

#eu4digital

## **EU4Digital: supporting digital economy and society in the Eastern Partnership**

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# Preparatory Actions to pilot a Digital Multi-modal Transport Corridor between the Baltic Sea and the Black Sea

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## List of Acronyms & Abbreviations

Abbreviations	Definition
API	Application programming interface
A2A	Administration to Administration
BY	Belarus
B2B	Business to Business
CEF	Connecting Europe Facility
CO	Certificate of Origin
DTC	Digital Transport Corridor
DTLF	Digital Transport and Logistics Forum
EaP	Eastern Partnership
EAEU	Eurasian Economic Union
eATA carnet	International customs and temporary export-import document
eBill of Lading	Consignment note used in sea transportation
EC	European Commission
eCMR	Electronic consignment note under the Convention on the Contract for the International Carriage of Goods by Road
eCO	Electronic Certificates of Origin
eIDAS	Electronic Identification and Authentication Services
eFTI	Regulation on electronic Freight Transport Information
eLogistics	Electronic logistics
ETA	Estimated Time of Arrival
eTrade	The use and exchange of electronic data and documents to support the trade transaction process
EU	European Union
GPS	Geographical positioning system
HDM	Harmonisation of digital markets
ICT	Information and Communication Technology
LT	Lithuania
MS	Member State
NCTS	New Computerized Transit System
NeLS	National eLogistics System
RFID	Radio Frequency Identification
SMGS	Agreement on Direct International Goods Transport by Rail & Procedure Instruction
UA	Ukraine
UCC	The Union Customs Code
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
TEN-T	Trans-European Transport Network
WCO	World Customs Organisation



## 1. Executive summary

### Objectives of the report

The overall objective of the report is to provide preparatory actions required to pilot a Digital Multi-modal Transport Corridor (DTC) in Eastern Partnership region. The geographical scope of the activity is between the Baltic sea and the Black sea, focusing on corridor Lithuania - Belarus – Ukraine. The preparatory actions are developed in the scope of [EU4Digital Facility](#) and [eTrade activity](#).

### Digital Transport Corridor (DTC) definition

Digital Transport Corridor (DTC) is a federated network of platforms, which provides different services for business and government, integrates information resources of the participants of international transport corridor and creates data pipeline for multi-modal cargo.

### Methodology

The preparatory actions for DTC were developed by performing the following activities by the EU4Digital central eLogistics topic experts as well as local experts from Eastern partner countries:

- EU direction and best practices analysis, including recommendations of Digital Transport & Logistics Forum (DTLF);
- consultations with identified key initiatives in EU: FEDeRATED and FENIX;
- consultations with the Commission's Directorate-Generals (DGs) – DG MOVE and DG NEAR;
- 'as-is' analysis of electronic document use in Belarus, Lithuania and Ukraine by conducting interviews, workshops and research by central and local experts;
- country workshops in Belarus, Lithuania and Ukraine with countries' stakeholders;
- consultations and alignments with the eTrade network.

### DTC state of play

The following findings were made:

- Since 2015, EC is assisted by Digital Transport and Logistics Forum (DTLF) in the developments related to digitalisation of the transport and logistics sector and fostering a more efficient electronic exchange of information in transport and logistics. Topics of focus - Paperless transport and Corridor freight information systems.
- Two focus areas on EU level:
  - Adoption of Regulation on electronic freight transport information (eFTI). Planned to be fully enforced by mid-2025 with 3 intervention objectives: (1) obligation for authorities to accept information via eFTI platforms; (2) alignment of digitalised processes for regulatory information checks/processing; (3) interoperability of IT systems and solutions (eFTI platforms).
  - Developing, testing and validating the federated network of platforms - interconnecting existing platforms and harmonising the services they offer (digital transport corridors). Two supporting projects: FEDeRATED and FENIX cover digitized transport document process, planning, monitoring, border crossing services and other areas in more than 40 living labs / pilot sites.
- Eastern partner countries have varying levels of digitalisation of the key and supporting logistic documents on a national level; cooperation and alignment of required information between different transport modes is not established. Therefore, national conditions for cross-border digital transport corridor need to be established.
- The two countries of focus (in the scope of EU4Digital activity) have initiated nation-wide initiatives for eLogistics platform establishment, i.e. Belarus and Ukraine. Countries plan government owned national eLogistics platforms.

