).

\(^{76}\) European Commission, Proposal for a COUNCIL DECISION establishing the position to be adopted by the Union at the 25th session of the OTIF Revision Committee as regards certain amendments to the Convention concerning International Carriage by Rail (COTIF) and to its Appendices.
• a description of the goods
• the number of units and their weight
• the names and addresses of the sender and recipient.

The document must:
• indicate the name of the carrier and:
• be signed by the carrier or a named agent for or on behalf of the carrier, or
• indicate receipt of the goods by signature, stamp or notation by the carrier or a named agent for or on behalf of the carrier
• indicate the date of shipment or the date the goods have been received for shipment, dispatch or carriage at the place stated in the credit. Unless the transport document contains a dated reception stamp, an indication of the date of receipt or a date of shipment, the date of issuance of the transport document will be deemed to be the date of shipment
• indicate the place of shipment and the place of destination stated in the credit.

A CIM consignment note provides a proof that the goods have been deposited at the railway for transportation. It also serves as a commitment to transport the goods and deliver them to the consignee. It provides evidence of the conditions of carriage.

The consignor is responsible for the accuracy of CIM notes and is liable for any loss or damage suffered by the carrier due to inaccurate information.

There is also a CIM consignment note for combined transport. In 2006 CIT (The International Rail Transport Committee) introduced a “CIM Consignment Note for Combined Transport,” to facilitate the combined transport in Europe and the electronic trade, as the new document can be processed in electronic format.

1.1.1 Paper and electronic consignment notes

Paper consignment note

A paper consignment note consists of 5 A4 sheets:

<table>
<thead>
<tr>
<th>Sheet</th>
<th>Retention of the sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Electronic consignment note

The consignment note and its duplicate may be created in the form of an electronic data record which can be transformed into legible written symbols. The procedures used for data storage and processing must be functionally equivalent to those for the paper system particularly in so far as the evidential value of the consignment note represented by that data is concerned.

The carrier and the customer are to set down the messages to be exchanged and the ways in which electronic consignment note data will be exchanged in a contract.

In anticipation of comprehensive implementation, a mixed system may be agreed in order to be able to use the electronic consignment note on sections of the journey. It will allow different data media to be used for one and the same consignment (paper consignment note, electronic consignment note, printout used as a paper consignment note). If necessary, the electronic consignment note is to be printed out.

#### 1.1.2. Other documents accompanying the goods (documents accompanying CIM consignment note)

### Wagon list

A wagon list (red colour) accompanies the CIM document. Customer agreements are to set down what data wagon lists are to contain and how they are to be used. The wagon list must at least contain this information:

- Name of document
  - Wagon list
- Reference to the consignment note to which it is appended:
  - Consignment identification number
  - Date of acceptance
  - Forwarding station
  - Destination station
  - Route
• Consignor
• Consignee
• Customs procedures

• Details of the wagons, the UTI and the goods:
  • Wagon number
  • UTI number
  • UTI type code
  • Gross mass [weight] of UTI
  • Net mass [weight] of UTI
  • Tare of UTI
  • Identity numbers of the seals on the UTI
  • Reference number of number on the transfer note
  • Loaded/empty status of the UTI
  • Customs documents
  • Description of the goods
  • NHM code
  • Details which the RID requires to be put on the consignment note when dangerous goods are carried
  • Mass [weight] of the load
  • Movement Reference Number (MRN)
  • Administrative Reference Codes (ARC)
  • Export

• Details of the escort(s)
  • Family and first name(s)

• Preparation of the wagon list
  • Address of the undertaking
  • Place and date
  • Signature

Except where specially agreed otherwise, six copies of the wagon list are to be made out (one per sheet of the consignment note, plus an additional one in case wagons have to be detached from a block train or group of wagons).

For those consignments which pass over the customs territory of the European Community or the territory on which the common transit procedure is applied, separate wagon lists must be made out for community goods and non-community goods.
Charges note

A rail consignment note contains a list of charges, called a “Charges note” (red colour) which include carriage charge, ancillary charges, customs duties and other charges. If the total of the charges to be accepted by the consignor cannot be determined exactly when the goods are accepted, these charges are to be entered on charges note. This document is to form the basis of the settlement with the consignor, at the latest thirty days after the expiry of the transit period.

The charges are to be paid by the consignor to the forwarding carrier or by the consignee to the destination carrier in accordance with the instructions. Instructions expressed as a three letters code are taken from Incoterms 2010. The use of Incoterms on the consignment note refers only to the payment of charges and has no other legal consequences for the contract of carriage (e.g. DAF “Delivered At Frontier (… named place)” means that all charges (carriage charges plus ancillary charges, customs duties and other charges) up to the tariff break point shown on the consignment note paid by the consignor).

Subsequent orders

The consignor and consignee may amend the contract by subsequent orders. Subsequent orders are to be given in an appropriate written form. Electronic methods such as the internet or e-mail are to be preferred to allow the flow of information to be speeded up. The form needs to be downloaded, completed, printed-out and sent electronically. Where subsequent orders are given by means of a document which is not pre-printed, the amendment required should be given both in code and in plain text. The signature may be replaced by a stamp, an accounting machine entry or in any other appropriate manner. In parallel, the duplicate of the consignment note is to be given to the carrier. The same amendments are to be entered on it.

78 https://www.incotermsexplained.com/
Notification of circumstances preventing carriage

In the case of circumstances preventing carriage in the sense of CIM Article 20, of his own accord the carrier is to take action to alleviate the circumstances or shall ask for instructions from the person entitled. The carrier is to ask for instructions in an appropriate written form from the person entitled (the consignee, except that it will be the consignor where the consignor has entered “consignee not authorised to take control of the goods”). Electronic methods such as the internet or e-mail are to be preferred to allow the flow of information to be speeded up. The signature may be replaced by a stamp, an accounting machine entry or in any other appropriate manner.

Notification of circumstances preventing delivery

In case of circumstances preventing delivery, the carrier is to ask for instructions from the consignor, unless an endorsement on the consignment note requires the goods to be returned without further formality. When the circumstances preventing delivery occur after the consignee has amended the contract of carriage, the carrier must notify the consignee.

The carrier is to ask for instructions in an appropriate written form from the consignor or, if appropriate, consignee. Electronic methods such as the internet or e-mail are to be preferred to allow the flow of information to be speeded up. A form for seeking instructions needs to be downloaded, completed, printed-out and sent electronically. It is recommended that the layout be the same. The signature may be replaced by a stamp, an accounting machine entry or in any other appropriate manner.

Dangerous goods

Europe-wide rules govern the transportation of dangerous goods by rail. These are known by the letters ‘RID’ (Appendix C of the COTIF agreement).

Any dangerous goods must be marked with their name, description and UN number (the UN number states which of the following nine categories your dangerous goods come under).

<table>
<thead>
<tr>
<th>UN Class</th>
<th>Dangerous Goods</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Explosives</td>
<td>Explosive substances and articles</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>2</td>
<td>Gases</td>
<td>Flammable gas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-flammable, non-toxic gas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toxic gas</td>
</tr>
<tr>
<td>3</td>
<td>Flammable liquids</td>
<td>Flammable liquids</td>
</tr>
<tr>
<td>4</td>
<td>Flammable solids</td>
<td>Class 4.1 Flammable solids, self reactive substances and solid desensitised explosives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class 4.2 Substances liable to spontaneous combustion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class 4.3 Substance which emits flammable gas in contact with water</td>
</tr>
<tr>
<td>5</td>
<td>Oxidising substances</td>
<td>Class 5.1 Oxidising substance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class 5.2 Organic peroxide</td>
</tr>
<tr>
<td>6</td>
<td>Toxic substances and infectious substances</td>
<td>Class 6.1 Toxic substances</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class 6.2 Infectious substances</td>
</tr>
<tr>
<td>7</td>
<td>Radioactive material</td>
<td>Radioactive material</td>
</tr>
<tr>
<td>8</td>
<td>Corrosive substances</td>
<td>Corrosive substances</td>
</tr>
<tr>
<td>9</td>
<td>Miscellaneous dangerous substances and articles</td>
<td>Miscellaneous dangerous substances and articles</td>
</tr>
</tbody>
</table>

In case of transportation of dangerous goods, the information that is required by the by Annex C on RID, needs to be indicated in the consignment note as well as in the wagon list.

**Document of carriage for empty uncleaned means of containment as defined by the RID**

The following provisions are applicable to the return of empty uncleaned means of containment, containing the residues of dangerous goods which are not accompanied by a consignment note or a wagon note.

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79 In accordance with paragraph 5.4.1.6.2.1 RID, the following means of containment are considered as packaging: “empty packaging”, “empty receptacle”, “empty IBC”, “empty large packaging”. In accordance with paragraph 5.4.1.6.2.2 RID, the following means of containment must be considered as means other than packaging “empty tank vehicle”, “empty tank wagon”, “empty demountable tank”, “empty tank container”, “empty portable tank”, “empty battery-vehicle”, “empty battery-wagon”, “empty MEGC”, “empty vehicle”, “empty wagon”, “empty container”, “empty receptacle”.

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82
The consignee for the loaded journey must supply the carrier with two copies of a declaration for each means of containment. For this purpose, two sheets from a consignment note are to be used. The following information must be entered in the appropriate spaces in the written declaration:

- consignor (consignee of the loaded journey),
- wagon number or designation of the means of containment,
- information required for empty uncleaned means of containment.

The other provisions of the RID applicable to packaging and to empty uncleaned means of containment containing residues of dangerous goods must also be observed by the consignee of the loaded journey.

1.2. SMGS consignment note

The Agreement on International Goods Transport by Rail (SMGS) governs railway activities between the countries. The countries that have entered into the agreement belong to the Organization for Cooperation of Railways (OSJD). The working languages of the OSJD are Russian and Chinese.

Transport between Europe and Asia is controlled by different regulations from Western Europe, such as:

- Agreement on Direct International Carriage of Passengers and Luggage by Rail and Procedure Instruction attached thereto (SMPS),
- Agreement on Direct International Goods Transport by Rail and Procedure Instruction attached thereto (SMGS),
- Rules of Reciprocal Use of Wagons in International Traffic (PPW),
- Agreement on Direct International Carriage of Passengers and Luggage by Rail (MPS)
- Agreement on Direct International Goods Transport by Rail (MGS).

The SMGS consignment note consists of 5 A4 sheets.\(^{81}\)

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\(^{80}\) The Organization for Cooperation of Railways (OSJD or OSShD) was established at a conference in Sofia, Bulgaria on 28 June 1956, the governmental ministers managing railway transport of Eastern bloc countries Albania, Bulgaria, Hungary, Vietnam, East Germany, China, North Korea, Mongolia, Poland, Romania, the USSR, and Czechoslovakia decided to establish a special intergovernmental organization, the executive body of which started operations in Warsaw, Poland on 1 September 1957. It is the equivalent of the International Union of Railways (UIC) to create and improve the coordination of international rail transport. Concerning especially the transports between Europe and Asia, it has helped develop cooperation between railway companies and with other international organisations. The members of this organisation created an international transport law.

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Original of the railway consignment note (accompanies the cargo to the destination station and is issued to the consignee with sheet 5 and cargo)</td>
</tr>
<tr>
<td>2</td>
<td>Road list (accompanies the cargo to the destination station and remains on the destination road)</td>
</tr>
<tr>
<td>3</td>
<td>Duplicate of the railway consignment note (issued to the sender after the conclusion of the contract of carriage)</td>
</tr>
<tr>
<td>4</td>
<td>Sheet of delivery of cargo (accompanies the cargo to the destination station and remains on the destination road)</td>
</tr>
<tr>
<td>5</td>
<td>Sheet of notification of the arrival of the goods (accompanies the cargo to the destination station and is issued to the consignee together with sheet 1 and cargo)</td>
</tr>
</tbody>
</table>

As well as the necessary number of additional copies of the road list intended for the way of departure and transit railways.

The sheets 1, 2, 4 and 5 of the SMGS consignment note accompany the goods to the destination station. Sheet 3 of the invoice (duplicate of the waybill) is returned to the shipper after the conclusion of the contract of carriage. This sheet does not have the power of the original invoice (sheet 1 consignment note).\(^2\)

### 1.3. Common CIM/SMGS consignment note

It is an alternative to the classic system of consignment with re-transcription of a SMGS consignment note to a CIM consignment note or from a CIM consignment note to a SMGS consignment note at the re-consignment point. The common CIM/SMGS consignment note may be used as a CIM consignment note in the area in which the CIM applies and as an SMGS consignment note in the area in which the SMGS applies. The same principle also applies to the use of the CIM/SMGS consignment note as a customs document.

Descriptions of the boxes are to be printed in two, or as appropriate three, languages of which one must be Russian and another either English, French or German. For consignments to or from the People’s Republic of China, descriptions of the boxes are additionally to be printed in Chinese.

The common CIM/SMGS consignment note consists of 6 A4 sheets:

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Retention of the sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Original of the consignment note</td>
<td>Consignee</td>
</tr>
<tr>
<td>2</td>
<td>Invoice</td>
<td>CIM carrier at the destination or SMGS destination railway</td>
</tr>
<tr>
<td>CIM 5</td>
<td>Duplicate of the consignment note</td>
<td>Consignor</td>
</tr>
<tr>
<td>SMGS 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Delivery note</td>
<td>CIM → SMGS traffic: destination railway SMGS → CIM traffic: not used</td>
</tr>
<tr>
<td>CIM 5</td>
<td>Arrival note/Customs</td>
<td>CIM → SMGS traffic: consignee/customs SMGS → CIM traffic: destination carrier/customs</td>
</tr>
<tr>
<td>SMGS 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Duplicate invoice</td>
<td>CIM → SMGS traffic: forwarding carrier SMGS → CIM traffic: not used</td>
</tr>
</tbody>
</table>

Block trains, groups of wagons and groups of containers may be consigned with a single CIM/SMGS consignment note and a CIM/SMGS wagon list/container list provided there has been prior agreement between the consignor and the carriers taking part and provided the following conditions are satisfied:

- same consignor and consignee,
- same acceptance point/forwarding station,
- same delivery point/destination station,
- same commodity (unless agreed otherwise).

With the CIM/SMGS consignment note the necessary CIM and SMGS conveyance contracts are condensed into a single document. This enables non-stop rail freight transport with a single consignment document between Europe, Russia and Asia. It also applies as a T1 transit declaration (see below) in the customs area of the EU/EFTA. It applies as a national customs (transit) document in each instance in the area of the SMGS regime and it can be used both in wagon loading and Combined Traffic.

A common CIM/SMGS consignment note has several advantages, *i.e.* export formalities/commercial verification can be dealt with as soon as the consignment has been dispatched in the EU/EFTA. No
amendments to the documents at the place of re-consignment between two legal areas and it guaranties thus minimal wagon stoppage times. A common CIM/SMGS consignment note is used voluntary, when agreed between the sender and the carrier.

1.3.1 Common CIM/SMGS electronic consignment note

CIM – Functional equivalence as the legal basis

The consignment note and its duplicate may be created in the form of an electronic data record which can be transformed into legible written symbols. The procedures used for data storage and processing must be functionally equivalent to those for the paper system particularly in so far as the evidential value of the consignment note represented by that data is concerned.

SMGS – Agreement between railways, consignors and consignees who apply the SMGS as the legal basis

The contract of carriage may be concluded using an electronic consignment note. The electronic consignment note is an electronic data record which is regarded as a paper consignment note supporting a contract of carriage. The arrangements for entering data into the electronic data record are to be agreed between the railway and the consignor. If necessary, this electronic consignment note and any supplementary sheets may be printed on paper. The original data is to be retained in addition to any altered data where data input to the electronic data record is altered in accordance with the provisions of the SMGS.

Agreement for the use of electronic data interchange for international freight traffic by rail (EDI agreement)

The carriers (railways) and the customers (consignors and consignees) are to set down the messages to be exchanged and the ways in which electronic consignment note data will be exchanged in a contract.

Common CIM/SMGS Wagon List

Except where otherwise agreed, the consignor is to make out the CIM/SMGS wagon list and give it to the forwarding carrier with the CIM/SMGS consignment note. As many copies of the CIM/SMGS wagon list must be attached as the CIM/SMGS consignment note has sheets. This must include the additional copies of the invoice.
**Specimen of the additional invoice forming**

A common CIM/SMGS consignment note also contains specimen of additional invoice forming.

**CIM/SMGS container list**

Except where otherwise agreed, the consignor is to make out the CIM/SMGS container list and give it to the forwarding carrier with the CIM/SMGS consignment note. As many copies of the CIM/SMGS container list must be attached as the CIM/SMGS consignment note has sheets to include the additional copies of the invoice.
CIM/SMGS formal report

The purpose of the CIM/SMGS formal report is to record the condition of the goods and the extent of loss or damage. The CIM/SMGS formal report is to be made out in at least two copies. One copy is to be attached to the CIM/SMGS consignment note. Descriptions of the boxes on the CIM/SMGS formal report are to be printed in two, or as appropriate three, languages of which one must be Russian and another either English, French or German. For consignments to or from the People’s Republic of China, descriptions of the boxes may additionally be printed in Chinese.

1.4. National freight bill

A national consignment note or domestic freight bill is very similar in format to the CIM consignment note. However, it can have a different official name. Sometimes the CIM consignment note is used in the domestic rail freight transportation.

2. Other documents

2.1 Forwarders’ certificates

If goods are send intermodally, it is unlikely that the same train will transport them the whole way. This is what the Forwarders’ Certificate of Receipt (FCR) is needed. It provides a proof that a forwarder has collected goods with irrevocable instructions to deliver them to the consignee indicated on the FCR.

The FCR can be presented for payment, rather than having to wait until a non-negotiable or negotiable transport document (the proof of the goods having been loaded onto the transport conveyance for the main international carriage, if any) is issued, which may be some time later.

While the FCR is non-negotiable, another similar document, the Forwarders’ Certificate of Transport (FCT), is negotiable. This means that the forwarder accepts responsibility to deliver to a specified destination - not to an unchangeable destination as with the FCR.
2.2 Insurance for international rail transport

As with any commercial transaction, there are risks associated with trading internationally. Before moving goods by rail, insurance for international rail transport needs to be issued.

Three main risks arise in international trade. These are loss, damage and delay, including detention at customs. The contracts should use Incoterms to specify exactly how these risks are shared between buyer and seller.

Incoterms are an internationally recognised set of trading terms that spell out exactly when responsibility for the costs and risks of a transaction shift from seller to buyer. The greater the risks are, the greater the insurance cover needs to be arranged.

Freight insurance covers common risks during handling, storing, loading or transporting cargo, but also rare risks, such as riots, strikes or terrorism.

There is a difference between the goods transport insurance and the carrier’s liability insurance. The covered risks, fixed compensation and indemnity of the contract of transport insurance are left to the holder’s choice. Nevertheless, the hauler’s liability insurance is determined by different regulations. Depending on the means of transport, indemnity is limited by the weight and value of the goods and is only given in cases where the transporter cannot be held liable.

International transport of goods by rail is regulated by the Convention concerning Intercarriage by Rail (CIM Convention), signed in Bern in 1980. The rail carrier is not responsible for losses of or damages to the goods if he proves that they arise from:

- the merchandise’s own defect(s);
- force majeure;
- a fault by the loader or consignee.

There is no EU regulation regarding compensation. Indemnification is normally limited to a maximum amount per gross kilo lost or damaged. In the majority of cases, therefore, the company is unlikely to receive anything approaching the value of its goods.

2.4 Documents for customs clearance in rail

2.4.1 Commercial invoice

The commercial invoice is a record or evidence of the transaction between the exporter and the importer. Once the goods are available, the exporter issues a commercial invoice to the importer in order to charge him for the goods.

The commercial invoice contains the basic information on the transaction and is always required for customs clearance. Although some entries specific to the export-import trade are added, it is similar to an ordinary sales invoice. The minimum data generally included are the following:

...
• Information on the exporter and the importer (name and address)
• Date of issue
• Invoice number
• Description of the goods (name, quality, etc.)
• Unit of measure
• Quantity of goods
• Unit value
• Total item value
• Total invoice value and currency of payment. The equivalent amount must be indicated in a currency freely convertible to Euro or other legal tender in the importing EU country
• The terms of payment (method and date of payment, discounts, etc.)
• The terms of delivery according to the appropriate Incoterm
• Means of transport

No specific form is required. The commercial invoice is to be prepared by the exporter according to standard business practice and it must be submitted in the original along with at least one copy. In general, there is no need for the invoice to be signed. In practice, both the original and the copy of the commercial invoice are often signed. The commercial invoice may be prepared in any language. However, a translation into English is recommended.

2.4.2 Custom Value Declaration

A Customs Value Declaration must be presented to the customs authorities where the value of the imported goods exceeds €10,000. The Customs Value Declaration must be drawn up conforming to form DV 1 \(^\text{85}\) of which a specimen is provided in Annex 8 \(^\text{86}\) to Regulation (EU) 2016/341 \(^\text{87}\) the UCC Transitional Delegated Act. \(^\text{88}\) This form must be presented with the Single Administrative Document (SAD) (see further).

The main purpose of this requirement is to assess the value of the transaction in order to fix the customs value (taxable value) to apply the tariff duties.

The customs value corresponds to the value of the goods including all the costs incurred (e.g.: commercial price, transport, insurance) until the first point of entry in the European Union. The usual

method to establish the Customs value is using the transaction value (the price paid or payable for
the imported goods).

2.4.3 T1 transit declaration

In order to bring the goods under the regulations of external Community customs transport, a T1
declaration to Customs needs to be submitted. Goods are not cleared as such, but they can be
transported from customs depot to customs depot under the supervision of Customs.

A T1 is a transit document used to transport goods from the customs office at the place of departure
to the customs office at the destination without paying customs duties and taxes within the
territories of the countries included in the transit agreement.

A T-document has restricted validity and must be settled in time by means of a subsequent
document or be cleared into free circulation by means of clearance, or exported outside the EU
again.

2.5 Freight documents

The following documents are to be filled in and presented to the customs authorities of the
importing EU country upon importation in order for the goods to be cleared:

2.5.1 Bill of Lading (B/L)

Issued by the shipping company to the operating shipper, confirming that the goods have been
received on board. The Bill of Lading serves as proof of receipt of the goods by the carrier obliging
him to deliver the goods to the consignee. It contains the details of the goods, the vessel and the
port of destination. It evidences the contract of carriage and conveys title to the goods, meaning that
the bearer of the Bill of Lading is the owner of the goods.

The Bill of Lading may be a negotiable document. A number of different types of bills of lading can be
used. “Clean Bills of Lading” state that the goods have been received in an apparent good order and
condition. “Unclean or Dirty Bills of Lading” indicate that the goods are damaged or in bad
order, in this case, the financing bank may refuse to accept the consignor’s documents.

2.5.2 FIATA Bill of Lading

A document designed to be used as a multimodal or combined transport document with negotiable
status. Developed by the International Federation of Freight Forwarders Associations (FIATA).

2.5.3 CIM consignment note

A CIM consignment note (discussed earlier) required for the transportation of goods by rail and
regulated by the Convention concerning International Carriage by Rail 1980 (COTIF-CIM). The CIM is
issued by the carrier in five copies, the original accompanies the goods, the duplicate of the original is
kept by the consignor and the three remaining copies by the carrier for internal purposes. It is
considered the rail transport contract.

See Logistics Glossary: http://www.logisticsglossary.com/term/t1/
http://www.f1express.fi/en-gb/node/66
http://fiata.com/home.html

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2.5.4 ATA Carnet

Temporary Admission carnets are international customs documents issued by the chambers of commerce in the majority of the industrialized world to allow the temporary importation of goods, free of customs duties and taxes. ATA carnets can be issued for the following categories of goods: commercial samples, professional equipment and goods for presentation or use at trade fairs, shows, exhibitions and the like.

2.5.6 Packing list (P/L)

The packing list (P/L) is an inventory of the incoming cargo required for customs clearance and accompanying the commercial invoice and the transport documents.

It generally includes the following:

- the exporter, the importer and the transport company
- date of issue
- number of the freight invoice
- type of packaging (drum, crate, carton, box, barrel, bag, etc.)
- number of packages
- content of each package (description of the goods and number of items per package)
- marks and numbers
- net weight, gross weight and measurement of the packages

No specific form is required. The packing list is to be prepared by the exporter according to standard business practice and the original along with at least one copy must be submitted. Generally, there is no need for it to be signed. However, both the original and the copy of the packing list are often signed. The packing list may be prepared in any language, although a translation into English is recommended.

2.5.7 Single Administrative Document (SAD)

All goods imported into the EU must be declared to the customs authorities of the respective EU country using the Single Administrative Document (SAD), which is the common import declaration form for all the EU countries.

The SAD may be presented either by:

- using an approved computerised system linked to Customs authorities; or
- lodging it with the designated Customs Office premises.

The main information to be declared is:

- identifying data of the parties involved (importer, exporter, representative, etc.)

• customs-approved treatment (release for free circulation, release for consumption, temporary importation, transit, etc.)
• identifying data of the goods (Taric code, weight, units), location and packaging
• the means of transport
• data about country of origin, country of export and destination
• commercial and financial information (Incoterms, invoice value, invoice currency, exchange rate, insurance etc.)
• list of documents associated with the SAD (Import licenses, inspection certificates, document of origin, transport document, commercial invoice etc.)
• declaration and method of payment of import taxes (tariff duties, VAT, Excises, etc)

The SAD set consists of eight copies; the operator completes all or part of the sheets depending on the type of operation.

For imports, generally three copies are used: one is retained by the authorities of the EU country in which arrival formalities are completed, another is used for statistical purposes by the EU country of destination and the last is returned to the consignee after being stamped by the customs authority.

2.5.8 Documents associated with the SAD

According to the operation and the nature of the imported goods, additional documents must be declared with the SAD and presented together with it. The most important documents are:

• documentary proof of origin, normally used to apply a tariff preferential treatment
• certificate confirming the special nature of the product
• transport document
• commercial invoice
• customs value declaration
• inspections certificates (health, veterinary, plant health certificates)
• import licenses
• community surveillance document
• cites certificate
• documents to support a claim of a tariff quota
• documents required for Excise purposes
• evidence to support a claim for VAT relief.
**Summary**

Rail documents required for international and domestic transportation of goods by rail:

<table>
<thead>
<tr>
<th></th>
<th>A block train</th>
<th>SWL/wagon group</th>
</tr>
</thead>
</table>
| **National transportation** | • Domestic consignment note  
• Wagon list  
• Dangerous goods (RID)  
• Train documents | • Domestic consignment note for each wagon or wagon group  
• Wagon list  
• Dangerous goods (RID)  
• Train documents |
| **International transportation** | • CIM/SMGS consignment note  
• Wagon list  
• Dangerous goods (RID)  
• Train documents  
• Custom documents | • CIM/SMGS consignment note for each wagon or wagon group  
• Wagon list  
• Dangerous goods (RID)  
• Train documents  
• Custom documents |
A.3. Air freight transport

In air freight transport, all shipments, irrespective of their origin and destination, are provided with documents from the carrier. In the case of air freight, the document issued by the airline is called an Airway Bill or simply AWB. However, there are two different types of airway bills based upon the party that is arranging the freight of the shipment. These are called Master Airway Bill and House Airway Bill. This article attempts to make clear the difference between HAWB and MAWB.

The AWB is issued by the airline agent to send the detail of the consignment. This contains a proof of the transport contract, proof of the management of the goods and the price justification. The AWB certifies the actual shipment of the goods once the airline has indicated the date and flight number. However, it is emitted as a non-negotiable document.

The AWB is ruled by the Warsaw Convention dated 12 October 1929 modified by the Montreal convention dated 28 May 1999.

The International Air Transport Association (IATA) established a model of Airway Bill that conforms to the rules mentioned in the Warsaw Convention.

Very often requested as part of a payment, the transport titles are important because they provide evidence of transport.

Two categories of documents should be distinguished:

- documents issued by transportation companies
- those issued by freight forwarders / forwarders.

In air transport, the air waybill (AWB) is both, a proof of the transport contract and the management of the goods, invoice, certificate of insurance and a reference guide for handling.

Two other documents are additionally important:

- the instruction letter of the sender
- the declaration of the shipper for dangerous goods.

The central element of the documentation required for export and import of goods by air is the Air WayBill (AWB). An air transport agreement is concluded between the carrier (airline) and consignor (who can be a forwarder). The contract is evidenced by the AWB. It can be established by the airline, the sender or the recipient. If it is a retail shipment, it is issued by the airline agent. If there is a consolidation, a House Air Waybill is established by the consolidator (in most cases the freight forwarder). It is then signed by the airline before the actual loading of the cargo, and then delivered to the consignor. This signature binds the carrier.

The AWB certifies the actual shipment of the goods once the airline has indicated the date and the flight number. As part of the procedure simplification of air cargo, IATA (you need to mention what this stands for as it was not mentioned before in text) generalizes its electronic air waybill device, the e-AWB. The procedure is open to operators from Montreal Convention ratifying states.

1. Air way bill (AWB)

The Air way bill (AWB) is a type of bill of landing that serves as a

1) receipt of goods by an airline (carrier)
2) contract of carriage between the shipper and the carrier.
It includes the conditions of carriage that define (among other terms and conditions) the carrier’s limits of liability and claims procedures, a description of the goods, and applicable charges.

The airline industry has adopted a standard format for AWB which is used throughout the world for both domestic and international traffic.

Unlike a bill of lading, an AWB is a non-negotiable instrument. It is usually issued by an air carrier of goods on receipt of goods after completion of export customs formalities of the country. The shipper obtains an airway bill once after handling over cargo to the airline. Since the cargo reaches by air and transit time is very short compared to sea shipment, a set of airway bills is sent along with the cargo for immediate reference on transit and for import customs clearance at destination airport by importer. Once the customs formalities at the loading airport are complete, a cargo transfer manifest (CTM) is issued by an IATA agent, along with airway bill and other required documents for transport are submitted to air carriers.

Original airway bills are issued in quintuplicate which is meant for carrier, importer, shipper and additional copies. Once the cargo arrives at a destination, the importer or his cargo agent approaches the destination office of the air carrier and collects the airway bill and other required documents sent by shipper along with cargo for necessary documentation for import customs clearance procedures and other references.

Importer may also collect copies of documents by courier or mail from shipper before arrival of goods. The shipper also can arrange to send airway bill and other documents through his bank to meet LC requirements.

The major difference between bill of lading and an Airway bill is that, an Airway bill is not a document of title. However, an Airway Bill can be prepared in such a way to be treated as a document of title and negotiable document.

How does it work?

IATA has established a pattern of AWB that conforms to the rules mentioned in the Montreal Convention (Chapter II, Article 5). The AWB may, according to the instructions of the shipper, cover one or more packages. It wears an ID number in which the first three digits qualify the Airline, followed by eight digits. In the paper version, the AWB must be established by the consignor in three original copies:

- the first part shall be marked "for the carrier" and is signed by the sender. It is, the signed transport contract.
- the second part shall be marked "for the consignee" and is signed by both the sender and the carrier. It is intended to accompany the shipment;
- the third copy is signed by the carrier who delivers it to the consignor after acceptance of the goods.

Once it is signed, it is an evidence for the proper handling of the goods. The signature of the carrier is done as soon as the goods are registered in its IT system, regardless of actual loading of the goods.

This is an important point in case of shipments under letter of credit, because the practice is not the same in air and maritime. In air, the date of issuance of the AWB acts as a shipping date, unlike lading, which must be embedded lading (that is to say certifying the placing on board of the goods).
The carrier of goods has the right to ask the sender to establish different AWBs when there are several packages.

**The responsibility of the parties**

According to Article 10 of the Montreal Convention, the sender is responsible for the accuracy of the information and statements concerning the goods which are indicated in the air waybill. He will bear the responsibility for any damage suffered by the carrier or any other person because of inaccurate or incomplete indications and statements.

**The parties to the contract of carriage**

The parties to the contract of carriage are always the shipper and the carrier:

Case 1: expedition under AWB given directly to the cargo agent.

The agent acts as broker. It is not part to the contract of carriage, which concerns only the shipper (here, the sender) and the company. Its responsibility is limited;

Case 2: shipping under exclusive AWB, in which the agent chooses the airline that carries out the transportation. The agent acts as dealer. His responsibility is broader. For his compensation, he signed a commission contract with the carrier.

Case 3: shipping via a consolidator who is monitoring a consolidation with parcels from various shippers loaded in full Unit Loading Devices (ULD). In this case, the consolidator agent becomes legally responsible near the carrier, shipper and therefore the editor of the AWB. The different shippers receive a management certificate (Forwarder's Certificate of Receipt) and their respective HAWB. The HAWB (House Air Waybill) embodies the contract between the consolidator with his customer. For the airline, only the AWB, therefore called Master Air Waybill (MAWB), is acting as an official contract. The agent acts as a forwarder since he is allowed to choose the airline to be used. By this fact alone, he has signed a commission contract with the sender.

**The AWB for integrators**

Integrators meet both cargo agent and carrier functions. They are, in this case, AWB emitters signed by the shipper. Express shipments, which constitute the main part of their business, are done with packaged goods exclusively (packages, parcels), directly accompanied by a simplified AWB filled by the shipper and issued at the collection of the goods, because of the signature process that ensures pick up.

**The mandatory information on the AWB**

- **The date and place of issuance of the contract**
- **Departure and destination points**
- **Planned stops, subject to the possibility for the carrier to stipulate that they may change in case of necessity, adding that this change will not be a reason for the carriage to lose its international status**
- **The date and time scheduled for departure and / or return**
- **The references of the shipper**
- **The references of the freight forwarder at departure and at destination**
- **The references of the carrier**
• The consignee’s references
• The references of the ground handling company at departure and at destination
• The nature of the goods
• The number of parcels, packing mode, particular marks or numbers of packages the weight, quantity, volume or cargo dimensions
• The apparent condition of the goods and packaging
• The cost of transport if stipulated, the date and place of payment and the person who has to pay (incoterm)
• Details of the taxes and the airfreight rate
• If the shipment is made Cash on Delivery, the commodity prices to be recovered and the possible additional costs
• The amount of the declared value if applicable
• The number of copies of the air waybill
• The documents handed to the carrier to accompany the air waybill
• The transport scheduled time and a brief indication of the route to be used if they have been agreed upon
• The statement that the carriage is subject to the system of liability established by the Warsaw Convention
• The customs information and legal aviation security information according to the type of goods to be transported
• The shipper’s profile and those of the potential forwarders involved.

2. MAWB

This is a document issued replacing the AWB in case of consolidation or in case the shipments are handled by a Freight forwarder. It is issued by either the airline or by its authorized agent. MAWB is a non-negotiable document, and it provides all the information for the transport of goods or consignment from one airport to another.

When an agent issues the document on behalf of an airline, it is called a Master Airway Bill (MAWB). MAWB has an eleven digit number printed on it, same as the AWB. The first three digits refer to the prefix of the airline and the remaining digits stand for the consignment, tracking the location of the shipment. There are several copies of MAWB, with the first three being considered originals. The first copy is the shippers (blue), the second of the airline (also blue), while the third copy given to consignee (orange). There is also a yellow copy that is considered as a delivery receipt.

3. HAWB

The acronym HAWB stands for House Airway Bill and is issued by the airfreight agent for its customer. There are two main functions of HAWB. It serves as the receipt for the goods or the shipment and also as an evidence of a contract between the airfreight agent and the customer. The freight agent accepts that it has received the goods from the customer and also the fact that it is obliged to act as a freight forwarder.
The document contains all the terms and conditions of the contract. Usually an HAWB is ready before the goods are delivered to the airline that carries them. However, HAWB is not a document of title. It is the responsibility of the airfreight agent to ensure that all correct entries are made in the HAWB. The agent also has to ensure proper management of the goods while they are under his custody. The agent has to make sure that the person who receives goods at the final destination is, in fact, a representative of the consignee.

4. e-AWB

According to what was described above, the paper Air Waybill is a critical air cargo document that constitutes the contract of carriage between the Shipper and the Carrier. The term “e-AWB” is adopted by International Air Transport Association (IATA) to describe the interchange of electronic data (EDI) message, instead of a paper air waybill, to conclude the contract of carriage. (Source from IATA)

The e-Air Waybill solution allows the electronic filing of transportation document of an air cargo shipment to a Carrier or an Authorized Agent. e-AWB is an industry-wide initiative by International Air Transport Association (IATA) to replace paper AWB. Every day, every International Air Cargo shipment can involve more than 30 different paper documents. Among the documents, the Air Waybill (AWB) or Air Consignment Note is the most important piece of non-negotiable transportation paper document in air cargo transportation issued directly by a carrier, or through its authorized agent.

The digital advancement has enabled more Exporters and freight forwarders to process documents in less time. With the replacement of AWB with e-AWB it allows a quicker turnover of electronic contract of carriage between the freight forwarder and the airline to make cargo transportation by air faster, more reliable and cost effective.

e-AWB provides data accuracy, confidentiality and efficiency to address the ever-changing challenges in the air freight and logistics industry. Through eliminating paper-based AWB and information exchanges between air cargo agents and airlines, e-AWB enables the companies and their business to save money. The savings are achieved through the following: a reduction in fees charged by the airline by transmitting AWB electronically, reducing paper usage costs, man-power and transport utilization costs, minimizing waiting time through at the airline/agent desk and an overall positive impact on the environment through the reduction in tons of paper used by paper-based AWB annually.

At the same time, it will produce higher productivity as there is no need to print or archive AWBs manually, reducing delays due to missing or illegible paper AWBs and thus preventing human errors.

Not all airlines and airports are ready to accept e-AWB.

A list of e-AWB-ready airlines is available by using the IATA free of charge e-Cargo Matchmaker web-based tool.
A.4. Inland waterways transport

In inland waterways transport, the following documents are used:

- CMNI Transport Document, issued by the carrier for each carriage of goods governed by the Budapest Convention (CMNI). A Bill of Lading can be requested by the shipper if it has been so agreed before the goods were loaded or before they were taken over for carriage.

- ADN transport document where applicable. The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) was done in Geneva in 2000 jointly by the United Nations Economic Commission for Europe (UNECE) and the Central Commission for the Navigation of the Rhine (CCNR) and entered into force in 2008. The AND has several objectives: first, to ensure a high level of safety of international carriage of dangerous goods by inland waterways; second, to effectively contribute to the protection of the environment by preventing any pollution resulting from accidents or incidents during such carriage; and, third, to facilitate transport operations and promoting international trade in dangerous goods.

- EVOA waste transport document where applicable, for the transportation of waste products, governed by EEC Regulation 1013/2006.

- Documents related to vessel identification based on the technical Directive (EU) 2016/1629 and/or national legislation issuing a unique vessel identification number by the national authority in which the owner has its seat and registered in the European Hull Database.

- Documents related to personnel professional certifications based on Directive 2017/2397 on professional qualifications which aims to establish a new system of qualifications and attestation of the crew members including a new database of e-service record books and logbooks.

International transport on Inland Waterways is governed by the CMNI convention according to which the carrier under a CMNI contract has to issue a transport document (art. 11).

According to the definition in art. 1.8 “In writing” includes, unless otherwise agreed between the parties concerned, the transmission of information by electronic, optical or similar means of communication, including, but not limited to, telegram, facsimile, telex, electronic mail or electronic data interchange (EDI), provided the information is accessible so as to be usable for subsequent reference. Directive 2000/31/EC on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market (‘Directive on electronic commerce’) in article 9 Article 9 a.o. determines that Member States shall ensure that their legal system allows contracts to be concluded by electronic means. Member States shall in particular ensure that the legal requirements applicable to the contractual process neither create obstacles for the use of electronic contracts nor result in such contracts being deprived of legal effectiveness and validity on account of their having been made by electronic means.

The CMNI transport document governs the contractual relationship between the contracting parties, which however might be used for other purposes as well, f.e. as evidence in case of claims. IVR has elaborated a model of such transport document.
The document evidences the contract of carriage between the Shipment and the Carrier and the taking over or loading of goods by the Carrier.

This provision states that the responsibility of the carrier under the contract of carriage is limited to a maximum of 102 units of currency or any other currency and that this limitation does not apply in case of any personal injury or death of a passenger or any loss of or damage to the baggage of the passenger.

1. Carrier and Shippers can agree that the contract is not liable for losses arising from the mentioned situations under this article.

2. The Franchisee and Abandoned Children are not liable for any personal injury or death of a passenger or any loss of or damage to the baggage of the passenger.
For the carriage of dangerous goods under ADN a transport document is required which based on ADN may be issued electronically (5.4.0.2.)

In the event of cross-border transport of waste the sender is subject to EEC Regulation 1013/2006 on shipments of waste within (EVOA). This Regulation contains the procedures to be complied with if one wishes to import waste from, export waste to or transport waste through a European Union member state, and export waste to a state outside the EU.

EEC Council Regulation No 11 concerning the abolition of discrimination in transport rates and conditions, in implementation of Article 79 (3) of the Treaty establishing the European Economic Community in article 6 requires a transport document to prove compliance with this regulation.

This regulation is used by national enforcement bodies in IWT (mainly in the Netherlands) to control the goods on board of a vessel.

Tax regulations in case of import or export of goods require certain information which can provided electronically.
A.5 Maritime freight transport

The increase of the international trade linked to the technological and logistics progresses, allowed
the container to be the major mode of transport in the maritime sector. It also generated a higher
rate of the harbor operations. On containerized ships, it became almost impossible to establish a
document containing the compulsory indications as per the 1924 convention.

The generic term, Bill of Lading (B/L) in the international sale and movement of goods is probably the
most important document. It has been relied upon by the commercial community for over hundreds
of years. A bill of Lading (B/L) is a classic document generated by a shipping line or its agent which
serves as an evidence of contract between the person (shipper/exporter) shipping the goods, the
carrier and the receiver of goods (buyer).

Liabilities of the parties involved in the carriage are set out in the Legal Issues document. The legal
responsibility considered in this document is the commercial role of the bill of lading in relation to
the transfer of title of goods and their payment.

In effect, the only party able to take delivery of the goods at destination is the one who is the
legitimate holder of the consigned or endorsed bill of lading.

As with the cloakroom ticket (no ticket, no coat principle) the key principle is no bill of lading, no
goods. However, with the bill of lading, the transfer of ownership (title) of the goods is not the same
as with the transfer of property. That will pass when the buyer and seller intend it should do so under
a contract of sale, usually when payment is made. Very often the bill of lading will be the control
document for the payment procedures in an international transaction.

Being assured that a contract of carriage exists, and that goods have been received by the carrier, the
bill of lading shows the buyer and the buyer’s bank that dispatch of goods according to the contract
of sale is under way. For the exporter, holding a bill of lading as title to the goods may control when
the buyer takes delivery by choosing the point at which it is transferred.

Increasingly, ocean carriers will request the data for the bill of lading to be submitted electronically in
order to save them re-keying the information, thereby reducing the scope for transcription
errors. B/L contains details of merchandise shipped onboard the vessel which is acknowledged and
duly signed by the Master of the vessel on behalf of the owner. The B/L certifies the condition of
goods loaded onto the vessel with some notation/endorsement, assigns title to the goods and makes
carrier responsible to release the merchandise to the holder of the title or a named party at the
destination port. The functionality of B/L signifies the importance of B/L in the overall shipping &
freight chain. B/L is considered as a unique document in the international trade because of its three
important characteristics / functions:

- It acts as an evidence of very good contract of carriage of goods by sea
- It is a proof of receipt of goods on board the vessel including its quantity and condition
- B/L acts as a legal document of title to the goods without which goods cannot be delivered at
  the final destination port.

As a negotiable document, which allows title of goods to be transferred by endorsements and
delivery, one or other parties to the transaction may control title to the goods.
For this reason, letters of credit often specify certain types of bills of lading in order for this control to be done, and there are a number of different types available to exporters depending on the type of service being used, as well as various clauses applicable.

1. Ocean bill of lading

The most commonly used and familiar document for transportation of goods across the international water, is an Ocean Bill of Lading. International trade today cannot function without this vital document.

An ocean bill of lading serves as a legally binding document between the shipper and carrier with regard to its role as a contract of carriage and receipt of goods as well. It also serves as a proof of ownership (Title) of goods and may be used either in a negotiable or non-negotiable form. An ocean bill of lading is commonly used in negotiable form in a letter of credit transaction (L/C), which may be bought, sold or traded before the goods are received by the original consignee or remain in transit. It also serves as valuable supporting document for settlement of claims for compensation against damage, delay or loss of cargo. The rights, responsibilities, and liabilities of the carrier and the shipper under an ocean bill of lading (normally printed on its back) are governed generally either by the older Hague rules, or by the subsequently adopted Hague-Visby rules. The term Marine Bill of Lading is also used in the international trade as a substitute of Ocean Bill of Lading.

Straight bill of lading

Straight bill of lading is a special type of B/L in which goods are consigned to a designated party. That means there is no scope to transfer the title or ownership of the goods through endorsement to any other party. Due this special characteristic, it serves as a “Non-negotiable & Non-transferable” document.

The carrier is under obligation to deliver to goods only to the named consignee mentioned in the B/L at the destination port, upon surrender of all the original Bills of Lading issued. This kind of B/L is widely used in shipping industry.

An order bill of lading

Contrary to straight bill of lading, an order bill of lading is one in which goods are consigned to the order of a named party or order of consignee. That means ownership of goods covered under this type of B/L, can be transferred from one party to another by endorsement. This kind of B/L is also termed as ‘Negotiable Bill of Lading’.

Generally goods are shipped under ‘To order B/L’, where payments have not been received in advance from buyer. Carrier’s destination agent may release the goods to the actual holder, against surrender of at least one of the issued originals and after thoroughly checking the endorsements on the back of the bill of lading.

Seaway bill of lading

A seaway bill of lading has similarity with straight bill of lading as the seaway bill does not confer title of the goods to the bearer. As such it is also considered as a non-negotiable document. But seaway B/L is different from straight B/L. Because a seaway bill is issued to facilitate overseas movement of goods between two offices of the same company located in two different countries.

For example, a pharmaceutical company in USA may request for issuance of a seaway B/L for shipment of medicines to their overseas sale office in Europe. Even if shipment takes place between
two different companies, no negotiation is required between the two either directly or via bank for release of the cargo. The carrier automatically releases cargo to the consignee, once the import formalities are duly completed.

No original B/Ls are issued in this case and therefore no surrender is required. The shipper is not required to submit original B/L to anyone to secure/realize his payment. Since no originals are issued in this type of B/L, the release of the same is termed as ‘Express release’ and embodied in the body of the B/L. Seaway B/L fulfils the first two roles, but does not satisfy the third role i.e. the document of title, as the document is non-negotiable.