### DTC concept

The DTC concept is based on a federated network of data exchange platforms along the physical transport corridor. It is built in accordance with EU existing requirements (DTLF, eFTI) and ongoingly adapted based on new specifications and provides different types of services: visibility-administrative (storing and sharing key logistics data), visibility-physical (transport progress, location details), information, quotation/ marketplace, booking and ordering services. DTC in Eastern partner countries is visioned as a network of centralized national solutions - National eLogistics Systems.



DTC shall become a new building block of digital infrastructure which can support and provide the effective cargo transportation in Eastern partner countries along European TEN-T transport corridors: the concept developed for a corridor Baltic Sea – Black Sea complements the extension of North Sea – Baltic TEN-T corridor.

The concept can be adapted and implemented to complement extension of other TEN-T corridors in additional corridor Black Sea – Caspian Sea, involving Armenia, Azerbaijan, Georgia and Republic of Moldova.

## Preparatory actions for DTC

Based on the findings described above, it is recommended to develop centralized solutions in countries for information exchange with series of Living Labs to test legal, organisational and technical barriers for multimodal and cross-border DTC implementation. The Living Labs are aimed at strengthening digital maturity in the Eastern partner countries and incentivising collaboration and networking in and between the Eastern partner countries and EU. The multimodality shall be increased gradually, starting with road and rail and finally – introducing maritime after 2025.

The core of this approach is a Living Lab for a centralized solution – National eLogistics System (NeLS). NeLS provides a single point of truth, enabling entities to submit regulatory information electronically and authorities to access it electronically on a single platform. During this Living Lab, only necessary parties shall be connected and basic modules of NeLS shall be developed to facilitate exchange of information foreseen in other Living Labs for eCMR, eSMGS/CIM, eCertificate of Origin and eTIR information exchange. These modules are related to information security, authorization, data exchange and storage.

NeLS implementation is gradual – results of Living Labs shall be expanded to connect wider range of public and private institutions as well as more modules for services (visibility, booking and ordering, etc.) can be developed in the future.

In parallel, a separate Living Lab for tracking services and harmonization with EU shall be performed. The concept is composed of 3 components:

- Component no.1: Visibility-administrative processes. It includes establishment of NeLS and Living Labs facilitating exchange of different sets of data for different modes, including eCMR, eSMGS/CIM, eCertificate of Origin and eTIR.
- Component no.2: Visibility-physical processes. It includes usage of tracking information for faster border crossing.
- Component no.3: Harmonization with EU.

These components are to be implemented in a 5-year programme in the following phases (see image below):

- Phase 1 – Establishment of DTC Living Labs in 2021 – 2022;
- Phase 2 – Development of DTC in 2022 - 2023 (second half);
- Phase 3 – Harmonisation with eFTI in 2023 (second half) – 2025.