Multimodal transport bill of lading

When a multimodal transport bill of lading is issued, it involves multiple modes of transport from the Place of Receipt to the final Place of Delivery (aircraft, rail, ships, trucks etc.). In other words, this kind of B/L covers door to door shipment of containerized cargo using different means of transportation from origin to the destination.

Through bill of lading

A “Through bill of lading” looks like a “Multimodal transport bill of lading”, as the shipment of cargo under such B/L, uses different means of transportation from origin to destination & ensures door to door shipments. But the main difference between a Through B/L and a Multimodal B/L is that the principal carrier under Through B/L is only liable for its own phase or leg of journey.

The carrier acts as an agent on behalf of the service providers who arranges inland movement of the cargo for “Pre-carrriage and On-carriage” phase of the total journey. The carrier is liable for any damage or loss of cargo for his particular leg of journey.

Port to Port bill of lading

When a B/L is issued as a Port to Port B/L (also known as Ocean Bill of Lading), the carrier’s responsibility begins at the port of loading and ends at the port discharge. Therefore it is not necessary to fill-up the boxes like Place of Origin / Receipt and Place of Destination / Delivery in order to avoid carrier’s liability.

Received for shipment bill of lading

Bill of lading of this type, if issued by carrier only serves as a receipt of goods accepted for shipment on a named vessel and does not certify their placement onboard the vessel. This is a situation where goods have arrived at the port of loading before arrival of the vessel. This kind of B/L is not considered as perfect B/L and is replaced by “shipped on board bill of lading”, when goods are actually loaded on board.

Clean bill of lading and clausèd B/L

When merchandise is received by the carrier or shipping line in good condition for loading onboard the vessel, the carrier denotes the B/L as “Clean bill of lading”. Generally, goods are loaded into container by shipper either at the shipper’s premise or at inland container depot (ICD) under the supervision of custom and port authority and the vessel Master are not at all involved in the loading process. For this reason, the Master of the vessel accepts cargo with comments that the goods have been received in apparently good condition & use and stamp notations with “SAID TO CONTAIN” & “SHIPPER’S LOAD-STOW AND COUNT” in B/L to safeguard their interest.
If B/L is issued without any adverse comment about the condition of cargo, it means that it is a ‘Clean B/L’. On the other hand, if the carrier detects some missing item or damage of goods before loading, then they record the information on the face of the B/L in terms of statement. Recording such statement (clause) on the body of B/L turns it into a “Claused bill of lading” and it is not normally accepted by the “Letters of credit” as a valid negotiable document.

**FIATA bill of lading (FBL)**

A FBL is a type of international transport document covering two or more modes of transport, such as shipping by road and by sea (Multimodal B/L). It is also used as a carriage contract and receipt that the goods have been received. When it is issued “to the order”, the FBL is the title of ownership of the goods and can, therefore, be negotiated. Designed by the International Federation of Freight Forwarding Agents Associations (FIATA) and based on UNCTAD/ICC rules, the FIATA Multimodal Transport Bill of Lading (FBL) is designated as a negotiable status document for use in multimodal transport or as a single transport document for port-to-port shipments.

It is now used in more than 60 countries and is acceptable as a marine ocean bill of lading under the ICC UCP 600 rules. As an international transport document the FBL is well suited, functioning as a forwarder house bill or as a multimodal transport document. It is issued under the same conditions throughout the world, and each issuer is required to have carrier’s liability insurance. Consequently, the FBL offers a substantial degree of protection to customers of forwarders. Only authorized forwarders members of FIATA (International Federation of Freight Forwarders Associations) or officially complying with the rules of FIATA can issue this document.

**Groupage and house bill of lading**

Freight forwarders frequently group consignments together from a number of shippers to a single country or port of destination. This technique is called groupage or consolidation and requires that a shipping line issues a bill of lading, showing a forwarder named as the shipper and his overseas agent named as the consignee. In order for the individual shippers to be able to have a bill of lading that exclusively covers their particular consignment, the forwarder (named as the shipper) will issue an additional bill known as the forwarders (or groupage) bill of lading. This enables a document that can be used to release the goods at destination or if necessary to negotiate with his customer for the payment of goods.

**Basic information to be indicated on a B/L**

Depending on the type of B/L, various information should be listed on the document, including:

- Carrier name and a signature from the carrier, the ship’s master, or a legal representative of either of these parties
- Date of Shipment
- Description of goods being loaded onto a vessel
- Notation of the port of loading and the port of destination
- Terms and conditions of carriage or a reference to these conditions listed in another document
- Detailed description of the goods being shipped (value, count, weight, size, markings/numbers, etc.)
- Name and address of the consignee
• Any special instructions for shipping
• Third party billing address when applicable

These information is just some of the items which may be required on a B/L. A marine/ocean shipping B/L, for example, will also need the name of the ship written on the document.

Additional documents commonly used in maritime transport, related to the goods being transported, are listed below based on previous studies performed by PortExpertise:

• **Hazardous Cargo**: Ship ID, date, version, port of departure, - destination, ETS, ETA, date issued, position (of cargo), Stowage rep, release no. Unittype/Unitnr, Goods description, Flashpoint, Pack Gr. Net-Gross Weight, Maritime pollution, IMO Class, SubCl, UN No., EMS No., Limited Quantity, Stowage Category, Total

• A **material safety data sheet** (MSDS), safety data sheet (SDS), or product safety data sheet (PSDS) is an important component of product stewardship and occupational safety and health. It is intended to provide workers and emergency personnel with procedures for handling or working with that substance in a safe manner, and includes information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures. MSDS formats can vary from source to source within a country depending on national requirements;

• **General declaration**: (IMO FAL form 1) – the basic document, in which the information relating to the ship is provided (Annex 1) in accordance with the requirements of control authorities on arrival in and departure from the port. The general declaration is valid if it is dated and signed by the ship’s master, ship’s agent or some other person authorised by the ship’s master;

• **Cargo declaration** (T2L Cargo manifest): IMO FAL Form 1. A shipping document used by customs personnel reviewing a particular transport vehicle’s intended trip that summarizes all bills of lading that have been issued by the carrier or its representative for that particular shipment. For example, a cargo manifest might be used for shipments made by sea, air or land, and will generally show the shipment’s consigner and consignee, as well as listing product details such as number, value, origin and destination. In addition, it contains information on the company issuing cargo manifest, print date/time, title, name/number/voyage details of vessel, community code, unit no., unit type, agent, consignee, no of, Qty, contents, weight, IMO, Temp

• **Customs clearance certificate**: Document issued by Customs and Excise authorities stating the all necessary formalities regarding customs are accomplished and that the vessel was “cleared in the regular way”

• **Dangerous Cargo plan m/v**: Plan identifying the exact position of the dangerous cargo in the ship’s holds.

• **Lashing information for stevedores**: Ship, arrival date, title, lashings in, lashings out per deck, contact details

• **Postal Delivery Bill**
• **Veterinary or Phytosanitary Declaration:** Phytosanitary certification is used to attest that consignments meet phytosanitary (regarding plants) import requirements and is undertaken by an NPPO (National Plant Protection Organization). A phytosanitary certificate for export or for re-export can be issued only by a public officer who is technically qualified and duly authorized by an NPPO (ISPM 12). A phytosanitary certificate for export is usually issued by the NPPO of the country where the plants, plant products or regulated articles were grown or processed. Phytosanitary certificates are issued to indicate that consignments of plants, plant products or other regulated articles meet specified phytosanitary import requirements and are in conformity with the certifying statement of the appropriate model certificate. Phytosanitary certificates should only be issued for this purpose.

• **Certificate of insurance:** A document indicating the type and amount of insurance coverage in force on a particular shipment. Used to assure the consignee that insurance is provided to cover loss of or damage to the cargo while in transit

• Bulk Carrier Booklet

• Exemption Certificate

• Pre-arrival Notification: Advanced Notice of Arrival sent from vessel to Port Master stating the vessel’s intention to arrive.

• BERMAN (Berth Management Message): an electronic message from a carrier, its agent or means of transport to the authority responsible for port and/or waterway management, requesting/announcing a berth (+ shift), giving details of the call & vessel, berth requirements, expected operations, requested services, request for departure (Arrival notification with Berth request, Arrival notification with Berth indication, Shift notification with Shift-to-Berth request, Shift notification with Shift-to-Berth indication, Arrival Priority Request, Departure request/Notification

• List stowaways: A stowaway check-list to be followed before departure any port by ship staff which must cover all the areas of the ship to be checked by ship staff.
ANNEX B – Inventory of documents accompanying the means of transport

B.1 Road transport

An inventory of documents accompanying road vehicles is included in a separate (attached) Excel-document.
B.2 Rail transport

Wagon list

As mentioned above, a wagon list accompanies the CIM document. Customer agreements are to set down what data wagon lists are to contain and how they are to be used. The wagon list must at least contain this information:

- Name of document
  - Wagon list
- Reference to the consignment note to which it is appended:
  - Consignment identification number
  - Date of acceptance
  - Forwarding station
  - Destination station
  - Route
  - Consignor
  - Consignee
  - Customs procedures
- Details of the wagons, the UTI and the goods:
  - Wagon number
  - UTI number
  - UTI type code
  - Gross mass [weight] of UTI
  - Net mass [weight] of UTI
  - Tare of UTI
  - Identity numbers of the seals on the UTI
  - Reference number of number on the transfer note
  - Loaded/empty status of the UTI
  - Customs documents
  - Description of the goods
  - NHM code
  - Details which the RID requires to be put on the consignment note when dangerous goods are carried
  - Mass [weight] of the load
  - Movement Reference Number (MRN)
  - Administrative Reference Codes (ARC)
• Export
• Details of the escort(s)
  • Family and first name(s)
• Preparation of the wagon list
  • Address of the undertaking
  • Place and date
  • Signature

Except where specially agreed otherwise, six copies of the wagon list are to be made out (one per sheet of the consignment note, plus an additional one in case wagons have to be detached from a block train or group of wagons).

For those consignments which pass over the customs territory of the European Community or the territory on which the common transit procedure is applied, separate wagon lists must be made out for community goods and non-community goods.

**Train document**

A train document[^93] is a list containing the necessary information for the safe operation of the train. The list can be manually prepared or produced by a computer system containing information on train services and wagons. It is prepared by railway undertaking (RU).

A train document contains information about:

• the train identification number and destination
• the class and number of the locomotive(s)
• formation of the train from the locomotive
• authorised length limit
• actual length of the train
• actual load of the train (the gross laden weight (in tonnes) of each wagon making up the train, including the weight of the locomotive and the weight of any wagon),
• Rout Availability (RA) (RA of wagons and locomotives must not exceed the RA number for the route over which the train is to run unless this is permitted by the application of special conditions. If the RA figure is to be exceeded, each movement must be authorised by the issue of an exceptional load form)
• highest route availability of any vehicle in the train
• maximum speed of the train (the maximum speed at which a freight train can run is determined by the lowest permissible speed of any vehicle making up the train. This is a subject to compliance with any emergency, temporary, or permanent speed restrictions. The

[^93]: https://www.rssb.co.uk/rgs/rulebooks/GORT3056%20Iss%204.pdf
maximum speed of any vehicle is contained in the wagon file for vehicles registered by Network Rail),

- minimum brake force required in tonnes
- actual brake force available in tonnes
- actual number of vehicles
- dangerous goods and their position in the train, or a statement that no dangerous goods are being conveyed.

The train document must be registered in the IT system of the railway infrastructure companies in each country. A loco driver must retain the train document during the journey. A train document must be provided for the guard if one is present for any part of the journey.

**B.3 Inland waterways transport**

Vessel identification: Based upon the technical Directive (EU) 2016/16294 and/or national legislation issuing a unique vessel identification number by the national authority in which the owner has its seat and registered in the European Hull Database.

**B.4. Maritime transport**

The following documents accompany the vessels/ships in maritime transport:

- **International Tonnage Certificate**: International Tonnage Certificate is a certificate issued to a shipowner by a government department in the case of a ship whose gross and net tonnages have been determined in accordance with the International Convention of Tonnage Measurement of Ships. The certificate states the gross and net tonnages together with details of the spaces attributed to each.

- **International Load Line Certificate**: Load line certificate certifies that vessel complies with the loadline convention. Loadline convention basically limits the ships on the minimum freeboard it needs to maintain. The minimum freeboard required by the loadline convention is calculated by taking into account many factors including reserve buoyancy of the ship.


- **Intact stability booklet**

- **Damage control plans and booklet**: The main purpose of this document is to stipulate appropriate action in the case of the hull damage. It should contain the following parts: 1. General Part; 2. Damage Control Plan (in form of a booklet); 3. Damage Survivability Information containing an analysis of different damage scenarios for standard loading conditions; 4. General

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Instructions for Controlling the Effects of Damage; 5. Associated Documentations (standard plans, diagrams etc).

- Minimum safe manning document: In accordance with Chapter V of the SOLAS Convention, Minimum Safe Manning Documents are issued to all ships which are subject to Chapter I of that Convention or to the Large Yacht and Passenger Yacht Codes.

- Fire safety training manual

- Fire Control plan/booklet

- On board training and drills record

- Fire safety operational booklet
  - Certificates for masters, officers or ratings

- **International Oil Pollution Prevention Certificate**: The IOPP certificate is issued to each new ship after an appointed surveyor has inspected it and found it to be in compliance with the MARPOL convention. The IOPP certificate gives details of all oily water separation and filtering equipment and also the associated monitoring equipment required under the convention.

- **Oil Record Book**: The Oil Record Book Part I shall be completed on each occasion, on a tank-to-tank basis if appropriate, whenever any of the following machinery space operations takes place in the ship: 1. ballasting or cleaning of oil fuel tanks; 2. discharge of dirty ballast or cleaning water from oil fuel tanks; 3. Collection and disposal of oil residues (sludge and other oil residues); .4. Discharge overboard or disposal otherwise of bilge water which has accumulated in machinery spaces; and .5. Bunkering of fuel or bulk lubricating oil.

- Shipboard Oil Pollution Emergency Plan

- International Sewage Pollution Prevention Certificate: Annex IV of MARPOL contains a set of regulations regarding the discharge of sewage into the sea from ships, including regulations regarding the ships’ equipment and systems for the control of sewage discharge, the provision of port reception facilities for sewage, and requirements for survey and certification.

- Garbage Management Plan

- Voyage data recorder system - certificate of compliance

- Cargo Securing Manual

- Document of Compliance

- Safety Management Certificate

- International Ship Security Certificate (ISSC) or Interim International Ship Security Certificate

- Ship Security Plan and associated records

In addition cargo ships must carry:

- Cargo Ship Safety Construction Certificate

- Cargo Ship Safety Equipment Certificate

- Cargo Ship Safety Radio Certificate
- Cargo Ship Safety Certificate
- Exemption Certificate
- Document of authorization for the carriage of grain
- Certificate of insurance or other financial security in respect of civil liability for oil pollution damage
- Enhanced survey report file
- Record of oil discharge monitoring and control system for the last ballast voyage
- Cargo Information
- Bulk Carrier Booklet
- Dedicated Clean Ballast Tank Operation Manual
- Crude Oil Washing Operation and Equipment Manual (COW Manual)
- Condition Assessment Scheme (CAS) Statement of Compliance, CAS Final Report and Review Record
- Hydrostatically Balanced Loading (HBL) Operational Manual
- Oil Discharge Monitoring and Control (ODMC) Operational Manual
- Subdivision and stability information.

Some of the information contained in the above documents are sent through Ship pre-arrival security information form prior to entry into the port of an EU Member State: IMO nr, name of ship, port of registry, flag state, type of ship, call sign, gross tonnage, immarsat call number, name of company and company ID number, CSO name and 24 hour contact details, Port of arrival, port facility of arrival, ETA, primary purpose of call, Information relating to SOLAS regulation 9.2.1 of Chapter XI-2: Valid ISSC, number, issued by expiry date; does ship have approved SSP on board, security level at which ship is operating, location of ship at time this report was made, last 10 calls at port facilities (date from/to, port, country, UN/LOCODE, port facility, security level), special or additional security measures taken, list the ship-to-ship activities during last 10 calls (date from/to, location or longitude-latitude, ship to ship activity and applied security measures). In addition, it contains a description of cargo aboard the ship, dangerous substances related to IMDG code classes 1,2,3,4,5.1,5.2,6.1,6.2,7, and 8, Confirm Dangerous Goods Manifest attached, confirm copy of ship’s crew / passenger list attached, any security-related matter to be reported, Agent (name/contact details) of agent of ship at intended port of arrival, Identification of person providing the information (title/position, name, signature, date/time of completion of the report)

**Cargo ships carrying noxious liquid chemical substances in bulk, shall carry in addition:**

- International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk (NLS Certificate): NLS Certificate is an international pollution prevention certificate. Such certificates are mandatory for ships carrying noxious liquid substances (NLS) in bulk. According to 33 CFR 151.05, NLS Certificate means an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk issued under MARPOL 73/78
- Cargo record book
- Procedures and Arrangements Manual (P & A Manual)
• Shipboard Marine Pollution Emergency Plan for Noxious Liquid Substances

**Chemical tankers must carry in addition:**


• International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk: carried by ships complying with the IGC code. For older ships complying with the GC code, then the Certificate of Fitness for the Carriage of Liquefied Gases in Bulk is required instead.

**Gas carriers, shall carry in addition:**

• Certificate of Fitness for the Carriage of Liquefied Gases in Bulk

• International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk or A23b: MARPOL 73/78 ANNEX II and Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code).

**Ship carrying dangerous goods in packaged form need to carry in addition:**

• Document of compliance with the special requirements for ships carrying dangerous goods: The Administration shall provide the ship with an appropriate document as evidence of compliance of construction and equipment with the requirements of regulation II-2/19 of SOLAS 1974. Certification for dangerous goods, except solid dangerous goods in bulk, is not required for those cargoes specified as class 6.2 and 7 and dangerous goods in limited quantities.

• Dangerous goods manifest or stowage plan

• For this purpose, the following messages must be transmitted:
  
  • Dangerous Goods notification: The shipper or consignor must provide the port authority and operator with details of the dangerous goods and amounts within good time – at the latest e.g. 24 hours before delivery into the harbour area.

  • IFTDGN: The IFTDGN message is an international UN/EDIFACT message to electronically transmit the notification of hazardous cargo to the Port Authorities or other players in the chain: “International Forwarding and Transport Dangerous Goods Notification”.

**Ships carrying Irradiated Nuclear Fuel (INF), shall carry in addition:**

• International Certificate of Fitness for the Carriage of INF Cargo: Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships (INF Code) under the International Convention for the Safety of Life at Sea of 1 November 1974

**Ships carrying Nuclear Waste shall carry in addition:**

• A Nuclear Cargo Ship Safety Certificate or Nuclear Passenger Ship Safety Certificate, in place of the Cargo Ship Safety Certificate or Passenger Ship Safety Certificate, as appropriate: A certificate, called a Nuclear Cargo Ship Safety Certificate shall be issued after inspection and survey to a nuclear cargo ship which satisfies the requirements for cargo ships on survey set
The below certificates are not mandatory but also accompany the means of transport for maritime transport:

- **Special Purpose Ship Safety Certificate**: More or less the same items as a Passenger Ship Safety Certificate, with the exception of subdivision load lines (which a special purpose ship does not have), and substituting "provisions of the Code" for "provisions of SOLAS". (The Special Purpose Ships Code, not SOLAS, contains the requirements for construction, LSA and FFE, etc. of special purpose ships.)

- **Certificate of Fitness for Offshore Support Vessels**

Other documents related to the means of transport include:

- **Ship's stores declaration**: (IMO FAL form 3) – the basic document in which the information relating to the ship's stores is provided in accordance with the requirements of the relevant control authorities and which is submitted on the arrival of the ship in port or departure from it. A ship's cargo declaration shall be valid, if it is dated and signed by the ship's master or by some other ship's officer authorised by the ship's master and having personal knowledge of the facts regarding the ship’s stores;

- **Crew’s effect declaration**: the crew’s effects declaration (IMO FAL form 4) – the basic document in which the information regarding the personal effects of the crew members is provided in accordance with the requirements of the relevant control authorities. The control authorities shall request data to be provided regarding the personal effects of crewmembers in the crew’s effects declaration, which are not exempted from customs duty or are subject to prohibitions or limitations.

- **IMO Crew List**: The crew list (IMO FAL form 5) – the basic document in which the information regarding the composition of the crew and the number of the crew on arrival of the ship in port and on departure from it is indicated in accordance with the requirements of the relevant control authorities. If the relevant authorities require information regarding the crew of a ship on its departure, a copy of the crew list presented on arrival may be submitted. In such case the list shall be resigned, certifying the changes indicated in the composition of the crew or that no such change has occurred. A crew list is valid if dated and signed by the ship’s master or some other ship’s officer authorised by the ship’s master;

- **Ships Particulars**: IMO FAL form 1 – the basic document, in which the information relating to the ship is provided in accordance with the requirements of control authorities on arrival in and departure from the port. The general declaration is valid if it is dated and signed by the ship’s master, ship’s agent or some other person authorised by the ship’s master;

- **Maritime Declaration of Health**: The international maritime traffic of people and goods has often contributed to the spread of pathogens affecting public health. The Maritime Declaration of Health (MDH), according to the International Health Regulations (IHR) (2005), is a document containing data related to the state of health on board a ship during passage and on arrival at port. It is a useful tool for early detection of public health risks.

- **IMO crew list arrival/departure**: IMO Fall form 5 contains: arrival/departure, name of ship, IMO nr., Call sign, voyage number, port of arrival/departure (x 2), flag state of ship, last port
of call, number, family name, given names, rank or rating, nationality, date and place of birth, nature and number of ID document, date and signature by master, authorized agent or officer

- Passenger list: the passenger list (IMO FAL form 6) – the basic document in which the information regarding passengers on the arrival of the ship in and departure from port is indicated in accordance with the requirements of the relevant control authorities. The information specified in Sub-paragraph 2.7.3 of the IMO FAL Convention shall be included in the passenger list. A passenger list is valid if dated and signed by the ship’s master, ship’s agent or some other person duly authorised by the ship’s master. A cruise ship may submit the registration information of the ship’s passengers instead of the passenger list; and the registration information of the ship’s passengers – the basic documents in which the information regarding the ship’s passengers on the arrival of the cruise ship in and departure from port is provided in accordance with the requirements of the relevant control authorities, and which is prepared in accordance with the requirements specified in regulatory enactments regulating the ship’s passenger registration procedures.

- Ship sanitation certificate: A Ship Sanitation Certificate is a document that corroborates a ship’s compliance with maritime sanitation and quarantine rules specified in article 39 of the International Health Regulations (2005) issued by the Utqilen Kirkenes.[1] The certificate serves as proof that the ship is free of clear sources of contagion and may be a requirement for permission of entry into port in some jurisdictions. It replaces the previous Deratting/Deratting Exemption Certificates (“DC/DEC”) provided for under the IHR (1969)

- Certificate of insurance or other financial security in respect of civil liability for oil pollution damage: Certificate to ensure that adequate compensation is available to persons who suffer oil pollution damage resulting from maritime casualties involving oil-carrying ships.

- Cargo Ship Safety Construction certificate: The certificate required to be carried on board of cargo ships of 500 gross tonnage and over, relative to the ship’s construction safety

- Cargo Ship Safety Equipment Certificate: The certificate required to be carried on board of cargo ships of 500 gross tonnage and over. A Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E) shall be permanently attached.

- Cargo Ship Safety Radio Certificate: That the ship has been surveyed in accordance with SOLAS chapter IV; that the survey showed that the ship complied with SOLAS requirements as regards radio installations; and the functioning of the radio installations used in LSA complied with SOLAS requirements; whether an Exemption Certificate has or has not been issued.

- Intact stability booklet: The Intact Stability Booklet is the document that follow the inclining experiment and then submitted for approval by the Classification Societies. This document allows the Ship Master to maintain a satisfactorily stability and to contains the height of gravity center within the limits, sufficient to meet the stability criteria required by the Classification Societies

- Passenger Ship Safety Certificate

• Safety Management Certificate (ISM code): The purpose of this Code is to provide an international standard for the safe management and operation of ships and for pollution prevention.

• Voyage data recorder system-certificate of compliance: The voyage data recorder system, including all sensors, shall be subjected to an annual performance test. The test shall be conducted by an approved testing or servicing facility to verify the accuracy, duration and recoverability of the recorded data. In addition, tests and inspections shall be conducted to determine the serviceability of all protective enclosures and devices fitted to aid location. A copy of the certificate of compliance issued by the testing facility, stating the date of compliance and the applicable performance standards, shall be retained on board the ship.

• Ship Security Plan and associated records: Ship Security Plan (SSP) is a plan that is formulated to ensure that that the measures laid out in the plan with respect to the security of the ship are applied onboard. This is in place to protect the personnel, cargo, cargo transport units, stores etc from any security related risks. The plan specifies responsibilities and procedures to counteract any anticipated threat to the vessel and her cargo.

• Continuous Synopsis Record (CSR): Continuous synopsis record is a special measure under Safety of life at sea (SOLAS) for enhancing the maritime security at the sea. According to SOLAS chapter i, all passenger and cargo ships of 500 gross-tonnage and above must have a continuous synopsis record on board. The continuous synopsis record provides an onboard record of the history of the ship with respect to the information recorded therein, and contains data such as name of ship, port of registration, ID number, ...

• Noise Survey Report: A noise survey report should be made for each ship in accordance with the Code on Noise Levels on Board Ships.

• Waste disposal / Collection notification: At many ports, all vessels calling at the port must notify their waste for each call. This information is often reported through edifact, to the harbour master’s administration.

• Notice of Readiness: The Notice of Readiness (NOR) is the document used by the captain of the ship, in the event of voyage chartering, to notify that his ship is ready, in every respect, to load and/or unload the goods. In the event of voyage chartering, the charterer has a certain term within which the loading and unloading activities must be carried out: the lay days. When exceeding the lay days, the charterer must pay the ship-owner compensation (demurrage). Depending on the moment when the NOR is issued, the lay days count start. In the event of a weather-sensitive cargo (e.g. grains that must be kept dry), the term “weather lay day is used” or “weather working days”. In that case, periods of weather unsuitable for loading or unloading do not count.
ANNEX C – Inventory of documents accompanying the personnel (road transport)

C.1 Road transport

Documents accompanying the personal in road transport include:

- Drivers licence,
- Tachograph Driver Card,
- Driver Certificate of Professional Competence (Driver CPC),
- Niche specific certificate (Crane operations, dangerous goods (ADR), transport of live animal etc.),
- European Health Insurance Card, etc.

C.2 Rail transport

According to the current Train Drivers Directive, all train drivers will have to detain a License and a certificate, the details of which are detained in digital format by the NSA and the Train Operator. Mandatory documents thus include:

- Driver’s License
- Driver’s Safety Certificates.

C.3 Inland waterways transport

Service books based on the various qualifications on board a vessel must accompany the personnel in inland water transport. Directive 2017/2397 on professional qualifications aims to establish a new system of qualifications and attestation of the crew members including a new database of e-service record books and logbooks.

C.4 Maritime transport

- Report of personal injury or loss of life
- Report of vessel casualty or accident
- Certificates for masters, officers or ratings (Endorsements & STCW)
ANNEX D – Mapping of provisions of International Conventions for the Carriage of Goods

The mapping of the provisions of International Conventions for the Carriage of Goods is included in a separate (attached) Excel-document.
ANNEX E – Standards and standardization bodies

This annex provides an overview of the standards and the relevant standardization bodies for electronic data sharing.

E.1. Standardization bodies

Different standardization bodies have already performed efforts towards harmonisation. Best known results are those produced by the three main internationally recognized standardization bodies developing open standards for data representation: UN/CEFACT, World Customs Organisation (WCO), International Standards Organisation (ISO).

UN/CEFACT is a standard setting organization under the United Nations Economic Commission for Europe, but with a global mandate and representation from every region of the world. Dating back to the 1960s, it has developed recommendations, eBusiness standards and Technical Specifications for every aspect of cross-border trade. Today’s work is centered around the Buy-Ship-Pay model covering commercial, logistics, transport and regulatory procedures. There are over 400 experts participating in UN/CEFACT developments from both the public sector and the private sector. The transport and logistics domain work is one of the largest groups.

WCO Data Model Project Team develops and maintains the WCO-DM; their work is governed by the Information Management Sub-Committee of the WCO. Their work aims to cover all aspects of regulatory procedures not only from customs but also other government agencies. Besides the WCO-DM, the WCO also produces a number of recommendations, conventions and tools for customs administrations. Membership at the WCO-DM Project Team is restricted to member organizations (customs agencies), but the private sector and other government authorities are welcome to join the work as non-voting observers. Since the version 3.3 of the WCO-DM which implemented the principle of Information Packages, more and more customs administrations (are intending to) use the WCO-DM.

ISO consists of technical committees, each with their own leadership and each potentially capable of making their own decisions and standards development independent of all of the other technical committees. There is therefore not just one ISO committee, but rather a collection of hundreds of technical committees. Several of the technical committees are pertinent to international transport and logistics, including ISO/IEC JTC 1 (Information technology), ISO TC 8 (Ships and maritime technology), ISO TC 104 (Freight containers), ISO TC 154 (Processes, data elements and documents in commerce, industry and administration), ISO TC 204 (Intelligent transport systems). Membership is open to public and private sector experts through their national mirror committees; each country needs to establish a mirror committee for each technical committee it wants to work with and pay a fee in order to finance the TC secretariat. All voting is done through the member countries.

CEN-CENELEC coordinates standardization at EU level, with similar rules of participation and technical committee organization as ISO. Standards developed by CEN-CENELEC can be adopted by ISO. CEN-CENELEC standards are mandatory at national level.

Other relevant standardisation bodies.

GS1 started from the standardization of electronic product codes. Additionally, they developed the so-called Electronic Product Code Information System (EPCIS), the Standard Serial Shipping Container number (SSSC), a Master Product data solution, and various messages supporting buy-sell of products. All GS1 IT solutions are for free; an enterprise has to pay for the electronic product codes.
IATA, the International Air Transport Association has developed a number of standards for the air industry, touching every aspect of air transport. IATA also develops conventions and resolutions for application in the air-industry supply chain. Only airlines may be full members (for pay), all other actors in the field may join as strategic partners (for pay). The resulting standards such as the Cargo XML or Cargo IMP are sold for a fee.

UIC, International Union of Railways is an international organization grouping together the actors in the rail industry. The ERA, European Agency for Railways, is an EU-level agency contributing to the implementation of EU legislation aiming to improve the competitive position of the railway sector. Membership is based on an equal single member from each member state and two additional members from the Commission. Both are working on the Electronic Consignment Note “EDN-xmlxsd” as a freight rail standard.

Other standards for data sharing, which are indirectly relevant to an electronic multimodal waybill, are those developed for managing a physical infrastructure. Examples are River Information Services (RIS), that also includes a dangerous goods declaration based on port community standards, DATEX II for road traffic information, and TAF/TSI for allocating paths on railway infrastructures to operate trains. Like stated before, these solutions either have their own dictionaries (e.g. TAF/TSI and DATEX II) and/or expand on the UNTDED. Additionally, systems supporting these standards have been developed like Rail Net Europe Train Information System (RNE TIS) for positioning of international trains and a hull database managed by EC DG Move with information of barges. National access points for road traffic data have been developed by Member States like NDW in the Netherlands. There is also a pan-European system for sharing licence data (EUCARIS).

However, none of these efforts led to an open system that allowed each stakeholder to implement, in the same way, the solution developed for one modal waybill to the other mode-specific transport documents.

**E2. Standards for data representation**

There is a long history of developing and implementation standards for electronic data sharing between IT systems of different organizations, starting already in the 70s and 80s of the previous century by development of the first dictionary for trade data elements and a uniform lay-out key for documents containing these data elements. Standards concerns data dictionaries, core components, messaging structures and models or frameworks.

Data dictionaries specify data semantics, independent of their exchange syntax. The most widely used such dictionary in international trade is the United Nations Trade Data Element Directory (UNTDED). Created in the 1980s, the initial use was to define all of the data on UN Layout Key documents in a clear, semantic way in order to ensure mutual understanding of the data on the documents. The UNTDED provides information on where the data is on paper documents and is often used as a reference in electronic messages in order to ensure everyone understands the same data. However, the UNTDED does not provide the information in its business context. UNTDED includes many elements like locations and countries, dates and times, and references that are
relevant for an eWaybill solution. Their representation for data sharing by Core Components is also specified.

Other data dictionaries can exist on a national level or on an industry level. UNECE Recommendation 34\(^5\) outlines the process to harmonize data between various agencies (can be applied to different domains as well) and besides suggesting to align these to an internationally agreed standard, also outlines some of the key information which should be present for each element of data, including data element name, data element definition, data type (alpha, numeric or alphanumeric), data range (if it is associated with a code list, for example), mode of transport used, process (import, export, transit...), category of use (cargo, means of transport, crew, passengers...), data source, etc.

Additionally, there are pan-European mode specific dictionaries especially focusing on interfaces between carriers and infrastructure managers, for instance addressing path allocation in rail transport (TAF/TSI) and road traffic information (DATEX II). These pan-European dictionaries are based on EU Directives.

**Code Lists** are essential for electronic exchanges. Information that can be codified facilitate the exchange of information. If code lists are not used, then textual information must be used, but then there are questions of which language to use, which spelling to use, what abbreviations are acceptable, etc. The UNECE maintains a number of code lists within the message exchange syntax UN/EDIFACT (see below) for everything from types of documents, to party roles. The UNECE also maintains a number of Code List Recommendations which cover information such as types of packages, types of means of transport, units of measure. Many of these code lists are jointly maintained with ISO. ISO and the International Chamber of Commerce also publish a number of code lists commonly used in international trade. Some examples include currency codes, country codes for the former and Incoterms for the latter.

Besides these UNECE code lists, there are also mode specific code lists like NHM for cargo in rail and Harmonized Systems code applied for customs declaration. These code lists are maintained by their standardization body.

**Ontologies, data models and frameworks** specify the semantics of elements of a dictionary in their particular context by including associations between elements like the ability to load a container on a vessel. There are different ways to represent this semantics:

- **Ontology** – an ontology is a conceptual specification of data, its associations, and rules/conditions of these associations. An example of a rule is that a vessel or truck has a maximum load capacity. Data elements are represented by concepts. An ontology is technically represented by an open standard, the Ontology Web Language (OWL), implying that ontologies can be shared between all types of (open source and Commercial Of The Shelve (COTS)) tools. There are currently only ontologies for logistics developed in research projects like EU FP7 INFSO iCargo. XSDs can be easily developed based on ontologies, although there are no rules and RDF (Resource Description Framework) has been developed to share (linked) data.

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• **Data model** – a data model is similar to an ontology, but modelled by for instance an Entity-Relationship model (ER-model) or a Unified Modelling Language (UML) class diagram. The Common Framework is a data model developed by various EU eFreight funded projects and the basis for XSDs (XML Schema Definitions, see further) standardized and accepted by ISO. There are many tools for developing data models, but, although there is a meta model for sharing data between these tools (XMI: XML Metadata Interchange), models cannot be shared without an issue between any two tools.

• **Framework models** – a data dictionary that provides data semantics but also puts the information into its business context, according a hierarchy of data. The city-name, the postal code or the address line are all parts of an address; and an address related to a consigner and an address related to the bank are not the same thing. Semantically, the information might have similar definitions, but the context will be different. The data model brings together this hierarchy of information and will represent it in relation to its business use. Like the data dictionary, the key information related to each data element is often included (data type, data range, data source).

The World Customs Organization Data Model (WCO-DM) is an example of such a data model. All information that is pertinent to a cross-border regulatory procedure is captured in the WCO-DM and represented within the above-mentioned hierarchy of data.

The UN/CEFACT Core Component Library (UN-CCL) is another example of such a framework model which consists of a set of standard components, covering all processes in international trade, both commercial, logistics and regulatory. This covers all areas of activities from insurance and banking to transport and logistics to agriculture, just to name a few. The result is a very large data model. Almost all entries within this data model should have a corresponding business process published in order to explain the use of the individual core components.

• **Reference Data Model** - a subset of a data model concentrating on one domain, one economy or one type of message. Both the UN-CCL and the WCO-DM have created such subsets in order to facilitate the use of their data models. The UN-CCL has one published on Supply-Chain and another soon to be published (planned December 2017) on Multi-Modal Transport. The WCO-DM uses the term "Information Packages" which can be linked to a procedure (declaration, certificates...), a region or a national economy, or even a specific organization’s needs like the UN-CITES certificate.

Ontologies and data model have modelling concepts for specialization with the ability to add particular rules, e.g. to distinguish a sea container from a Uniform Load Device that are both equipment for transport, and the construction of associations between different concepts that provide the ability to specify concepts only once. The framework – and Reference Data Models have hierarchical structures where associations are modelled by hierarchy, which may require duplicate specifications of concepts, and does not have the specialization constructs. Whereas ontologies and data models are based on standardized meta models which means that many tools and (open source) software solutions are available to develop, maintain, and implement these models. The framework – and reference data models have a proprietary meta model. They are also not always openly available, e.g. membership of WCO is required to receive a copy of the WCO DM. The UN-CCL on Multi-Modal Transport is only free available on paper; a specific software tool supporting the meta model is required for processing a machine-readable format of this UN-CCL.
Message exchange syntax are the rules used to organize elements into electronic messages in a way which is comprehensible by both a sender and a receiver. The previous paragraphs talk about the dictionaries and the semantic definitions; the syntax would be the grammar used to put these data elements into comprehensible groups of information.

UN/EDIFACT is one of the earliest internationally developed syntax dating from the mid-1980s. It was widely adopted by the transport and logistics industry as well as retail and is still very widely used today (representing roughly 95% of all maritime trade electronic messages for example). Information in such messages are grouped by segments (represented by three-letter names), often reflecting a group of boxes on paper documents; and as such, there are strict rules on the length of information which can be provided for each data element. These are defined by UN Standard Messages (UNSMs). UN/EDIFACT messages are sometimes developed by other organizations, e.g. WCO, but the message directories and guidance material is still centrally maintained and published by the UNECE.

Extensible Markup Language (XML) is another widely used message exchange syntax. The hierarchical structure is represented by XSDs (XML Schema Definitions) that contain both the hierarchical structures and any format restrictions (data types, maximal lengths, mandatory conditions, and code values). Ontologies are already represented by XSDs with reserved words; data models and frameworks can also be represented by XSDs.

Many software developers currently use JSON (Java Script Object Notation) for sharing data between the various components of the system they develop. On top of JSON, they utilizing JSON-LD (LD: Linked Data) to represent semantics of JSON files. They are also used to applying JSON in data sharing with components external to the system they develop, based on for instance Application Programming Interfaces (APIs). These software developers have less or no skills regarding UN/CEFACT and do find XSDs a burden.
ANNEX F – SG1 T1 Survey Analysis

Annex D presents the analysis of the responses to the online questionnaire ‘Digital Transport and Logistics Forum (DTLF) - Use of digital transport documents by businesses’ launched in April 2017. A first subsection introduces the approach of the survey. It is followed by an analysis, question per question, of the responses received.

F.1. Introduction and methodological approach

The questionnaire has been online since 3 April 2017. While the questionnaire remains open, the present analysis covers responses received between 3 April 2017 and 3 February 2018. It has been shared with all DTLF Members, who were then asked to disseminate the survey among their networks.

The key objective of this survey is to understand the current state of play regarding the use of electronic documents in transport. The survey targets primarily the (potential) users of such documents.

The survey covers all documents that contain information related to the cargo which need to be transferred between the actors along the transport and logistics chain and/or shown to the public authorities for inspection in order for a transport operation to be completed. In particular, the survey refers to two types of freight transport documents:

- Documents which are used as evidence of contractual relationship between shipper and carrier and which are covered by respective international conventions (for e.g. CMR, CIM/SMGS consignment notes, air waybill, bill of loading etc.)
- Documents accompanying the goods as evidence of ownership, certificates of origin, phytosanitary certificates, dangerous goods certificates and the like.

Throughout the survey, the acronym "e-fTD" is used to refer to freight transport documents in electronic format. It is important to note that, for the purpose of this survey, "e-fTD solutions" is understood as the IT-based applications that allow the use of the information /data otherwise contained in paper transport documents in an electronic format (e.g. eCMR and Transfollow for road, eAWB360 for air, electronic CIM/SMGS for rail, etc.). Similarly, for the purpose of this survey, "international/cross-border" transport is primarily understood a transport operation that crosses at least one border between the EU Member States.

Several methodological remarks related to responses and their analysis must be highlighted. Firstly, the survey does represent an official inquiry but serves as a basis for the work of the DTLF and its sub-group on electronic transport documents. Secondly, the majority of questions were not mandatory for respondents (“best-effort basis”) and, as a result, respondents often skip questions that they consider less relevant or applicable to them. The analysis, question per question, presented below is thus based on the number of respondents for each question.
F.2. Respondent profile

This section provides an overview of respondents to the DTLF Team 1 Online Survey (questions 2 to 6 of the survey). The first question of the survey covers the contact details of the participant and will only be used to further contact respondents for follow-up qualitative interviews, if needed.

Question 2: Member State

The DTLF Team 1 Online Survey (hereafter ‘the survey’) gathered replies from 106 respondents in 18 Member States. Germany, France and Spain are the most represented countries, with 19, 11 and 11 replies respectively.

No response was received for 10 Member States (Austria, Cyprus, Czech Republic, Estonia, Hungary, Ireland, Latvia, Luxembourg, Malta, Slovenia) However, 6 respondents did not specify the Member State they were based in.

Figure 10 – Respondent profile: Member State (SG1 T1 survey)

Questions 3, 4: Type and size of organisation

Forwarders and logistic service providers are the most represented type of organisation with 26% of replies to the survey. Shippers and consignees come second, with 18% of replies. It should also be noted that 21% of replies fall into the ‘Other’ category that include: Public Body, Member State, Consultants, Inland waterway manager, Cargo Handling Agent for Airlines, Consignor, Truck and railcar loading facility, Producer, Research Institute, Non-governmental organisation, Customs Broker / Customs Software, Port Authority, Telematics solution provider.

Figure 11 – Respondent profile: Type of organisation (SG1 T1 survey)
Very large organisations (500 or more people) are the most represented with 42% of replies. Medium-large organisations (50 - 249 people) come second (17%) while small- to medium-sized organisations (10 - 49 people) come third (15%). Medium-large organisations (250 - 449 people) are the least represented with 8% of replies.

**Figure 12 – Respondent profile: size of the organisation**

Question 5, 6: Geographical level of operations and transport mode expertise

A wide majority of respondents (58%) represent organisations with international or cross-border operations, while 26% operate both at national and international or cross-border level. Regarding their expertise in terms of transport-mode, 24% focus on road, 20% on multimodal and 19% on maritime transport.

96 Please note that for the purposes of this survey, by international/cross-border transport is primarily understood a transport operation that crosses at least one border between the EU Member States.
F.3. Use of eDocuments for freight Transport (e-fTD) – Road

This section includes the analysis of the DTLF Team 1 Online Survey questions 7 to 14, dedicated to the organisations active in road transport (26 out of 106 respondents).

Question 7, 8, 11: Use of e-fTD in national road freight operations

The majority of respondents (54%) do not use e-fTD in their national road freight operations, while only 12% do use e-fTD.

In terms of the nature of the documents used in their electronic format, e-CMR was mentioned twice and dangerous goods once. The ‘Other’ category included: *e-invoice, e-signature, National Consignment note, scanned customer delivery notes.*

Finally, two respondents specify their use of electronic documents amounts to 1% - 25% of their national operations, while one respondent uses them in 51% - 75% of cases.

Question 9, 10, 12: Use of e-fTD in cross-border road freight operations

Nearly half of the respondents specify they do not use e-f-TD in their cross-border road freight operations, while only 12% mention they do.

In terms of the nature of the documents used in their electronic format, e-CMR was mentioned twice and dangerous goods once. The ‘Other’ category included: *e-invoice, e-signature.*

Finally, two respondents specify their use of electronic documents amounts to 1% - 25% of their cross-border operations, while one respondent uses them in 26% - 50% of cases.
Question 13: Drivers of paper-based transport operations

Most cited reasons for partially or entirely paper-based transport operations are the facts that electronic documents are not accepted by relevant national and cross-border authorities (both cited 8 times). It also appears that respondents’ business counterparts not using e-fTD refrains them from moving on to electronic documents.

Note: 27% or 7/26 of the respondents did not reply to this question.

Table 9 – Q13: If your transport operations are still partially or entirely paper based, what are the main reasons?

<table>
<thead>
<tr>
<th>Answer choices</th>
<th># responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-fTD are not accepted by the relevant authorities in other EU countries</td>
<td>8</td>
</tr>
<tr>
<td>e-fTD are not accepted by the relevant authorities in my country</td>
<td>8</td>
</tr>
<tr>
<td>My clients/business partners do not use e-fTD</td>
<td>7</td>
</tr>
<tr>
<td>I am not aware of the existence/use of e-fTD solutions</td>
<td>6</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in my country</td>
<td>5</td>
</tr>
<tr>
<td>My clients/business partners have different e-fTD solutions</td>
<td>5</td>
</tr>
<tr>
<td>I cannot afford the costs of the technical support (hardware and software) for an e-fTD solution</td>
<td>3</td>
</tr>
<tr>
<td>I consider that the benefits of using e-fTD are still too low compared to the investment in the needed IT solution(s)</td>
<td>3</td>
</tr>
<tr>
<td>I’m not issuing any transport document</td>
<td>2</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in other EU countries</td>
<td>2</td>
</tr>
<tr>
<td>I do not trust e-fTD</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td>There are no e-fTD solutions available in my country</td>
<td>1</td>
</tr>
<tr>
<td>e-fTD are not accepted by the banks and insurance companies with which I work</td>
<td>1</td>
</tr>
<tr>
<td>I prefer paper</td>
<td>0</td>
</tr>
</tbody>
</table>

Question 14: Digitalisation of freight transport environment

A wide majority of respondents believe it is necessary to move towards a digital, paperless freight transport environment. Only 8% declare that papers work just fine.
Figure 17 – Q14: Do you believe it is necessary to move towards a digital, paperless freight transport environment?

F.4. Use of eDocuments for freight Transport (e-fTD) – Rail

This section includes the analysis of the DTLF Team 1 Online Survey questions 15 to 22, dedicated to the organisations active in rail transport (13 out of 106 respondents).