Phase 1 – Establishment of DTC Living Labs	Phase 2 – Development of DTC	Phase 3 – Harmonisation with eFTI
<b>Component no. 1: Visibility-administrative processes</b> Phase 1 begins with the establishment of NeLS (LL 1.1) and implementation of cross-border eCMR data exchange (LL 1.2). Existing platforms shall be used to build up NeLS (currently observed in Ukraine and Belarus). NeLS core functionalities and modules are developed for testing Living Labs between two EaP countries as well as with EU. NeLS shall be adjusted during phase 1 to function as full solution in phase 2. After phase 1, the specification for LLs (LL 1.3-1.5) is prepared, NeLS assessment performed (compliance with EU requirements, functionalities that need to be introduced for new LLs, etc.) and recommendations for national regulations are provided to facilitate legal acceptance of exchanged electronic data via NeLS. <b>Component no. 2: Visibility-physical processes</b> In parallel to NeLS development and eCMR data exchange, a separate solution for Usage of tracking data for faster border crossing is developed (LL 2.1).	<b>Component no. 1: Visibility-administrative processes</b> During phase 2, NeLS (including LL 1.2) is adjusted for cross-border exchange of eSMGS/eCIM, eCO and eTIR data (LL 1.3-1.5) and to adhere any regulatory changes and EU developments. DTC is continued to be developed by: <ul style="list-style-type: none"><li>• Development of LL 1.3: eSMGS/eCIM as transit declaration</li><li>• Development of LL 1.4 Cross-border eCO data exchange</li><li>• Development of LL 1.5 Cross-border eTIR data exchange</li></ul> Every Living Lab is tested & adjusted during phase 2. <b>Component no. 2: Visibility-physical processes</b> The results of LL 2.1 are evaluated and adjusted. If considered successful, tracking data is used for faster border crossing as live solution.	To facilitate future interoperability of systems in Eastern partner countries and EU Member States, the evaluation of released eFTI requirements and specifications is done during phase 3. Gap analysis is performed and required technical, organisational and legal adjustments of NeLS and Living Labs are made. To facilitate cross-border exchange with EU countries, NeLS would also take on the functions of eFTI platforms after all eFTI specifications are released. In order to minimize any changes needed, NeLS and Living Labs shall be continuously developed according to DTLF & eFTI as per Component no. 3.
<b>Component no. 3: Harmonisation with EU</b> During all phases of DTC implementation, representatives of Eastern partner countries participate in DTLF sessions and public events to be informed about developments in EU and facilitate harmonisation in Eastern Partnership. EaP country representatives shall observe developments of DTLF, FEDeRATED and FENIX network to develop and adjust NeLS accordingly during all phases. Connections could be established and site visits organized through EU4Digital networking activities.		



Platforms already being developed in the Eastern partner countries can be used as NeLS if proven to be capable and secure. Currently, related developments are observed in Ukraine and Belarus.

## Organisational actions

As part of DTC development, the following organisational preparation will be required:

- On a national level:
  - Appoint a responsible institution for facilitating and coordinating DTC development in the country.
  - Appoint a responsible institution for supervising NeLS development (potentially - future NeLS operator).
  - Adjust legal base during DTC establishment and implementation phases.
  - Develop and adjust NeLS in line with the principles of EU developments, namely DTLF recommendations, eFTI regulation, requirements and specifications as well as results of FEDeRATED and FENIX network living labs.
- On a cross-border level:
  - Connect and agree with partner country on testing cross-border information exchange in Living Labs: NeLS to NeLS for exchange between two Eastern partner countries; NeLS to corresponding existing government or private systems between Eastern partner country and EU member state (no central platform development is planned in EU MSs, i.e. Lithuania).
  - Establish DTC working group facilitating DTC implementation on a regional level (could be considered under eTrade Expert Network in Eastern partner countries).
  - In addition to the Living Labs recommended in this report, develop other initiatives to test organizational capacity, improve collaboration between countries and strengthen digitalisation.
  - Assign the representatives and participate in DTLF activities & discussions (*the format of involvement to be decided*).
  - Continuously follow the developments of DTLF, FEDeRATED and FENIX network to adjust NeLS in order to minimize any changes needed.

## 2. Introduction

Preparatory actions to pilot a Digital Multi-modal (both maritime and land) Transport Corridor between the Baltic Sea and the Black Sea are developed under European Union's regional facility "EU4Digital Facility: bringing the benefits of the harmonised digital market to the Eastern Partnership countries", thematic area of eTrade.