Question 15, 16, 19: Use of e-fTD in national rail operations

One third of the respondents (31%) use e-fTD in their national rail operations, while 46% declare not to use electronic documents.

In terms of the nature of the documents used in their electronic format, e-CIM was mentioned once, e-CIM/SMGS was mentioned twice, similarly to e-SMGS alone, while dangerous goods, certification of conformity and phytosanitary certificate were all mentioned once.

Finally, one respondent specifies their use of electronic documents amounts to 51% - 75% of their national operations, while another respondent uses them in 76% - 100% of cases.

Figure 18 – Q15: Do you use e-fTD in your national rail freight operations?

Question 17, 18, 20: Use of e-fTD in cross-border rail operations

Concerning the use e-f-TD in cross-border rail operations, respondents are more evenly spread, with 31% declaring to use them, and 38% not using e-fTD in their cross-border rail freight operations.
In terms of the nature of the documents used in their electronic format, e-SMGS was mentioned twice. The ‘Other’ category included: e-CUV.

Finally, one respondent specifies their use of electronic documents amounts to 1% - 25% of their cross-border operations, while another respondent uses them in 51% - 75% of cases.

Figure 19 – Q17: Do you use e-fTD in your cross-border rail freight operations?

Question 21: Drivers of paper-based transport operations

The most cited reason for partially or entirely paper-based transport operations is simply the preference of respondents for paper (cited 2 times). Other cited reasons are the unacceptance of electronic documents by relevant national or cross-border authorities, and the availability of e-fTD solutions in respondents’ countries.

Note: 62% or 8/13 of the respondents did not reply to this question.

Table 10 – Q21: If your transport operations are still partially or entirely paper based, what are the main reasons? Select all that apply.

<table>
<thead>
<tr>
<th>Answer choices</th>
<th># responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>I prefer paper</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td>e-fTD are not accepted by the relevant authorities in other EU countries</td>
<td>1</td>
</tr>
<tr>
<td>e-fTD are not accepted by the relevant authorities in my country</td>
<td>1</td>
</tr>
<tr>
<td>I cannot afford the costs of the technical support (hardware and software) for an e-fTD solution</td>
<td>1</td>
</tr>
<tr>
<td>There are no e-fTD solutions available in my country</td>
<td>1</td>
</tr>
<tr>
<td>I’m not issuing any transport document</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by the banks and insurance companies with which I work</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in other EU countries</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in my country</td>
<td>0</td>
</tr>
<tr>
<td>My clients/business partners do not use e-fTD</td>
<td>0</td>
</tr>
<tr>
<td>My clients/business partners have different e-fTD solutions</td>
<td>0</td>
</tr>
<tr>
<td>I consider that the benefits of using e-fTD are still too low compared to the investment in the needed IT solution(s)</td>
<td>0</td>
</tr>
<tr>
<td>I do not trust e-fTD</td>
<td>0</td>
</tr>
<tr>
<td>I am not aware of the existence/use of e-fTD solutions</td>
<td>0</td>
</tr>
</tbody>
</table>
Question 22: Digitalisation of rail freight transport environment

A wide majority of respondents (54%) believe it is necessary to move towards a digital, paperless rail freight transport environment. None declare that papers work just fine.

Figure 20 – Q22: Do you believe it is necessary to move towards a digital, paperless freight transport environment?

F.5. Use of eDocuments for freight Transport (e-fTD) – Air

This section includes the analysis of the DTLF Team 1 Online Survey questions 23 to 30, dedicated to the organisations active in air transport (16 out of 106 respondents).

Question 23, 24, 27: Use of e-fTD in national air freight operations

The majority of respondents (44%) do use e-fTD in their national air freight operations, while only 12% do not use e-fTD.

In terms of specific documents used in their electronic format, Master Air Waybills, House Waybills and Flight Manifests were mentioned 7, 6 and 6 times respectively.

Finally, it appears that respondents using e-fTDs do so for 26% - 50% of their national air freight operations.

Figure 21 – Q23: Do you use e-fTD in your national air freight operations?

Figure 22 – Q24: If you use e-fTD, please indicate which documents you use in their electronic form.
Figure 23 – Q27: If you use e-fTD, what percentage of your national operations entail e-fTD (annually)?

Question 25, 26, 28: Use of e-fTD in cross-border air freight operations

Half of the respondents specify they do use e-fTD in their cross-border rail operations, while only 6% mention they do not.

In terms of specific documents used in their electronic format, Invoices (Shipper), Master Air Waybills and House Waybills were mentioned 9, 8 and 7 times respectively.

Finally, it appears that respondents using e-fTDs do so for 26% - 50% of their cross-border air freight operations.

Figure 24 – Q25: Do you use e-fTD in your national air freight operations?
Table 11 – Q26: If you use e-fTD in cross-border operations, please indicate which documents you use in their electronic form.

<table>
<thead>
<tr>
<th>Documents used in their electronic form</th>
<th># responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invoice (Shipper)</td>
<td>9</td>
</tr>
<tr>
<td>Master Air WayBill (Freight Forwarder)</td>
<td>8</td>
</tr>
<tr>
<td>House WayBill (Freight Forwarder)</td>
<td>7</td>
</tr>
<tr>
<td>Flight Manifest (Airline)</td>
<td>6</td>
</tr>
<tr>
<td>Notice to Captain (Ground Handling)</td>
<td>5</td>
</tr>
<tr>
<td>Flight Import Cargo declaration (Airline)</td>
<td>5</td>
</tr>
<tr>
<td>Flight Export Cargo declaration (Airline)</td>
<td>5</td>
</tr>
<tr>
<td>Load Release (Ground Handling)</td>
<td>4</td>
</tr>
<tr>
<td>Freight Book list (Airline)</td>
<td>4</td>
</tr>
<tr>
<td>Security Declaration (Airline)</td>
<td>4</td>
</tr>
<tr>
<td>Transit Declaration (Airline)</td>
<td>4</td>
</tr>
<tr>
<td>Transfer Manifest (Airline)</td>
<td>4</td>
</tr>
<tr>
<td>House WayBill Manifest (Freight Forwarder)</td>
<td>4</td>
</tr>
<tr>
<td>Security Declaration (Freight Forwarder)</td>
<td>3</td>
</tr>
<tr>
<td>Import Goods Declaration (Freight Forwarder)</td>
<td>2</td>
</tr>
<tr>
<td>Customs Release import (Customs)</td>
<td>1</td>
</tr>
<tr>
<td>Import Goods Declaration (Consignee)</td>
<td>1</td>
</tr>
<tr>
<td>Customs Release Export (Customs)</td>
<td>1</td>
</tr>
<tr>
<td>Export Goods Declaration (Shipper)</td>
<td>1</td>
</tr>
<tr>
<td>Dangerous Goods Declaration (Shipper)</td>
<td>1</td>
</tr>
<tr>
<td>Letter of instruction (Shipper)</td>
<td>1</td>
</tr>
<tr>
<td>Packing list (Shipper)</td>
<td>1</td>
</tr>
<tr>
<td>CITES certificate (Shipper)</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 25 – Q28: If you use e-fTD, what percentage of your cross-border operations entail e-fTD (annually)?
Question 29: Drivers of paper-based transport operations

The most cited reasons for partially or entirely paper-based transport operations are the fact that respondents’ clients or business counterparts do not use e-fTDs or that they have different e-fTD solutions (cited 5 and 4 times respectively).

Note: 50% or 8/16 of the respondents did not reply to this question.

Table 12 – Q29: If your transport operations are still partially or entirely paper based, what are the main reasons?

<table>
<thead>
<tr>
<th>Answer choices</th>
<th># responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>My clients/business partners do not use e-fTD</td>
<td>5</td>
</tr>
<tr>
<td>My clients/business partners have different e-fTD solutions</td>
<td>4</td>
</tr>
<tr>
<td>I consider that the benefits of using e-fTD are still too low compared to the investment in the needed IT solution(s)</td>
<td>2</td>
</tr>
<tr>
<td>I am not aware of the existence/use of e-fTD solutions</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td>e-fTD are not accepted by the relevant authorities in other EU countries</td>
<td>1</td>
</tr>
<tr>
<td>There are no e-fTD solutions available in my country</td>
<td>1</td>
</tr>
<tr>
<td>I'm not issuing any transport document</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by the banks and insurance companies with which I work</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in other EU countries</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in my country</td>
<td>0</td>
</tr>
<tr>
<td>I cannot afford the costs of the technical support (hardware and software) for an e-fTD solution</td>
<td>0</td>
</tr>
<tr>
<td>I prefer paper</td>
<td>0</td>
</tr>
<tr>
<td>I do not trust e-fTD</td>
<td>0</td>
</tr>
</tbody>
</table>

Question 30: Digitalisation of air freight transport environment

A wide majority (62%) of respondents believe it is necessary to move towards a digital, paperless freight transport environment. None declare that papers work just fine.

Figure 26 – Q30: Do you believe it is necessary to move towards a digital, paperless freight transport environment?
F.6. Use of eDocuments for freight Transport (e-fTD) – Maritime

This section includes the analysis of the DTLF Team 1 Online Survey questions 31 to 36, dedicated to the organisations active in maritime transport (20 out of 106 respondents).

Question 31, 33: Use of e-fTD in national maritime freight operations

Some 30% of respondents do not use e-fTD in their national maritime freight operations, while only 10% do use e-fTD.

In terms of specific documents used in their electronic format, two respondents identified ‘EDI Messages via ELEMICA’ and ‘All the ones in the NSW and others in Spain as DG entrance request’.

Finally, two respondents specify their use of electronic documents amounts to 1% - 25% of their national operations, while three respondents use them in 76% - 100% of cases.

---

Question 32, 34: Use of e-fTD in cross-border maritime freight operations

35% of the respondents specify they do use e-fTD in their cross-border rail operations, while only 10% mention they do not.

Finally, three respondents specify their use of electronic documents amounts to 1% - 25% of their cross-border operations, three other respondents estimate such share of operations to 51% - 75%, while two other respondents use them in 26% - 50% of cases.

**Figure 28 – Q32: Do you use e-fTD in your cross-border maritime freight operations?**

---

**Question 35: Drivers of paper-based transport operations**

The most cited reasons for partially or entirely paper-based transport operations are the fact that respondents’ clients or business counterparts do not use e-fTDs, and, that there are no e-fTD solutions available in the respondents’ countries (cited 5 and 3 times respectively).

*Note: 50% or 10/20 of the respondents did not reply to this question.*

**Table 13 - If your transport operations are still partially or entirely paper based, what are the main reasons?**

<table>
<thead>
<tr>
<th>Answer choices</th>
<th># responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>My clients/business partners do not use e-fTD</td>
<td>5</td>
</tr>
<tr>
<td>e-fTD are not accepted by the banks and insurance companies with which I work</td>
<td>3</td>
</tr>
<tr>
<td>There are no e-fTD solutions available in my country</td>
<td>3</td>
</tr>
<tr>
<td>e-fTD are not accepted by the relevant authorities in other EU countries</td>
<td>2</td>
</tr>
<tr>
<td>e-fTD are not accepted by the relevant authorities in my country</td>
<td>2</td>
</tr>
<tr>
<td>I am not aware of the existence/use of e-fTD solutions</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
<tr>
<td>I’m not issuing any transport document</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in other EU countries</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in my country</td>
<td>0</td>
</tr>
<tr>
<td>My clients/business partners have different e-fTD solutions</td>
<td>0</td>
</tr>
<tr>
<td>I consider that the benefits of using e-fTD are still too low compared to the investment in the needed IT solution(s)</td>
<td>0</td>
</tr>
<tr>
<td>I cannot afford the costs of the technical support (hardware and software) for an e-fTD solution</td>
<td>0</td>
</tr>
<tr>
<td>I prefer paper</td>
<td>0</td>
</tr>
<tr>
<td>I do not trust e-fTD</td>
<td>0</td>
</tr>
</tbody>
</table>

**Question 36: Digitalisation of maritime freight transport environment**
A wide majority of respondents (60%) believe it is necessary to move towards a digital, paperless freight transport environment. Only 5% declare that papers work just fine.

**Figure 29 – Q36: Do you believe it is necessary to move towards a digital, paperless freight transport environment?**

![Image of a pie chart showing 60% who believe it is necessary, 35% who do not need papers, 5% who do not specify, and 0% who declare papers work just fine.]

**F.7. Use of eDocuments for freight Transport (e-fTD) – Inland waterways**

This section includes the analysis of the DTLF Team 1 Online Survey questions 37 to 44, dedicated to the organisations active in inland waterway freight transport (6 out of 106 respondents).

**Question 37, 38, 41: Use of e-fTD in national inland waterway freight operations**

Half of respondents (50%) do not use e-fTD in their national rail operations. While none of the respondents replied explicitly ‘Yes’, three specific documents were still identified as used in their electronic format: ‘e-CMN’, ‘Waste’, ‘Dangerous goods’.

Finally, none of the respondents specified the share of operations in which electronic documents are used.

**Figure 30 – Q37: Do you use e-fTD in your national inland waterway freight operations?**

![Image of a pie chart showing 50% who do not use e-fTD, 33% who are not applicable, 17% who do use e-fTD, and 0% who are not specified.]

**Question 39, 40, 42: Use of e-fTD in cross-border inland waterway freight operations**

Half of the respondents specify they do not use e-f-D in their cross-border rail operations, while 17% mention they do.
In terms of the nature of the documents used in their electronic format, three were identified: ‘e-CMN’I’, ‘Waste’, ‘Dangerous goods’.

Finally, none of the respondents specified the share of operations in which electronic documents are used.

Figure 31 – Q39: Do you use e-fTD in your cross-border inland waterway freight operations?

Question 43: Drivers of paper-based transport operations

The most cited reason for partially or entirely paper-based transport operations is the fact that respondents’ clients or business counterparts do not use e-fTDs.

Note: 33% or 2/6 of the respondents did not reply to this question.

Table 14 – Q43: If your transport operations are still partially or entirely paper based, what are the main reasons?

<table>
<thead>
<tr>
<th>Answer choices</th>
<th># responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>My clients/business partners do not use e-fTD</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
<tr>
<td>I consider that the benefits of using e-fTD are still too low compared to the investment in the needed IT solution(s)</td>
<td>1</td>
</tr>
<tr>
<td>I’m not issuing any transport document</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by the banks and insurance companies with which I work</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in other EU countries</td>
<td>0</td>
</tr>
<tr>
<td>e-fTD are not accepted by courts and in procedures in front of courts in my country</td>
<td>0</td>
</tr>
<tr>
<td>My clients/business partners have different e-fTD solutions</td>
<td>0</td>
</tr>
<tr>
<td>I cannot afford the costs of the technical support (hardware and software) for an e-fTD solution</td>
<td>0</td>
</tr>
<tr>
<td>I prefer paper</td>
<td>0</td>
</tr>
<tr>
<td>I do not trust e-fTD</td>
<td>0</td>
</tr>
</tbody>
</table>
Question 44: Digitalisation of inland waterway freight transport environment

A wide majority (67%) of respondents believe it is necessary to move towards a digital, paperless freight transport environment, while 16% declare that papers work just fine.

*Figure 32 – Q44: Do you believe it is necessary to move towards a digital, paperless freight transport environment?*

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>67%</td>
</tr>
<tr>
<td>No need, papers work just fine</td>
<td>16%</td>
</tr>
<tr>
<td>Not specified</td>
<td>17%</td>
</tr>
</tbody>
</table>

F.8. Use of eDocuments for freight Transport (e-fTD) – Multimodal

This section includes the analysis of the DTLF Team 1 Online Survey questions 45 to 52, dedicated to the organisations active in multimodal transport (21 out of 106 respondents).

Question 45, 46, 49: Use of e-fTD in national multimodal freight operations

Some 24% of the respondents do use e-fTD in their national multimodal freight operations, while 19% do not use e-fTD.

In terms of the nature of the documents used in their electronic format, respondents identified notably: *Invoice (Shipper), Packing list, Master Air Waybill, House Waybill* and others (mentioned twice).

Finally, four respondents specify their use of electronic documents amounts to 1% - 25% of their national operations, while one respondent uses them in 51% - 75% of cases.

*Figure 33 – Q45: Do you use e-fTD in your national multimodal freight operations?*
Table 15 – Q46: If you use e-fTD, please indicate which documents you use in their electronic form.

<table>
<thead>
<tr>
<th>Type of document used in electronic form</th>
<th># responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate of origin</td>
<td>2</td>
</tr>
<tr>
<td>Security Declaration (Freight Forwarder)</td>
<td>2</td>
</tr>
<tr>
<td>House WayBill (Freight Forwarder)</td>
<td>2</td>
</tr>
<tr>
<td>Master Air WayBill (Air – Freight Forwarder)</td>
<td>2</td>
</tr>
<tr>
<td>Letter of Instruction (Shipper)</td>
<td>2</td>
</tr>
<tr>
<td>Packing list (Shipper)</td>
<td>2</td>
</tr>
<tr>
<td>Invoice (Shipper)</td>
<td>2</td>
</tr>
<tr>
<td>e-CMR (road)</td>
<td>2</td>
</tr>
<tr>
<td>Phytosanitary certificate</td>
<td>1</td>
</tr>
<tr>
<td>Dangerous goods</td>
<td>1</td>
</tr>
<tr>
<td>Security Declaration (Airline)</td>
<td>1</td>
</tr>
<tr>
<td>Flight Manifest (Airline)</td>
<td>1</td>
</tr>
<tr>
<td>House WayBill Manifest (Freight Forwarder)</td>
<td>1</td>
</tr>
<tr>
<td>Certificate of conformity</td>
<td>0</td>
</tr>
<tr>
<td>Notice to Captain (Air – Ground Handling)</td>
<td>0</td>
</tr>
<tr>
<td>Not specified</td>
<td>0</td>
</tr>
<tr>
<td>e-CMNI (inland waterways)</td>
<td>0</td>
</tr>
<tr>
<td>e-SMGS (rail)</td>
<td>0</td>
</tr>
<tr>
<td>e-CIM/SMGS (rail)</td>
<td>0</td>
</tr>
<tr>
<td>e-CIM (rail)</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
</tbody>
</table>

Question 47, 48, 50: Use of e-fTD in cross-border multimodal freight operations

Some 24% of respondents specify they do use e-fTD in their cross-border multimodal freight operations, while only 5% mention they do not.

In terms of the nature of the documents used in their electronic format, respondents identified notably: Invoice (Shipper), Packing list, Master Air Waybill, House Waybill and others (mentioned twice).

Finally, three respondents specify their use of electronic documents amounts to 1% - 25% of their cross-border operations, while one respondent uses them in 26% - 50% of cases.

Figure 34 – Q47: Do you use e-fTD in your cross-border multimodal freight operations?
Table 16 – Q48: If you use e-FTD in cross-border operations, please indicate which documents you use in their electronic form.

<table>
<thead>
<tr>
<th>Documents used in their electronic form</th>
<th># responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import Goods Declaration (Freight Forwarder)</td>
<td>2</td>
</tr>
<tr>
<td>House WayBill (Freight Forwarder)</td>
<td>2</td>
</tr>
<tr>
<td>Master Air WayBill (Freight Forwarder)</td>
<td>2</td>
</tr>
<tr>
<td>Customs Release Export (Customs)</td>
<td>2</td>
</tr>
<tr>
<td>Export Goods Declaration (Freight Forwarder)</td>
<td>2</td>
</tr>
<tr>
<td>Packing list (Shipper)</td>
<td>2</td>
</tr>
<tr>
<td>Invoice (Shipper)</td>
<td>2</td>
</tr>
<tr>
<td>e-CMR (road)</td>
<td>2</td>
</tr>
<tr>
<td>Certificate of origin</td>
<td>1</td>
</tr>
<tr>
<td>Dangerous goods</td>
<td>1</td>
</tr>
<tr>
<td>Customs Release import (Customs)</td>
<td>1</td>
</tr>
<tr>
<td>Import Goods Declaration (Consignee)</td>
<td>1</td>
</tr>
<tr>
<td>Flight Manifest (Airline)</td>
<td>1</td>
</tr>
<tr>
<td>Export Goods Declaration (Shipper)</td>
<td>1</td>
</tr>
<tr>
<td>CITES Certificate (Shipper)</td>
<td>1</td>
</tr>
<tr>
<td>Letter of instruction (Shipper)</td>
<td>1</td>
</tr>
<tr>
<td>Phytosanitary certificate</td>
<td>0</td>
</tr>
<tr>
<td>Certificate of conformity</td>
<td>0</td>
</tr>
<tr>
<td>Notice to Captain (Ground Handling)</td>
<td>0</td>
</tr>
<tr>
<td>Load Release (Ground Handling)</td>
<td>0</td>
</tr>
<tr>
<td>Freight Book list (Airline)</td>
<td>0</td>
</tr>
<tr>
<td>Security Declaration (Airline)</td>
<td>0</td>
</tr>
<tr>
<td>Transit Declaration (Airline)</td>
<td>0</td>
</tr>
<tr>
<td>Flight Import Cargo Declaration (Airline)</td>
<td>0</td>
</tr>
<tr>
<td>Transfer Manifest (Airline)</td>
<td>0</td>
</tr>
<tr>
<td>Security Declaration (Freight Forwarder)</td>
<td>0</td>
</tr>
<tr>
<td>House WayBill Manifest (Freight Forwarder)</td>
<td>0</td>
</tr>
<tr>
<td>e-CMNI (Inland waterways)</td>
<td>0</td>
</tr>
<tr>
<td>e-SMGS (rail)</td>
<td>0</td>
</tr>
<tr>
<td>e-CIM/SMGS (rail)</td>
<td>0</td>
</tr>
<tr>
<td>e-CIM (rail)</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
</tbody>
</table>

Question 51: Drivers of paper-based transport operations
The most cited reasons for partially or entirely paper-based transport operations are the fact that respondents’ clients or business counterparts do not use e-FTDs, and, that they have different e-FTD solutions (cited 4 and 3 times respectively).

Note: 48% or 10/21 of the respondents did not reply to this question.

Table 17–Q51: If your transport operations are still partially or entirely paper based, what are the main reasons?

<table>
<thead>
<tr>
<th>Answer choices</th>
<th># responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>My clients/business partners do not use e-FTD</td>
<td>4</td>
</tr>
<tr>
<td>My clients/business partners have different e-FTD solutions</td>
<td>3</td>
</tr>
<tr>
<td>I consider that the benefits of using e-FTD are still too low compared to the investment in the needed IT solution(s)</td>
<td>2</td>
</tr>
<tr>
<td>I’m not issuing any transport document</td>
<td>2</td>
</tr>
<tr>
<td>I prefer paper</td>
<td>2</td>
</tr>
<tr>
<td>I do not trust e-FTD</td>
<td>2</td>
</tr>
<tr>
<td>e-FTD are not accepted by the banks and insurance companies with which I work</td>
<td>1</td>
</tr>
<tr>
<td>e-FTD are not accepted by courts and in procedures in front of courts in other EU countries</td>
<td>1</td>
</tr>
<tr>
<td>e-FTD are not accepted by courts and in procedures in front of courts in my country</td>
<td>1</td>
</tr>
<tr>
<td>e-FTD are not accepted by the relevant authorities in other EU countries</td>
<td>1</td>
</tr>
<tr>
<td>e-FTD are not accepted by the relevant authorities in my country</td>
<td>1</td>
</tr>
<tr>
<td>I cannot afford the costs of the technical support (hardware and software) for an e-FTD solution</td>
<td>1</td>
</tr>
<tr>
<td>There are no e-FTD solutions available in my country</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
<tr>
<td>I am not aware of the existence/use of e-FTD solutions</td>
<td>0</td>
</tr>
</tbody>
</table>

Question 52: Digitalisation of rail transport environment

Nearly half of the respondents believe it is necessary to move towards a digital, paperless freight transport environment, while 14% declare that papers work just fine.

Figure 35 – Q52: Do you believe it is necessary to move towards a digital, paperless freight transport environment?
F.9. Benefits and barriers – All responses (106 respondents)

Question 53: Benefits of e-fTD

Less paperwork and faster administration of affairs is the most cited benefit of e-fTD according to the overall respondents of the survey (cited 29 times as a significant benefit). Respondents believe that fewer benefits will be gained in the areas of settlement of insurance issues.

*Figure 36 – Q53:* Please indicate, from your experience, the extent to which using e-fTD instead of paper documents has brought benefits to your business.

---

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Yes, significantly</th>
<th>Yes, to a limited extent</th>
<th>Not really</th>
<th>I cannot tell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easier communication of information in multiple languages</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved collaboration and transparency with my business partners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faster processing of information/documents by the authorities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simplified communication with the authorities (less paper work)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased business opportunities (better customer service, new, tailor-made services,...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-use of information in the created databases in other activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher quality, accuracy and reliability of data (the potential for human error is reduced as)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Better and faster recording of changes that occur during a transport operation (e.g,...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easier settlement of insurance issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easier settlement of freight payment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimized archival requirements (including reduced environmental impact due to...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced operational times</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less paperwork, faster administration of affairs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Question 54: Importance of e-fTD benefits

Simplified business processes is the most cited benefit of e-fTD becoming the main means of communicating information during transport operations according to the overall respondents of the survey (cited 33 times as most important benefit). Respondents believe that fewer benefits will be gained in the area of implementation of cabotage rules.

*Figure 37 – Q54:* If the use of e-fTD becomes the main means of communicating information during transport operations, in which of the following areas do you expect most benefits?
Question 55: Barriers to e-FTD

Overall respondents believe most limiting barriers hindering the acceptance and use of e-FTD are legal and regulatory barriers (cited 46 times). Least mentioned issue by the respondents is interest of business and stakeholders.

Figure 38 - Q55: In your opinion, what issues are currently limiting the acceptance and use of e-FTD?

Question 56: Legal barriers to e-FTD

Among legal and regulatory barriers, respondents believe most hindering issues are related to the lack of appropriate legislative frameworks in the EU Member States on the acceptance by the authorities of e-FTD (cited 26 times). Non-application of existing relevant EU or national regulations on data, use and acceptance of e-FTD at national level was suggested as least hindering issue by the respondents.
Question 57: Technological barriers to e-FTD

Among technical/technological barriers overall respondents consider that lack of interoperability of e-FTD solutions between the different transport modes is the most hindering issue (cited 28 times). None of the options is essentially considered as least limiting by the respondents.

Question 58: Procedural and organisation barriers to e-FTD

Among procedural and organisational barriers, respondents consider the fact that most EU Member States’ authorities still request a paper copy for checking purposes as the most limiting barrier (cited 34 times).
Question 59: Security concerns and e-fTD

Among security concerns, trust and confidentiality are rated as most limiting barriers by the respondents (both cited 22 times).

Question 60: Interest of stakeholders and e-fTD

With regards to the interest of stakeholders influencing the acceptance and use of e-fTD, costs of investment are considered as the most limiting by the respondents (cited 25 times).
Question 61: Future development of e-FTD solutions

For the future development of e-FTD solutions, the preference of respondents is being able to use one e-FTD solution for all types of freight transport documents for all transport modes (multimodal eWaybill+) (cited 12 times) as well as being able to use one e-FTD solution for all the different mode-specific consignment note/contract of carriage documents (multimodal eWaybill) (cited 11 times).

Figure 44 – Q61: For the future development of e-FTD solutions for (intra-EU) cross-border, what is your preference?

Question 62: EU intervention in e-FTD
To facilitate the use of e-FTD, the respondents believe that EU intervention is absolutely needed in ensuring acceptance of e-FTD by all Member States authorities (cited 43 times).

*Figure 45 – Q62: To facilitate the use of e-FTD, please evaluate the need for intervention at EU level with a view to achieve the following*

<table>
<thead>
<tr>
<th>Question 63: Types of EU intervention in e-FTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most effective EU-level intervention according to the respondents would be to adopt measures to ensure trust, confidentiality and data security between e-FTD solutions; facilitate access to data and access control by national authorities across Member States and to support the implementation of an EU Single Window to facilitate collaboration and connectivity with national authorities on the model of the US ACE platform (all cited 23 times).</td>
</tr>
</tbody>
</table>
Figure 46 – Q63: To achieve the objectives you identified above, which of the following types of EU level intervention would be, in your view, most effective.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support the implementation of an EU Single Window to facilitate collaboration</td>
<td>4</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td>23</td>
</tr>
<tr>
<td>and connectivity with national authorities in the model of the US ACE platform</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facilitate access to data and access control by national authorities across Member States</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Adopt measures for harmonization of all elements of the different e-FTD solutions</td>
<td>4</td>
<td>16</td>
<td>16</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Adopt measures (legislative or “soft”/guidelines) for harmonization of services of e-FTD solutions</td>
<td>4</td>
<td>9</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Adopt measures to ensure harmonization of requirements for e-FTD solutions for acceptance by the Member States authorities</td>
<td>13</td>
<td>9</td>
<td>20</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Adopt measures to ensure harmonization of data elements across different (module-specific) e-FTD solutions</td>
<td>8</td>
<td>5</td>
<td>10</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Adopt measures to ensure trust, confidentiality and data security between e-FTD solutions</td>
<td>22</td>
<td>14</td>
<td>14</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Adopt measures to ensure coherence of e-FTD solutions with developments in EU regulations and international bodies</td>
<td>23</td>
<td>11</td>
<td>20</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Support and promote pilots, projects and best practices of e-FTD solutions to reach critical mass</td>
<td>5</td>
<td>13</td>
<td>18</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Promote the implementation of e-FTD solutions developed by international bodies</td>
<td>7</td>
<td>3</td>
<td>11</td>
<td>19</td>
<td>14</td>
</tr>
</tbody>
</table>

1 (Least effective) 2 3 4 5 (Most effective)

Question 64: Actors and their roles in e-FTD

For actor(s) which could have a significant role, the respondents identify European Commission as the most relevant one (cited 42 times).

Figure 47 – Q64: Can the following actors assist in the promotion of and use of e-FTD?

The ‘other’ category included the following remarks:

- *One of the goals for international and national associations is to accompany its members towards the technological transition.*
- *Obviously the European Commission, the national and local governments should also have a deep impact for the recognition of the use of electronic freight document, since it should lead to a better management of the transport itself and officialise the dematerialisation of the transport document for global deployment.*
- *Technology providers have a also a big part to play since they will be the ones to provide the easiest and the most appropriate and interoperable solutions to the users.*
- *Obviously users will be the one to make the use of electronic transport document solution a success or not.*
- *International, national associations, European Commission-National governments and private sector companies have to work closely on common process and standard for every kind of transport modes (air, sea, road, rail and inland waterways). Data quality is key principle to have clean processes among the different stakeholders of the supply chain, it’s a crucial point.*
- *The actors above must work in a kind of process, first through EU so everybody interprets the requirements the same way in MS. next step is national governments and other local stakeholders. When a common ground is set then the users and technology provider can work.*
- *For European Commission and National Government - adoption of legislation The Local Government - Lobbying Technology providers - Lobbying*
ANNEX G – SG1 T3 Survey Analysis

Annex E presents the analysis of the responses to the online questionnaire ‘Digital Transport and Logistics Forum (DTLF) - Use of digital documents related to registration and certification of vehicles - by businesses, inspection authorities and end users’ launched in April 2017. A first subsection introduces the approach of the survey. It is followed by an analysis, question per question, of the responses received.

G.1. Introduction and methodological approach

The questionnaire has been online since 3 April 2017. While the questionnaire remains open, the present analysis covers responses received between 3 April 2017 and 3 February 2018. It has been shared with all DTLF Members, who were then asked to disseminate the survey among their networks.

The key objective of this survey is to understand the current state of play regarding the use of electronic documents in transport, with a view to enable effective paperless processes at roadside checks, accessing industry plants, terminals etc. More specifically, the survey focuses on data and information related to registration and certification of road vehicles, as contained in the Vehicle Registration Certificate, Green Card (International Certificate of Motor Insurance) and Certificate of Conformity (CoC), as well as other vehicle documents needed in relation to roadside checks, transport of dangerous goods (ADR), animal transport, transport of waste etc. Vehicle documents which are used in the national context are also relevant for the purposes of this survey.

G.2. Respondent profile

This section includes the analysis of the DTLF Team 3 Online Survey questions 2 to 4 (the first question of the survey covers the contact details of the participant).

Question 2: Member State

The DTLF Team 3 Online Survey (hereafter ‘the survey’) gathered replies from 29 respondents in 12 Member States. Germany, Bulgaria and Spain are the most represented countries, with five, four and four replies respectively.

Figure 48 – Respondents per Member State
Questions 3 & 4: Type and size of organisation

Forwarders and logistic service providers are the most represented type of organisation with 24% of replies to the survey. Fleet owners and managers come second, with 17% of replies. It should also be noted that 21% of replies fall into the ‘Other’ category that include: Member State, port authority, research institute, telematics service provider and transport consultant.

*Figure 49 - Respondent profile: Type of organisation (SG1 T3 survey)*

Very large organisations (500 or more people) are the most represented with 35% of replies. Smaller organisations (10 - 49 people) come second (24%) while large organisations (250 - 449 people) come third (21%). Medium-large organisations (50 - 249 people) are the least represented with 10% of replies.

*Figure 50 - Respondent profile: Size of organisation (SG1 T3 survey)*

G.3. Digital storage of vehicle data and certification
This section includes the analysis of the DTLF Team 3 Online Survey questions 5 to 13.

**Question 5: Digital storage of Vehicle Registration Certificates (VRC)**

A wide majority of replies (59%) show that in most Member States, VRCs are stored digitally in a centralised national database. Besides, while 17% of respondents indicate they do not know whether this is the case, no one explicitly specifies VRCs are not stored digitally in their Member State.

*Note: 24% of the participants did not reply to this question.*

**Figure 51 – Q5: In your country, is the information contained in the Vehicle Registration Certificates stored digitally in a centralised national database?**

**Question 6: National legislation and VRC**

A wide majority of replies (72%) show that in most Member States, national legislation makes it mandatory to carry a VRC in the form of a paper or smartcard on board the vehicle when driving. On the other hand, 4% of the replies indicate carrying a copy of the VRC when driving is not mandatory.

*Note: 7 or 24% of the participants did not reply to this question.*

**Figure 52 – Q6: Does your national legislation make it mandatory to carry a Vehicle Registration Certificate, in the form of paper or smartcard, on board the vehicle when driving within your country?**
Question 7: Online access to national VRC database

According to the survey, police, administrations and roadside inspectors appear to be the actors having online access to information and data stored in the national VRC databases in most Member States (16, 10 and 9 replies respectively). The ‘other’ category include: governmental road transport agencies.

*Note: 7 or 24% of the participants did not reply to this question.*

*Figure 53 – Q7: Who has online access to information and data stored in your national Vehicle Registration Certificate database?*

![Bar Chart]

Question 8: Access to national VRC database

While a great number of respondents indicated they do not know how to access information and data stored in the national VRC database, dedicated platform and webpage responses were selected 6 and 5 times respectively by respondents. The ‘other’ category includes: webservice (*accessible through a State-Owned VPN*) (mentioned twice) and no access (mentioned twice).

*Note: 7 or 24% of the participants did not reply to this question.*

*Figure 54 – Q8: How can information and data, stored in your national Vehicle Registration Certificate database, be accessed?*
Question 9: Benefits of on-line access to national VRC database

Respondents consider that simplified processes, including reduced administrative burden and rapid access to information, reduced operational time are the most important benefits of the on-line access (both selected 13 times). These are closely followed by cost reduction, including administrative costs (selected 11 times). The ‘other’ category includes: as a non-governmental stakeholder we are not able to access the database. We can only assume that the benefits would be the first three points on the list. This can therefore be assimilated to a I don’t know response.

Note: 8 or 28% of the participants did not reply to this question.

Figure 55 – Q9: What are the benefits of the on-line access, in your experience?

Question 10: National VRC database and other information

A wide majority of respondents seem not to be aware of any other information stored in the national VRC databases. In fact, 48% of respondents indicated they do not know whether it contains other information than the information related to the VRC, and 28% did not reply to the question. Only 10% replied positively and 14% negatively.

Figure 56 - Q10: Does your national Vehicle Registration Certificate database contain other information than the information related to the Vehicle Registration Certificate?
Question 11: Access to VRC data in EU cross-border context

A wide majority (59%) of respondents seem not to be aware of any use case of digital access to vehicle registration data in a EU cross-border context, while only 14% replied positively to the question.

*Figure 57 – Q11: Are you aware of any use case of digital access to vehicle registration data in a EU cross-border context – namely, direct access by the national authorities of one EU country to data stored in the national vehicle register database of another EU country?*

Question 12: Other digital storage of vehicle data

Respondents seem not to have a clear view on any other digital storage of data related to vehicle certification in their Member State. Indeed, for all but one other data type potentially stored digitally (PTI inspection approval), the ‘I don’t know’ response was selected an equal number or more times than the positive or negative clear-cut ‘Yes’ or ‘No’ answers. Still, PTI inspection, certificate of conformity and vehicle type approvals received the biggest number of positive responses, with 10, 9 and 8 ‘Yes’ replies respectively.

*Note: 10 or 34% of the participants did not reply to this question.*

*Figure 58 – Q12: Are you aware of any other digital storage of data related to vehicle certification in your country?*
Question 13: Necessity of digital storage of vehicle data

A wide majority of respondents (62%) believe it is necessary to move towards digital storage, management and access of vehicle data, certification, documentation of approval, and the like, while only 7% think papers do work just fine.

Figure 59 – Q13: Do you believe it is necessary to move towards digital storage, management and access of vehicle data, certification, documentation of approval, and the like?

G.4. Benefits

This section includes the analysis of the DTLF Team 3 Online Survey questions 14 to 16.

Question 14 & 15: Benefits per area

The most important benefits of digitalisation of vehicle-related data are perceived to be encountered in faster inspection of documents by enforcement authorities (ranked first 8 times and second 1 time) and in increased efficiency of operations at access checks (ranked first 4 times and second 5
times). Least important benefits are expected in facilitation of multimodal transport operations (ranked sixth 9 times and fifth 3 times) and opportunities to re-use information (ranked sixth 2 times and fifth 9 times). No other benefits were mentioned in question 15.

Note: 9 or 31% of the participants did not reply to question 14 and none replied to question 15.
Figure 60 – Q14: In which of the following areas do you believe most benefits will be encountered?

<table>
<thead>
<tr>
<th>Area</th>
<th>Importance 1 (Most)</th>
<th>Importance 2</th>
<th>Importance 3</th>
<th>Importance 4</th>
<th>Importance 5</th>
<th>Importance 6 (Least)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunities to re-use information</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Facilitation of multimodal transport operations</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Increased efficiency of operations at access checks (gate check at industrial plant, transport terminals etc.)</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Reduced cost, including administrative costs</td>
<td>2</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Simplified communication with administration authorities</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Faster inspection of documents by enforcement authorities</td>
<td>8</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Question 16: Centralisation in a single window

The majority of the respondents believe centralisation of access to one “single window” is either absolutely needed (24%) or very important (31%). None replied it is not important, and only 17% replied it is somewhat important.

Figure 61 – Q16: Do you think it is important to centralise access to one single paperless access point/“single window”?
G.5. Barriers

This section includes the analysis of the DTLF Team 3 Online Survey questions 17 to 23.

Question 17: Most limiting barriers

The issues limiting the acceptance and hindering the use of digital vehicle documentation data the most are perceived to be legal and regulatory barriers at EU and national level (ranked considerably limiting 12 times and somewhat limiting 5 times) and procedural and organisational barriers (ranked considerably limiting 7 times and somewhat limiting 9 times). The least limiting issue appears to be the lack of trust in IT systems (ranked considerably limiting 2 times and not limiting 10 times).

Note: 9 or 31% of the participants did not reply to question 14 and none replied to question 15.

Figure 62 – Q17: In your opinion, what issues are currently limiting the acceptance and hindering the use of digital instead of paper vehicle documentation data?

Question 18: Legal and regulatory barriers

Three legal and regulatory barriers seem to be affecting electronic storage and access to data on vehicles registration and certification data specifically: different national regulations, lack of appropriate national-based legislative framework and non-application of existing legislative framework at national level (all selected 13 times).

Note: 10 or 34% of the participants did not reply to this question.
Question 19: Procedural and organisational barriers

The most limiting procedural and organisational barrier appears to be the fact that EU or third countries’ national authorities still request a paper copy for verification purposes (selected 16 times).

Note: 10 or 34% of the participants did not reply to this question.
Question 20: Technical barriers

The most limiting technical barrier appears to be the Lack of interoperability of digital systems between EU countries (selected 17 times). One respondent notes that “This does not necessarily imply that there is a need for another system”.

Note: 10 or 34% of the participants did not reply to this question.

Figure 65 – Q20: Among technical barriers, please identify specific issues.

Question 21: Lack of trust in data systems

The most limiting issues related to lack of trust in data systems are perceived to be linked to guarantees of unauthorised usage of data, and data security (both selected 13 times).

Note: 9 or 31% of the participants did not reply to this question.

Figure 66 – Q21: Please identify specific issues related to lack of trust in data systems.

Question 22: Interest of businesses and stakeholders

The most limiting issues related to interest of businesses and stakeholders in using electronic documents are perceived to be linked to lack of thrust in digital solutions (selected 10 times). However, 7 respondents consider that business and stakeholder interest are not a significant barrier overall.

Note: 9 or 31% of the participants did not reply to this question.
Question 23: Other barriers

Only one respondent replied to question 23, and considers that the Risk of forgery and fraud is another barrier or issue currently limiting the acceptance and hindering the use of digital instead of paper vehicle documentation data.

Note: 28 or 97% of the participants did not reply to this question.

G.6. Recommendations

This section includes the analysis of the DTLF Team 3 Online Survey questions 24 to 28.

Question 24: Intervention needs per area

Over all, respondents believe intervention is needed in all areas suggested in the survey. More specifically, acceptance by EU Member States authorities of electronic transport documents for verification purposes is considered as key intervention area (selected 16 times). The ‘other’ category includes: A working system for transfers between EU Member States and those geographical neighbors who are not members.

Note: 10 or 34% of the participants did not reply to this question.
Figure 68 – Q24: In your opinion, intervention is needed in the following areas:

<table>
<thead>
<tr>
<th>Intervention Description</th>
<th>Yes</th>
<th>No</th>
<th>I don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure coherence with developments in EU legislative framework</td>
<td>12</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Ensure trust, confidentiality and data security between the national systems adopted by</td>
<td>14</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>the different Member States</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure harmonization of data formats between the different national databases/systems</td>
<td>14</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Acceptance by banks and insurance companies of electronic transport documents</td>
<td>13</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Establishment of a “European single window”</td>
<td>13</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Establishment of a “national single window”</td>
<td>14</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Acceptance by EU Member States authorities of electronic transport documents for verification purposes</td>
<td>16</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Other areas of intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: 13 or 45% of the participants did not reply to this question.

Figure 69 – Q25: If you selected ‘yes’ for the harmonisation of data formats between the different national databases/systems, please indicate which of the following measures would be, in your opinion, more appropriate.

Question 25: Intervention in harmonisation of data formats

A wide number of respondents believe that providing EU-wide standards for an interoperable environment supporting different systems would be the most appropriate measure for the harmonisation of data formats between the different national databases and systems (selected 14 times). The ‘other category’ includes: Create interoperability mechanisms to support legacy systems and international connectivity and As above, for interchange between EU and non-Member States.

Note: 13 or 45% of the participants did not reply to this question.
Question 26: Intervention in ensuring trust and confidentiality

An equally wide number of respondents believe that ensuring coherence with developments in EU legislative framework and in international bodies would be the most appropriate measures for the ensuring trust, confidentiality and data security between national systems (selected 12 times).

Note: 13 or 45% of the participants did not reply to this question.

Figure 70 – Q26: If you selected ‘yes’ for ensuring trust, confidentiality and data security between national systems, please indicate which of the following measures would be, in your opinion, more appropriate.

Question 27: Intervention actors and their roles

Question 27 requested to identify the actor that could assist in the promotion of and use of electronic transport documents, in the areas identified the above question 24. Results related to each identified area are depicted in separate graphs (Graphs 27.a. to 27.f.).

Note: 11 or 38% of the participants did not reply to this question as a whole.

27.a. An equally wide number of respondents believe both the EU and the national governments should have a significant role in promoting the acceptance by EU Member States’ authorities of information and documents in electronic format (both selected 12 times).

27.b. A wide majority of respondents believe the national governments should have a significant role in establishing a “national single window” (selected 14 times). In addition, a wide number of respondents believe national and international associations should have a minimal role (selected 10 times).

27.c. A wide majority of respondents believe the EU should have a significant role in establishing a “European single window” (selected 14 times).

27.d. A wide number of respondents believe the EU should have a significant role in harmonising data formats (selected 11 times).

27.e. A wide majority of respondents believe the EU should have a significant role in ensuring trust, confidentiality and data security between the different Member States systems.
Figure 71 – Q27a: Acceptance by EU Member States authorities of information/documents in electronic format

Figure 72 – Q27b: Establishment of a "national single window"

Figure 73 – Q27c: Establishment of a "European single window"
Question 28: Other intervention actors and their roles

Technology providers are perceived as other entities having a significant role towards the acceptance and use of electronic transport documents (selected 9 times). Both banks and insurance companies follow closely with a significant role (selected 8 times), however, a twice larger number of respondents (10) believe insurance companies should have a minimal role compared to banks (5).

Note: 9 or 31% of the participants did not reply to this question.
G.7. Digital storage of driver qualification, licences, skills and education

This section includes the analysis of the DTLF Team 3 Online Survey questions 29 to 32.

Question 29: Necessity of a single access point/smartcard

While a large share of respondents did not reply to the question (38%), an equally large share believes it is necessary to merge driver data, qualification, education, skills etc. into one single access point.

**Figure 77 – Q29: Do you believe it is necessary to merge driver data, qualification, education, skills, etc. into one single access point/smartcard?**

Question 30: Benefits of a single access point/smartcard

Most respondents (ranked first 4 times and second 8 times) believe most benefits derived from merging driver data, qualification, education, skills etc. into one single access point will be encountered in increased coordination with administration authorities.
Note: 13 or 46% of the participants did not reply to this question.

Figure 78 – Q30: In which of the following areas do you believe most benefits will be encountered?

Question 31: Additional benefits of a single access point/smartcard

Question 31 requested to specify any additional benefit related to the question 30 above. The survey collected no replies for this question.

Question 32: Centralisation of driver documents

While a large share of respondents did not reply to the question (38%), a share of 31% believes it is necessary to important to centralise access to the driver related documents into one single paperless access point / "single window".