The Eastern Partnership (EaP) is a joint policy initiative, which aims to deepen and strengthen relations between the European Union (EU), its Member States and its six Eastern neighbours: Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova and Ukraine.

### Digital Transport Corridor (DTC)

The DTC concept is based on a federated network of data exchange platforms along the physical transport corridor. It is built in accordance with EU existing requirements (DTLF, eFTI) and ongoingly adapted based on new specifications and provides different types of services: visibility-administrative (storing and sharing key logistics data), visibility-physical (transport progress, location details), information, quotation/ marketplace, booking and ordering services. DTC in Eastern partner countries is visioned as a network of centralized national solutions - National eLogistics Systems.

DTC shall to become a new building block of digital infrastructure which can support and provide the effective cargo transportation in Eastern partner countries along European TEN-T transport corridors, see 3.2.1 TEN-T.

### Vision

Eastern partner countries process logistics information in-between and with EU MS using only electronic means through centralized national solutions (National eLogistics Systems) and enable cargo monitoring and tracking tools for customs clearance, regulatory compliance checks and other relevant processes.

### Objective

To develop one point of data provision and exchange on a country level by developing National eLogistics Systems and ensuring interoperability in and between Eastern partner countries and EU Member States.



## Geographical scope

The geographical scope of the activity is between the Baltic sea and the Black sea, focusing on corridor Lithuania - Belarus – Ukraine. The corridor shall link with Danish, German, and Swedish seaports and TEN-T corridors. A visual representation of such corridor is shown in Image 1.



Image 1. Multi-modal cargo movement map visualization from Black sea to Baltic sea

The concept can be adapted and implemented to complement extension of other TEN-T corridors in additional corridor Black Sea – Caspian Sea, involving Armenia, Azerbaijan, Georgia and Republic of Moldova.

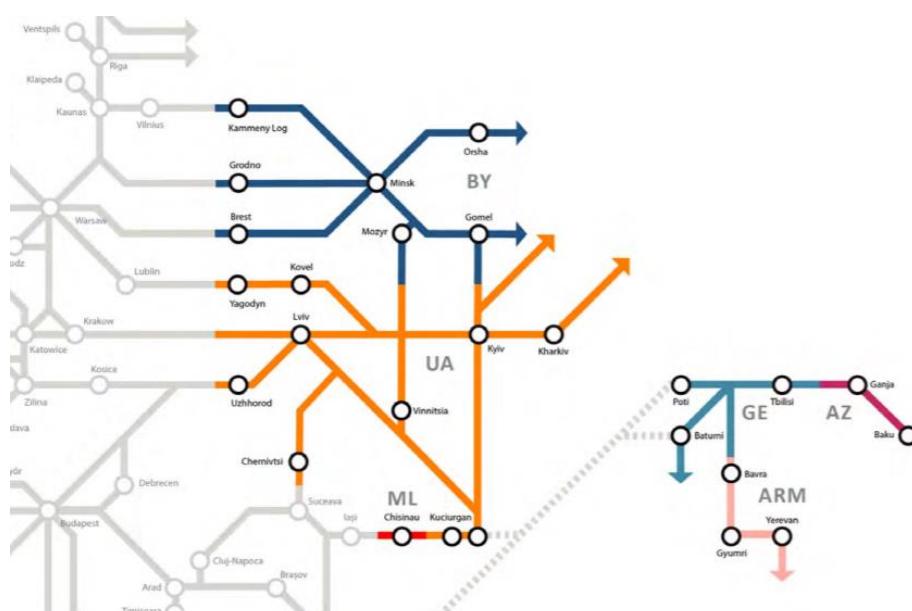


Image 2. Extension of the TEN-T core network programme<sup>1</sup>

<sup>1</sup> Report on “Indicative TEN-T investment action plan” prepared by the World Bank (December 2018). Retrieved from: [https://www.euneighbours.eu/sites/default/files/publications/2019-01/ten-t\\_iap\\_web-dec13.pdf](https://www.euneighbours.eu/sites/default/files/publications/2019-01/ten-t_iap_web-dec13.pdf)