Figure 79 – Q32: Do you think it is important to centralise access to the driver related documents into one single paperless access point / "single window"?
ANNEX H - Developing a federative network of platforms for eTransport document data

This annex introduces a blueprint for federative platforms supporting sharing of data for transport documents, based on the results of DTLF SG2. There is already a number of platforms available (see section 4); these will be components in a federative network of platforms for electronic transport documents for the European Union.

The federative network of platforms is presented in terms of various options for authorities to access relevant data of transport documents. A potential implementation in road transport illustrates how these federative platforms can be used by both enterprises and authorities.

Although the European Union can stimulate the creation of such federative platforms for electronic transport documents supported by many platforms of different providers ('system-of-systems'), it will always rely on other countries since logistics is global. Air, sea, and rail transport cross for instance the borders of the European Union. Creation of global federative platforms for paperless trade depends on agreements that can be made by for instance the United Nations and/or in combination with bilateral agreements with non-EU countries. Optimization of paperless transport can be achieved within the European Union and, as long as there is no globally accepted federative network of platforms, gateway solutions have to be constructed and/or globally operating carriers will have to interface with different platforms. These aspects are outside scope of this document, the focus will be on constructing a federative network of platforms for eTransport document data for the European Union.

First of all, the general problem is introduced, resulting into concepts and components for federative platforms as a basis for the blueprint. These concepts and components are identical to Sub Group 2 (section 3.1 of the final report of DTLF Sub Group 2). Implementation options are presented. This section will show how federative platforms could function from a government perspective, re-using data already available in the private domain. Interoperability between business and government is expressed in the B2G Interoperability Stack.

G.1 Solution and service providers for federative platforms – the challenge

Federative platforms for sharing (access to) data of eTransport Documents consists of more than one commercial-, community- and enterprise solutions for storage and (controlled) sharing eTransport Documents in the private domain, where these solutions are either in the domain of a logistics stakeholder (enterprise solution) or are provided by an external provider (commercial - or community solution). In case these platforms are used by both business and authorities to share data of documents, they have to adhere to particular rules reflecting data quality. These are given hereafter.

Federative platforms consists of many different platforms of different providers, each authority requires easy access to a proper platform based on its inspection regime. Enterprises can select a platform of choice, which implies that authorities potentially deal with several solutions. Federative platforms will have to hide this complexity to authorities by making different platforms interoperable. There need to be protocols between the various platforms, depending on the inspection regime of an authority.

Furthermore, enterprises have to interconnect once to platform of choice and be able to share eTransport Document (data) with all other enterprises and authorities connected to the federative
platforms. Federative platforms have to support the principle of connect- and register once and the ability to do business with all other enterprises that connect. This can be done on the basis of Logistics Services as a guide for Logistics Core Components as described in the previous section.

This option requires agreement amongst service - and solution providers, providers of IT systems to enterprises, enterprises with their internal software development department, and authorities on their requirement regarding accessibility. For road transport, (a limited number of) eCMR platform providers can agree on constructing federative platforms, potentially integrating with Eucaris. This approach will be discussed in the next section, based on generic concepts for describing such federative platforms.

The railways’ digitisation activities are also affected by the European Commission’s Regulation on the Technical Specification for the Interoperability (TSI) of the Railway Systems in the European Union (EU). Amongst the rules dealing with the subsystem “Telematics applications for freight service (TAF)”, the Regulation contains a series of provisions on the exchange of information amongst train operating companies and between them and the railway infrastructure managers. One of the matters provided for in the TAF TSI is that the leading train operating company is to provide all the other train operating companies involved in a transport with the necessary information for the operational performance of their part-service in the form of a standardised electronic ConsignmentOrderMessage (COM). In parallel with that, the increased use of purchases/sales of transport services by the railways, it has also become necessary to supply the necessary data for the commercial processing of their part-performance to those substitute carriers who do not make use of the (electronic) consignment note. In order to be able to solve that challenge with the maximum degree of automation, the “COM” is currently being further developed at sectoral level into the “COM+”. The latter contains all the commercial and operational data necessary for provision a part-performance (on the basis of the consignment note data saved electronically).

In Inland waterway transport the RIS infrastructure provides a basis for exchange of e-documents and should be taken into consideration. Although it contains standards for sharing transport document data, especially between barge operators and infrastructure managers for reporting facilities, implementations of sharing these e-documents differ per infrastructure manager based on implementation regulations of EU Directives.

The EC monitors the implementation of TAF TSI and RIS on a regular basis. This monitor shows that mandatory elements will be implemented (e.g. rail path allocation based on Rail Net Europe (RNE) systems for international trains), but not features will be supported by relevant stakeholders or they may still have proprietary solutions in place. Systems like those of RNE can function as a registry to find data of international trains; a database like the hull database for inland waterways combined with AIS (Automatic Identification System) service as a (distributed) registry to find data of barges.

G.2 A blueprint for federative platforms of eTransport document data

Whereas the final report of DTFL SG2 (section 3.1) presents the generic concepts for specifying federative platforms, this section will specialize federative platforms to a particular modality as an illustration of its application in eTransport document data. Although the EU and Member States might not realize federative platforms themselves, there is already a number of platforms available in the private sector (see before), they will have to interface with individual platforms of the public sector based on an inspection procedure. In view of authorities transforming their procedures into data driven procedures, the blueprint for a modality will be provided independent of the mechanism
applied for sharing data. Risk based inspection can for instance be based on declarations and subscriptions by authorities to data.

First of all, the blueprint for road transport will be given to illustrate this way of operation. Secondly, the generic components for all other modes will be identified.

G.2.1 Federative platforms for eTransport Document data in road transport

Federative platforms for eTransport Document data in road transport needs to consider the following aspects:

- Authority use cases
- The current practice of freight road transport
- The introduction of eCMR platforms and required registries to fit the use cases
- Visualization of the use cases with the registries
- Identification, Authentication, and Authorisation

The main challenge is how to get access to the proper data of eTransport Documents in view of particular use cases and inspection procedures. Integration with current systems and procedures for identification of trucks based on their licence plates is required; re-use and extension of the Eucarissy network of licence plate registrations with National Contact Points is recommended. This will be detailed further.

The proposed federative network of platforms can be specified as follows using the terminology introduced by DTLF SG2:

<table>
<thead>
<tr>
<th>Generic term</th>
<th>Term for road transport</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>End-users</td>
<td>Any authority implementing a particular inspection regime (see section 4.4.2) or responsible for road traffic safety</td>
<td></td>
</tr>
<tr>
<td>Registry platform</td>
<td>Different types of registries that may combine functionality (i.e. a vehicle registry)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vehicle details</td>
<td>Registration of licence plates of trucks</td>
</tr>
<tr>
<td>Owner details</td>
<td>The owner of a truck. An owner is responsible for certificates for operating a truck. These certificates are stored in another registry.</td>
<td></td>
</tr>
<tr>
<td>User details</td>
<td>The actual user of a truck. A user may require permits and qualification certificates for its drivers. These qualifications can be stored in another registry.</td>
<td></td>
</tr>
<tr>
<td>eCMR Registry</td>
<td>A registry with eCMR platforms</td>
<td></td>
</tr>
<tr>
<td>Customer-carrier registry</td>
<td>The assumption is that each carrier has at least an administration listing its customers. It has to be used in case a customer produces and stores the data. It provides the endpoint of a customer</td>
<td></td>
</tr>
</tbody>
</table>
The following figure shows the overall relation between the various registries with their links. Since a user can be an owner and also produces an eCMR data set, this is considered as one virtual registry.

![Figure 80 – relations between the various registries](image)

The owner – and user registries may be combined, since the owner can also be the user. A user should provide an indication to the eCMR platform utilized. There may be alternative solutions like each cargo item having a link (an endpoint) to its relevant data. Such a solution requires access to cargo items.
In the private domain, various identifiers are used that are not all known to authorities:

- Licence plate of truck – unique identification of a truck.
- VIN number – sensor identification of vehicle
- Consignment identification – unique identification of an consignment transported by carrier on behalf of a customers.
- Trip number – unique identification of a route of a truck on a given day.

These identification will be used to access particular data. The structure of these concepts will be described hereafter.

**G.2.1.1 Authority use cases**

Currently, inspection officers are able to halt trucks and request their CMRs and other relevant documents. These CMRs can already be printed on board a truck and thus be handed over manually be a truck driver to an inspection officer. Inspection officers do not have to change their procedures. However, a paperless transport offers additional opportunities to both inspection officers and carriers, as will be shown by examples of scenarios.

The following two scenarios are currently foreseen:

- **Random inspection** – regulatory authorities like police and inspection authorities have the capability to halt and inspect a truck. They require access to CMR data, based on for instance a license plate. With paperless transport, inspection officers are able to validate the content of a truck by assessing eCMR data sets based on a license plate. Trucks will not be halted unnecessarily, thus preventing unnecessary waiting times to truck drivers and enabling inspection officers to focus on goods flows that are not compliant with regulations.

- **Accidents** – emergency situations where an eCall message is generated to 112-numbers. Based on this message, cargo details of a truck need to be retrieved. Emergency units will have all details on cargo of a truck, before actual being at the scene of the accidents. It allows them to properly prepare themselves for handling the accident.

Future use cases can be the following:

- **Access restrictions in urban areas** – vehicles with certain cargo are not allowed access in for instance parts of a city or urban area. Access restrictions might be for certain periods of a day or special permits are required to get access. Access restrictions might be automatically governed based on accessing cargo (and/or vehicle) data for a license plate.

- **Overview of cargo flows** – real time over view of cargo flows in a particular area with a focus on for instance types of cargo like dangerous cargo. The objective is to increase safety by controlled access of different types of dangerous cargo to a particular area. This is a generic query of all transport means in a particular area at a time, it may include all modalities: trucks, barges, and trains.

- **Any other scenario requiring data.**

A query generating an overview of cargo flows in a particular area is independent of a license plate of a truck, but will be based on geofencing. It is expected to return data of all moving transport means in a the geofencing area and its cargo details. Currently, authorities do not have any details on cargo movements in their areas of responsibilities and are thus not able to dynamically optimize for instance traffic flows.
### G.2.1.2 Organisation of freight road transport

The current situation with respect to transport of cargo by road has the following characteristics:

- **Truck and trailer(s)** – a truck can have more than one trailer, where the truck has a VIN number and a license plate. The trailers all have their own license plate. A VIN number acts as a sensor. A truck can also have its own load capacity.
- **Owner and operator** – carriers can rent or lease trucks and trailers from commercial companies. Therefore, the trucker of a trucking company not necessarily owns the truck or one of the trailer(s).
- **Full truck load versus less than truck load** – a transport of a truck with one or more trailers can be for one particular customer (full truck load) or many different customers during its trip.
- **Customer and carrier** – a carrier may operate on behalf of one or more customers on different days, each day potentially with a different constellation of truck and trailer(s).
- **Delivery conditions** – a carrier can operate on behalf of a consignee (delivery conditions of the goods: ex works) or on behalf of a shipper (delivery conditions: free delivered (or a similar one)).
- **Data and document** – in the current situation a CMR can be produced by a customer or a carrier.
- **eCMR platforms** – the data representing an eCMR can be stored in the IT system of an enterprise (e.g. LSP or his customer) or the solution of an external provider (eCMR, TransFollow, etc.).

Mostly SMEs carriers have the documents produced by their customer on paper, where data is stored in the IT system of the customer. Large carriers produce store the CMR data in their own IT systems and produce a document when relevant.

In this context, authorities need to access the proper data representing the eCMR. The eCall message needs to be extended to retrieve the proper data set.

The following assumptions are made:

- The combination of a truck and (rented/leased) trailer(s) is not relevant for tracing the cargo transported by a carrier at any given moment. In case the carrier or his customer produces the data for the CMRs, the composition of the truck and trailer(s) does not seem relevant as long as the data can be associated to a truck.
- A truck can always be owned or leased/rented by a carrier. Therefore, there has to be a register of owner and lessee/renter. Such a register is dynamic, since trucks maybe leased or rented for short periods of time.
- An owner of a vehicle is already registered in a national registry.
- The association between a customer and carrier is part of the data for an eCMR.

### G.2.1.3 Federative platforms for an eDocument Infrastructure for road

To be able to find the proper data sets for retrieving eCMR data out of eCMR platforms, registries have to be used. Registries of license plates are available, these are interconnected by the Eucaris network with National Contact Points (Eucaris NCPs that function as endpoints of these licence plate registries). Furthermore, some Member States like the UK have implemented a registry for storing relations between owner and lessee/renter that enable retrieving of for instance a carrier renting a particular truck or trailer.
It is assumed that eCMR data sets are stored by eCMR platforms. There are already several commercial eCMR platforms. There will also be shippers, consignees, and Logistics Service Providers (LSPs) that will have their own solutions. Thus, there will be many solutions. All these solutions can be queried for data, but this might be too time-consuming and might lead to too many queries for the individual solutions based on for instance the combination of license plate (or VIN) and time, which requires storing the license plate (or VIN) as data of the eCMR data set. An alternative is focused queries to only those eCMR platforms that contain the required data sets. Therefore, registries are introduced.

All these different solutions will be utilized across all EU Member States. The previous sections already list a number of requirements to these solutions to have them accepted by Member State authorities. Belgium is considering developing a registry for storing data of acceptable eCMR platform that meet Belgium conditions. This acceptance might be on a EU scale, as an extension of for instance the eCMR treaty.

To properly find the eCMR platform to share required eCMR data sets between business and authorities, registries additional to existing ones like license registries are identified:

- Owner – lessee/renter registry: a registry of leasing companies and lessees/renters linked to a license plate. Whenever this registry is queried on owner, it returns the (last known) lessee/renter of a vehicle.
- Customer – carrier registry: a registry associating a customer with a carrier. The entries in this registry are per consignment. This registry is only relevant in case customers store the eCMR data. This registry only needs to be queried if the eCMR registry does not have an entry for a carrier.

These registries might not be implemented as separate registries. They can be realized in different ways; considerations are:

- Owner – lessee/renter registry. A vehicle will contain a VIN, but the eCall message has a field which can contain identification. This field could be used to contain an identification of the carrier utilizing the truck as owner or lessee/renter. The identification needs to be added manually, so a system needs to be available. The identifier could be the URL of the lessee/renter/owner. It is the URL where data of cargo can be found. This type of solution does not work for all of the identified use cases like a query on cargo transported by all moving transport means in for instance urban areas for a time period. The latter requires a registry for owner – lessee/renter. There are two options to realize an owner-lessee/renter registry:
  - Private registry – each owner has a registry of lessees/renters.
A private registry is preferred, since each leasing or rental company will have this type of information for invoicing, etc. By downloading the actual identification of a lessee/renter to a truck, it can be used in the eCall message. This latter solution requires adjustment of procedures and systems.
- Customer – carrier registry. The registry with the link between a customer and carrier is abundant if all eCMR platforms can be queried for retrieving relevant data (commercial eCMR platforms and IT systems of customers and LSPs that store the eCMR data). Otherwise, it is logical that carriers have this type of registry as minimal functionality (they also need it for invoicing and payment). Therefore, this registry is not shown in the next figures.
The above-mentioned registries can also be combined. For instance, the owner is the user, there is no lessee/renter involved. The owner can also have its own eCMR platform, which implies that a query (via an Eucaris NCP) to a registry directly returns the relevant CMR data set. This is depicted by the use case of on road inspection (see hereafter).

In addition to these registries, the vehicle location details have to be known to be able for an authority to assess movements of goods in a geofenced area. The assumption is that a carrier will know the location of its trucks, based on for instance the use of On Board Units. Another approach would be to assess the location of the mobile phone of truck drivers, but only for particular usage.

Currently, most registries are linked by identifications, e.g. a license plate and a Chamber of Commerce registration of for instance carriers. In a completely digitized world, these identifications can be replaced by URIs (Uniform Resource Identifiers) or URLs (Uniform Resource Locators or http-addresses). They can be used to link different data sets (so-called ‘Linked Data’). For instance, a license plate registry can contain a URL to a registry of an owner. A (REST\textsuperscript{97}) query to a license registry based on the license plate number (or VIN) is forwarded by extending it with the URL of the owner.

G.2.1.4 Support of the use cases by federative platforms

The previous parts have listed a number of use cases for authorities. These are detailed hereafter in terms of data flows between the various solutions. Queries need to contain a timestamp for which the data is to be provided. A carrier can use this timestamp to identify a particular trip of a truck, thus providing a list of customers or data of the eCMRs of the cargo on the truck (less than truck load).

Use case 1 – random inspection

On road inspection is based on querying the registries with a license plate that is entered by an inspection officer. In the simplest case, the truck and trailer(s) are owned by the carrier and the carrier has its own eCMR platform. The carrier is able to produce the required data set. The following figure shows this solution.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure81.png}
\caption{carrier owned truck and carrier operated eCMR platform}
\end{figure}

\textsuperscript{97} REST is the common protocol for implementing Application Programming Interfaces (APIs). A REST query can be entered as a URL in a browser, returning the result in the browser window.
There is a number of variants of the above solution where a carrier has its own eCMR platform, that will be detailed further.

1. Carrier owned truck and commercial eCMR platform

   *Figure 82 – carrier owned truck and commercial eCMR platform*

2. Carrier owned truck and customer produced eCMR data set

   *Figure 83 – carrier owned truck, customer produced eCMR data set*

3. Carrier owned truck and customer produced eCMR data set in a commercial eCMR platform

   *Figure 84 – carrier owned truck, customer produced eCMR data set from a commercial eCMR platform*

4. Rented truck/trailer by a carrier, where the eCMR data set is produced by a customer and stored in a commercial eCMR platform (most complex situation)
Use case 2 - accidents

In the use case of accidents, the query is generated by an eCall message. In case the eCall message does not contain the URL of the user of a truck, the afore-mentioned queries are applicable. In case an eCall message contains the URL of the user of the truck (the carrier that is the user can also be the owner), the owner/user registry is directly queried via an Eucaris NCP. It is not necessary to

Use case 3 - access restriction in particular areas

Like mentioned before, access control to particular areas still requires further validation. It is complex on its own. Therefore, the implementation variants of this use case are only for illustration of the usage of cargo data and the implications of access restrictions to eCMR platforms. Please note that in for instance Australia permits for access to an area can be obtained for individual truck movements in real time, including real time payment of these permits. Truck drivers will have a choice to take either the short distance for which they have to pay, or the longer detour that is free of charge (or cheaper).

In this particular scenario, a truck driver requires access to a particular area, e.g. an urban area. Access restrictions are on the level of the type of truck, but can also relate to the type of cargo. Access restrictions can also have a time window. Carriers may also have permits for entering particular areas, where these permits may be restricted to cargo types (e.g. dangerous cargo is not allowed during day time in a particular area).

Access restrictions can be based on commercial flows (e.g. restrictions on eCommerce delivery of packages and food during particular times in an area), type of cargo (e.g. dangerous cargo), packaging (no container transport in city centers), and/or weights (e.g. maximal weights allowed on particular roads). Authorities responsible for economic activities and/or infrastructure in an area have to govern these access restrictions, e.g. municipalities and national road infrastructure managers.

The access restriction to types of trucks is not considered in this document. This particular document focusses on access restrictions to cargo. Access control can be implemented in different ways, for instance:
Road blocks – especially city centers have road blocks equipped with sensors. License plate information can be detected with the sensor, where the sensor performs the following actions:

- Querying its NCP with a reference to the applicable access restrictions.
- The query is handled like in the on road inspection scenario.
- The query result is an indication whether or not access restrictions are valid.
- In case the access restrictions are invalid, the road block is temporarily lowered/removed automatically to let the truck pass.

Cameras – these function as sensors and have similar actions. However, the result maybe to inform a truck driver of potential charges to be paid or offer an alternative route.

On Board Units (like the units used for paying tolls) – these signal that a particular area with access restrictions is entered and additional charges have to be paid. The On Board Unit will have direct access to an eCMR platform and evaluate whether or not additional charges have to be paid. By automatically paying these charges, the infrastructure manager(s) provide permission.

Probably other mechanisms for access control can be (or are already) implemented that can be extended by including details of the cargo.

In case this use case becomes valid, the implication for the eCMR platforms is:

- Access restrictions – these should be published as a structured set of rules that are accessible to all eCMR platforms
- Inference of access restriction – eCMR platforms have to be able to infer the access restrictions to all cargo carried at a given time by a truck and its trailers. All relevant eCMR data sets should be inferred.

**Use case 4 - overview of cargo flows in an area**

Different types of queries can be foreseen, for instance:

- Overview of dangerous cargo flows in a geofenced area at any given time;
- Overview of all dangerous cargo flows passing or in a geofenced area during a particular period;
- Overview of all commercial movements like eCommerce deliveries in a given time period in a particular urban area;
- Etc.

The following figure shows how a query with respect to cargo flows in a geofenced area can be handled.
In this illustration of handling a query, a Contact Point is introduced to distribute the query to an Eucaris NCP and the IMs for inland waterways and rail. Only the national IMs for inland waterways and rail need to be queried (unless the geofence passes boundaries of Member States). A Contact Point may even detect that the area does not have a particular infrastructure, e.g. there is no inland waterway in a particular urban area.

Again, implementation of this use case is not known, nor has it been validated. However, it illustrates that eCMR have to be able to address queries on cargo details of a particular truck and its trailers. Systems of owners/users also have to be able to provide data on locations and movements (routes) of transport means.

**G.2.1.5 Identification and Authentication**

Besides the fact that inspection officers are only allowed to query for cargo data based on their tasks (this needs to be validated by an authority and/or NCP at national level), identification, authentication, and access control becomes of the uttermost importance. Various commercial and privately owned eCMR platforms will be queried by inspection officers of different nationalities.

In this context, Identity and Authentication of that identity requires additional research. Most solutions are based on Identity Providers and Certification Authorities, but innovative solutions are also developed and implemented. In this respect the following solutions seem to be subject to further study:

- **eIDAS.** eIDAS provides a means for citizens and employees of companies to log in systems of all Member States authorities with their national identification. The focus of eIDAS is on identification and authentication to access services of authorities. A national identity is provided by a national Identity Provider and authenticated by a national Certification Authority. eIDAS is not applicable to civil servants accessing private systems and has not been accepted by the private sector as a solution.
• **iShare.** An interface specification developed in the Netherlands by the Neutral Logistics Information Platform (NLIP) for sharing identity information between any two privately owned systems. The interface specification is based on OAuth2.0. iShare assumes the existence of many Identity Providers and Certification Authorities by focusing on support of an open standard for sharing identities. The open standard, OAuth2.0, has been extended to include delegation: one stakeholder can perform particular services or access data by delegation of another.

• **Self-sovereign identities.** Self-sovereign identities are based on individuals managing their digital identity(ies). They don’t require an Identity Provider or Certification Authority, but refer to a particular open standard. Identities are certified by proofs and assertions that can be issued by trusted third parties like banks or chambers of commerce. An individual can also have proofs and assertions issued by his employer that state his access control rights or can be delegated by someone else to perform particular functionality. Sovrin, a solution based on blockchain technology, is the most well-known at this moment. It is operated by a number of independent providers and a number of banks provide proofs and assertions.

In fact, eIDAS has arranged that proofs and assertions of citizens can be shared amongst Member States. Self-sovereign identities make identities applicable across the world. Sovrin is one possible identity scheme; Bitcoin is another scheme, IPDB (Inter Planetary Data Base, providing a virtual database constituting of different solutions) yet another. These are all based on the DID (DID: Distributed IDentity) syntax developed by W3C (World Wide Web consortium).

**G.2.2 Other modalities**

Other modalities utilize other identification schemes for transport means like AIS for vessels and barges and train numbers for trains. They also have various identifications:

<table>
<thead>
<tr>
<th>Identification</th>
<th>Sea</th>
<th>Air</th>
<th>Inland waterways</th>
<th>Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport identification</td>
<td>Vessel name</td>
<td>Airplane name</td>
<td>Barge name</td>
<td></td>
</tr>
<tr>
<td>Sensor</td>
<td>AIS, Radio Call sign</td>
<td>AIS</td>
<td>Train sensor</td>
<td></td>
</tr>
<tr>
<td>Consignment</td>
<td>B/L number</td>
<td>House AWB number</td>
<td>Consignment note number</td>
<td>Consignment note number</td>
</tr>
<tr>
<td>Manifest</td>
<td>Manifest number</td>
<td>Master number</td>
<td>Load list</td>
<td>Wagon list</td>
</tr>
<tr>
<td>Trip</td>
<td>Voyage number</td>
<td>Flight number</td>
<td>-</td>
<td>Train number (according TAF TSI)</td>
</tr>
</tbody>
</table>

Note that a trip of a train has a train number. This train number identifies the unique composition of a particular train and its wagons utilizing a path in the railway infrastructure. The train number changes when (1) the wagon composition or (2) traction changes.

In case of sea, air, and rail transport, different operators may collaborate. For sea and air, this is known as an alliance where one of the alliance partners operating a voyage or flight has final responsibility towards an authority. This operating party has to collect data from its alliance partners.
and make it available to authorities. In case of rail, different operators can have wagons in the same train. The Railway Undertaking operating such a train is responsible to provide all relevant data to authorities.

Like for road, the relevant components for the other modalities can be given (can be complemented for air; the structure for road is given before; the concept of ‘endpoint’ can also be added but is not yet in use as such).

<table>
<thead>
<tr>
<th>Generic term</th>
<th>Sea</th>
<th>Inland waterways</th>
<th>Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>End-users</td>
<td>Any authority implementing a particular inspection regime or responsible for road traffic safety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registry platform</td>
<td>Different types of registries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vessel registry</td>
<td>National barge registry, EC Hull database</td>
<td>Registries of Railway Undertakings</td>
<td></td>
</tr>
<tr>
<td>(international)</td>
<td>National Infrastructure Manager registries (AIS data)</td>
<td>Train positions of international trains (RNE TIS) and national registries of Infrastructure Managers</td>
<td></td>
</tr>
<tr>
<td>Shipping line registry</td>
<td>National barge operator registry</td>
<td>Train registry (to be developed)</td>
<td></td>
</tr>
<tr>
<td>(published as open data by shipping lines via for instance port authorities or third parties)</td>
<td>-</td>
<td>To be published by individual Railway Undertakings/ Operators based on allocated paths (TAF TSI)</td>
<td></td>
</tr>
<tr>
<td>Storage/infrastructure platform</td>
<td>IBM/Mearsk GTD, ..</td>
<td>-</td>
<td>Raildata, Railway Undertakings/ - operators</td>
</tr>
</tbody>
</table>

From a safety perspective, Infrastructure Managers (IMs) of inland waterways and rail have the following data:

- **Position** – the position of barges and trains is always known to IMs. Barges have mandatory use of AIS (Automatic Identification System), which is shared by skippers and IMs. Rail IMs have sensors detecting trains on a rail section. Railway Undertakings/Operators also have train positions based on sensors in locomotives. RNE TIS (Rail Net Europe Train Information System) contains the position of international trains.

- **Cargo details** – IMs of rail and inland waterways have details of dangerous cargo. Barge operators have to produce dangerous cargo declarations as part of River Information Systems (RIS) to IMs. Railway Undertakings have to produce cargo details to IMs, where these cargo details use the NHM classification (Nomenclature Harmonisée des Marchandises).
This memo does not provide details as to the systems that store the data of barges and trains; these details can be added at a later stage.

G.3 Use of federative platforms by authorities

The previous paragraph illustrated access paths to data to support different use cases and different inspection procedures of authorities. There are still a number of choices to be made with respect to the development of federative platforms, depending on the inspection procedure and its supporting mechanism. First of all the mechanisms and their requirements for an interoperability stack for B2G is described, secondly, the B2G interoperability stack is further detailed and finally options for authorities to implement the functionality are discussed.

G.3.1 Generic support of data sharing mechanisms for B2G

In general, the mechanisms can be described as follows, where solutions in terms of an interoperability stack are also listed (the B2G interoperability stack will be described later):

- **On request.** Whenever a transport means is halted for inspection and data of documents have to become available, on request access is as follows:

  - **Enterprise IT.** An officer either receives a local print of the data on a document or can view the relevant data on a device provided by an enterprise. When required, an enterprise needs to make the data available to an authority.

    **B2G interoperability stack:** a local application or a printed document, which is independent of the way documents/data are stored at a platform in the private domain.

  - **Authority platform.** The data of the document is pushed to an authority platform by which it can be accessed by an officer. The endpoint of the authority at the platform needs to be provided by the officer, e.g. by providing an email address to which a document can be pushed in for instance PDF. The authority platform needs to validate the identification of the platform utilized by an enterprise to provide the document.

    **B2G interoperability stack:** authority endpoint combined with the communication protocol (e.g. email address using the public Internet or an authority document store), the document format (e.g. PDF or any other format, see section 4), and identity and authentication needs to be agreed at least at server level (e.g. https).

  - **Private domain platform.** An officer can access the platform at which the data of the document is available. The officer uses an identification and certification mechanism accepted by federative platforms and thus the platform. The platform is able to authorize an officer and grants him access to the required document. The authority platform should contain a list of documents that are required to be accessible to particular officers representing an authority.

    **B2G interoperability stack:** enterprise endpoint, the communication protocol and document format like in the previous option, and the identification and authentication mechanism applied at organizational level (personnel of authorities).

- **Declaration.** Enterprises should register themselves as being able to provide data by means of declarations to particular authorities, e.g. customs authorities and infrastructure
managers. The registry will probably be in the public domain and operated by authorities. Notice that in this option, data of transport documents is duplicated leading to multiple versions, at least one in the private and another in the public domain. There are different perspectives regarding submission of data representing electronic documents, namely:

- **Authority platform – harmonized data sets of documents.** In case authorities have agreed to one data set to be submitted to relevant authorities, they should provide the endpoint to the authority platform to which the data representing electronic documents should be submitted. The platform may act as Single Window platform taking care of distributing relevant documents to the endpoints of each authority connecting to the Single Window platform, in line with the five key principles defined by the UN (see before).

  *B2G interoperability stack:* single entry endpoint, the communication protocol, harmonized data format and semantics based on for instance WCO data model (section 4), at least server identification and authentication (e.g. https).

- **Authority platform – single document.** In case authorities only have an authority platform but not harmonized their data requirements, the endpoint of the relevant authority on the authority platform should be given to route the proper data to the proper authority. Routing can also be based on document/declaration type, in which case the platform has to have a table associating endpoints to document/declaration types.

  *B2G interoperability stack:* same as the previous, but now the document format and semantics required by the authority.

- **Authority platform per authority.** In case an authority has its own platform, the endpoint of the platform is equal to the endpoint of the authority. The platform utilized by an enterprise has to contain a table of document/declaration types associated with endpoints of each authority.

  *B2G interoperability stack:* authority endpoint, the communication protocol, data format and semantics, and at least server identification and authentication (e.g. https).

- **Search.** In this option, each enterprise should have registered its endpoint in a distributed registry, where such a registry can be integrated with a registry containing certificates and/or permits. The distributed registry should contain additional data of the goods movements or have access to additional data sources, depending on for instance the type of searches of an authority. If for instance an officer would like to search for all transport means with dangerous cargo in a particular area like a city or passing a city, locations of transport means and potentially timetables with routes should be provided. Locations can be provided by accessing additional data sources like the AIS data available to infrastructure managers of inland waterways. Based on these searches, the actual documents can be retrieved from the platform providing the endpoint.

Thus, enterprise should not only provide their endpoint, but also sufficient data to find the appropriate documents at the endpoint. By formulating required searches, authorities can indicate the data they required. The optimal situation is that one harmonized data set is
provided to private platform, which can be expressed in data available by (harmonized) documents of the private sector simplifying the provision of the appropriate data.

**B2G interoperability stack**: harmonized authority search data semantics and – format, enterprise registration (including enterprise endpoint), timetables (optional), transport means locations and their endpoint (e.g. AIS data retrieval), the communication protocol(s), at least server identification and authentication (e.g. https).

- **Subscription**: In the subscription option, enterprises register their endpoints in a (distributed) registry, access endpoints of authorities based on document/data requirement of these authorities. Platforms in the private domain will have to submit events meeting these authority requirements, providing a link to the actual document. A private domain platform will require the endpoint and has to have a subscription mechanism. Event data structures and semantics can be further specified by Sub-group 2 as part of platform services. An authority endpoint can be implemented at a particular platform like indicated for declarations.

**B2G interoperability stack**: authority notification requirements, event data formats and semantics, authority endpoint, communication protocol(s), (harmonized) data/document format (and semantics) that can be provided by enterprises or is required by authorities, at least server identification and authentication (e.g. https) for sharing event data, and the identification and authentication mechanism applied at organizational level (personnel of authorities).

Like indicated in the explanation of how different mechanisms can be implemented, a (distributed) registry is required, either in the public or the private domain. Authorities should also make their document/data requirements available in a structured way to make it easy to implement them in all of the above options.

### G.3.2 B2G interoperability stack

The aforementioned mechanisms all identified a B2G interoperability stack for sharing electronic data of documents. The following table lists a summary of the B2G interoperability stack that needs further specification.

**Table 18 – Summary of B2G interoperability stack requiring further specification**

<table>
<thead>
<tr>
<th>B2G interoperability stack</th>
<th>Functionality</th>
<th>Mechanisms of data sharing (B2G)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Protocols</td>
<td>The protocols required for actually, secured sharing of data between any two platforms.</td>
<td>All, except the on request with enterprise IT</td>
<td>eDelivery or any other tool</td>
</tr>
<tr>
<td>Data format</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDF/unstructured</td>
<td>View of data</td>
<td>On request</td>
<td>PDF viewer</td>
</tr>
<tr>
<td>Structured messaging</td>
<td>Data sets of documents can be processed by machines</td>
<td>All (except the on request with enterprise IT)</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>B2G interoperability stack</th>
<th>Functionality</th>
<th>Mechanisms of data sharing (B2G)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured events</td>
<td>Events can be processed automatically to retrieved (un)structured or documents</td>
<td>Subscription</td>
<td></td>
</tr>
<tr>
<td>Data semantics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Document</td>
<td>Each document has its own semantics, no harmonization</td>
<td>Represents the current situation</td>
<td></td>
</tr>
<tr>
<td>Harmonized</td>
<td>Harmonized document structure</td>
<td>Especially for authority platforms with one or more authority endpoints</td>
<td>Either based on a dominant player approach by authorities or authorities re-using enterprise data</td>
</tr>
<tr>
<td>Search</td>
<td>Harmonized search approach</td>
<td>Search</td>
<td>Integration with location based services needs to be provided</td>
</tr>
<tr>
<td>Event semantics</td>
<td>The semantics of events for sharing links to visibility data</td>
<td>Subscription</td>
<td>Semantics part of SG2 – team 2</td>
</tr>
<tr>
<td>Registration semantics</td>
<td>Sharing registration information like endpoints, required data/documents, etc.</td>
<td>Search and subscription</td>
<td></td>
</tr>
<tr>
<td>Identification and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>authentication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Server identification</td>
<td>Server certificates for identifying platform</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>Organization / person</td>
<td>Use of certification authorities and agreed identity schemes for identification at application level</td>
<td>On request (private domain platform), subscription</td>
<td>EU agreed mechanisms could potentially be applied (e.g. eSense) and/or the results of the Dutch iShare project and Identity Blockchain solutions based on Decentralized Identity (W3C standard).</td>
</tr>
<tr>
<td>identification</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Like the table shows, particular aspects need further elaboration. The B2G interoperability stack could also only be applicable for B2B integrating different platform.
The previous table presents a generic approach. In practice, there are already various implementations based on open standards like reporting of dangerous goods to rail (TAF TSI) and Inland waterways (RIS) and support of rail visibility between Railway Undertaking and Infrastructure Manager by TAF TSI. Similarly, other modalities will have these types of approaches. There are also various projects providing visibility to for instance customs and other authorities, implementing for instance an event mechanism. This event mechanism and its milestones differ per project and need to be aligned. Examples are the mechanism developed by EU FP7 CORE, the Open Trip Model (OTM, a Dutch initiative), the H2020 SmartRail solution (implementing EU FP7 CORE), and the H2020 Aeolix mechanism.

From the perspective of an enterprise, platform could also provide uniform services, e.g. for storage and accessing data/documents, indicating new documents are available, etc. These eTransport Document Services need further elaboration, based on the concepts of ‘service’ and ‘protocol’ developed by DTLF SG2 – team 2.

**G.3.3 Implementation options for authorities**

The previous already identified a number of implementation options for authorities like a choice of endpoints and mechanisms to support inspection procedures. These choice will lead to different solutions that will be elaborated further in this paragraph. A differentiation to authorities and the different modalities will be made, showing potential solutions.

Authorities have different options for implementing the approach, also in relation to the procedure. An Endpoint of an authority is a basic notion that needs to be considered, where different options can be taken.

**No endpoint or platform required.** An authority does not require an endpoint if it accesses a private endpoint implemented by some platform of the federative platforms. This particular implementation is required in the search procedure and the upon-request availability of data. It requires a registry where a transport means can be associated with its owner and its endpoint. An example is to use licence plates registries of trucks (Eucaris) to assess data of its owner. Additionally, a registry with an endpoint needs to be provided.

**Authority endpoint within a private domain.** An authority has an endpoint in a private domain platform, most often a community platform. This is for example the case for (air)port authorities, where authorities utilize an (air)port community system to receive and/or access the data of enterprises. In case several authorities utilize one endpoint and have harmonized their data requirements, that endpoint can serve as a maritime single window running on for instance a port community system. Data or events with links to data are provided via this endpoint to all relevant authorities.

**Authority platform endpoint.** Each authority has its own platform. The endpoint of the platform is identical to the endpoint of the authority. Data or events with links to data are provided via this endpoint to all relevant authorities.

**Multiple authorities connected to one authority platform.** Multiple authorities have their endpoint provided by one platform, that we could call a Single Window platform. In view of the five key elements for Single Window identified by UN ECE (see before), there are four variants, along two dimensions. These dimensions are:

- **One or multiple Single Window platform.** Different authorities have combined efforts into constructing one or more Single Window platform, e.g. a maritime – and a trade Single
Window. The applicable Single Window Platform identification for each authority needs to be known and each authority has to specify its endpoint on a platform. The data is not necessarily harmonized by the authorities, but events with links to data can also be shared via these platform/endpoints.

- **Harmonized or authority specific data sets.** In case authorities have harmonized their data set, the Single Window platform identification is sufficient. Otherwise, the authority endpoint within that Single Window platform also needs to be known.

Authorities will most probably also have particular registries in the public domain. Examples are registries like AEO (Authorized Economic Operator), licence plate registries that are interoperable, and others. In the proposed federative platforms, these registries should provide (links to) endpoints of both authorities and enterprises, the mechanism and format to share data.

**G.4 Platform services and protocols**

Platforms have to implement services like those identified by DTLF SG2 (see section 4): the Registration –, Connection – and the Visibility Service with their protocols to share data amongst different platforms used by end-users (B2B). This does not imply that each provider needs to implement all services or the complete service; a provider can differentiate to a particular modality with its eTransport Documents like an eCMR. The visibility service for data of eTransport documents like eTransport documents is fed by transport order data, e.g. order data shared between shipper and carrier as the basis for an eCMR.

The following platform services (and protocols) need to be supported:

- **Registration service** – a user should be able to register itself by one of the solutions providing the federative platforms. The Registration Service has variants, namely:
  - **Commodity type** – registration of the type of cargo and its characteristics, for instance transport of containers, dry -, or liquid bulk, including the capability to handle for instance dangerous cargo. This refers to details of ‘transport service’ as described in the report of DTLF Sub Group 2 (section 4). This information is relevant for configuration of the connection (see further).
  - **Vehicle type(s)** – the types of vehicles that are utilized and/or owned by a carrier. This information is relevant to particular authorities; mostly it is stored in a vehicle registry (road) or some registry for another modality.
  - **Qualifications** – details of qualifications of relevant personnel utilizing the assets. These details can be found in relevant registries.

  Additionally to these business level information, more technical information should be registered like the endpoint of the platform at which the relevant data can be accessed.

  The Registration Service needs to have the proper precision and recall: the registered details have to be accessible by all relevant stakeholders (public and private sector), independent of the implementation of the Registration Service by a registry. For instance, NCPs have been implemented for road to address this issue.

- **Visibility Service** – various services to (1) create a new data set representing (one or more) eTransport Document(s), (2) retrieving the data set of one or more eTransport Documents, and (3) updating the data set. These services are triggered by particular business processes, for instance the update of a data set will be at a milestone called ‘proof of delivery’ (see Visibility Services, final report of DTLF SG2 section 4). A user has to be able to configure particular milestones at which particular data for eTransport Document(s) has to be available.
or will be updated, including access to the data. The Data Manipulation Service can be
specific to a data set for a particular eTransport Document, e.g. an eCMR Data Service. It is
assumed that the data set of the Data Manipulation Service is standardized amongst all
solutions. The Data Manipulation Services are based on milestones relevant to an itinerary
shared by two stakeholders, e.g. the place of acceptance and – delivery of the cargo,
whereas the transport means may contain shipments of many other customers of the same
Logistics Service Provider.

Data access is based on an access control mechanism, where the stakeholder creating the
data set assigns authorisation rights to others (read or update). A special delete function is
not foreseen; it is assumed that an archiving function is available.

The Visibility Service for eTransport document data can be implemented in three ways:

- **Link to data** – a link to data set of (one or more) eTransport Document(s) is shared to
  relevant stakeholders. Each stakeholder may evaluate the link and access that part of
  the data set relevant to itself. It requires access control mechanism, potentially
  based on attribute values (e.g. a customer authority may require access to a data set
  identified by a particular value of ‘country of import’).

- **Data push** – the data is duplicated by a message to a recipient. Depending on the
  implementation, authorities may receive one data set for all relevant eTransport
  Documents or per eTransport Document.

- **Data access** – access to data is provided, without actively informing a stakeholder
  that data is available.

- **Connection Service** – each stakeholder is able to connect to one of the solution of the
  platforms, based on its Registration Service. The Connection Service may be based on a
  template, for instance specifying movement of a particular commodity type like liquid bulk
  and/or international, cross-border goods movements.

- **Support Services** – the following Support Services are required:
  - **Logging and audit trail** – specification of data shared or accessed by other
    stakeholders. A log, containing the data that is shared, cannot only be used by the
    stakeholder providing the data, but also by an authority to piggy back on data shared
    between stakeholders. An audit trail contains relevant information events: a
    timestamp at which particular data is shared with or accessed by another
    stakeholder.
  - **Identity and authentication** – providing mechanisms to uniquely identify relevant
    stakeholders and authenticate the identity. Most platforms utilize a user
    name/password combination, but external Identity Providers and Certification
    Authorities can also be used.

The data aspects of the Data Manipulation Service are specified by a semantic model, that can be
implemented by a standard. The following figure shows the main concepts of this semantic model; it
can be represented by an ontology (see also DTLF Sub Group 2).
The Registration Services address the commodity type shown by ‘product’, ‘cargo’, and ‘equipment’. These concepts, that reflect the Logistics Core Components, need further detailing from different viewpoints, e.g. logistics, customs compliance, and safety.

**G.5 Connection to the federative platforms**

The objective of the Connection Service is to integrate IT back office applications of any stakeholder to one the platforms or implement its own platform. Private sector stakeholders may have so-called Transport Management – or Manifest Systems containing data sets of eTransport Documents and so-called Fleet Management Systems addressing Maintenance and Repair Operations (MRO) of transport means. Additionally, Customs Declaration Systems may be used to provide data to customs authorities. Each of these systems can be connected with federative platforms, meaning that the Data Manipulation Services can be utilized. Depending on its approach, a national authority may want to require access to the log of a platform or utilize on of the Data Manipulation Service (e.g. the implementation of receiving a link to the data set of a particular eTransport Document).

The Connection Service is supported by a particular ontology of events, milestones, and itinerary, like the one shown in DTLF SG2 (final report of DTLF SG2 section 4, see also next figure)
In this respect, the administrative milestones indicate that a particular document of a type with a format is available, whereas they also state the format and structure in which the document will be available. Standardization of format and structure based on a common semantic model will limit the varieties, but having these two data elements allows the support of the current situation and migration towards any future situation.

The physical milestones can be used to indicate that a loading operation is completed, i.e. the goods are loaded on a truck and accepted by the carrier. At that time, the data set for a particular eTransport Document is available, e.g. an eCMR.

In this respect, each stakeholder may select how to connect to federative platforms by configuring the following data to provide the required data set of an eTransport document, including business process milestones at which the data will be provided:

- **Milestones.** The milestones that can be produced or have to be consumed by the stakeholder need to be transformed into a generic model like shown before.
- **Itinerary.** In case the chain is decomposed in an export and import chain, i.e. it is a global supply chain, the main transport leg with carrier and transport means connecting the two chains has to be processed. Relevant stakeholders handling the second part of the chain have to be provided. These will be part of the data set of an eTransport Document like a B/L. In case there is one transport leg, relevant places and times will be listed.
- **Commodity type and its physical characteristics.** Like for logistics services (section 3.2.2), details of the cargo are provided. These details can include the actual content of the cargo required on-carriage to a final destination, however under particular legal restrictions.
(see section G.3). A sender and recipient should identify the type of commodity they can handle, e.g. containers, pallets or liquid bulk.

- **Classification.** Particular recipients of data sets require the application of particular code sets like the HS-code for customs and NHM code for rail transport. It means that another view of cargo has to be generated, which may be complex. Either the classification can be provided by an IT back office system or it needs to be inserted before submitting the data. It is assumed that a recipient will be able to process the relevant classification.

- **Conditions.** Any conditions relevant to a logistics operation, like instructions to an LSP and delivery – and payment conditions agreed amongst a customer and an LSP.

Probably, a forwarder (or forwarding department of a shipper) will be able to provide itinerary details in case of global chains. Potential recipients of these data sets may not always be able to process these details, since their processes and systems are based on processing paper documents. A platform in the federative platforms may provide additional functionality to support these stakeholders.

It can be expected that authorities will also use this type of functionality by indicating the data sets they require at particular milestones. Authorities also have to indicate their implementation of the Visibility Service, e.g. a data push based on particular data structures stemming from for instance the EU CDM or receiving a link to data when it is available.
ANNEX I – References and bibliography

EU (Digital) Single market


EU Digital Transport and Logistics Forum (DTLF)


EU Transport and Mobility

*General EU transport*

Road


Air


Rail


Maritime


Inland waterways


International Transport

General transport


• UNECE. (2012). Trade facilitation implementation guide. (Available at: http://tfig.unece.org/contents/international-transport-organizations.htm )

Road


Air


Rail


Maritime


**Inland waterways**