## Multimodality

Multimodal transport is the transportation of goods under a single contract but performed with at least two different modes of transport. One of the goals of DTC is to connect and harmonize information exchange between different modes. The documentary requirements and number of stakeholders involved for a consignment transported via different modes are higher and procedure more complex than the one transported via single mode. Therefore, a digital transport corridor shall be developed by firstly establishing Living Labs in single mode of transport between several countries and scaling to additional modes afterwards. The indicative representation for possible route from Black sea to Baltic Sea on multimodal transportation is shown in the Image 3.

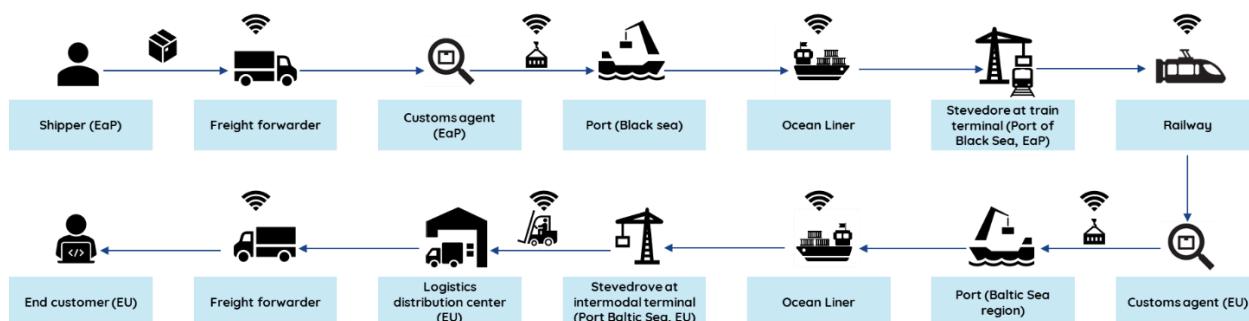


Image 3. Multi-modal cargo movement diagram visualization from Black sea to Baltic sea

## Impact

- Exchange of logistics information is harmonised with EU – simpler, faster and trusted.
- Increased digital maturity in various transport modes inside Eastern partner countries and cross-border.
- Living Labs build up a consolidated solution – NeLS (fragmentation avoided).
- Tested (piloted) and later - live DTC solutions.
- Gradually created data pipeline.
- Stronger collaboration and networking between different logistics stakeholders in Eastern partner countries (preparation organisationally).

## 3. EU direction and best practices

### 3.1. European direction

It is important for EU member states and neighbour countries to collaborate within the fields of data exchange for more efficient economies. Therefore, it is necessary to increase data sharing between stakeholders in transport and logistics sector to optimize all types of cargo flows in the supply chain, utilize assets and manage capacities better, thereby reducing shipping costs. The process synchronization is particularly required in cases where there is no commercial relation between the stakeholders.

The logistic sector developments in EU are moving towards establishing interoperability between standardized platforms and systems of different countries and supply chain participants to facilitate logistic data exchange. The key EU initiatives shaping EU transport sector in the context of DTC are Digital Transport and Logistics Forum (DTLF) and TEN-T European Transport Corridor Network.

#### DTLF

Since 2015, EC is assisted by **Digital Transport and Logistics Forum (DTLF)** (see 3.2.2) in the developments related to digitalisation of the transport and logistics sector and fostering a more efficient electronic exchange of information in transport and logistics. Topics of focus of DTLF - Paperless transport and Corridor freight information systems. The key developments are happening in two areas:

1. Adoption of **Regulation on electronic freight transport information (eFTI)** (see 3.2.4). Planned to be fully enforced by mid-2025 with 3 intervention objectives: (1) obligation for authorities to accept eFTI; (2) alignment of digitalised processes for regulatory information checks/processing; (3) interoperability of IT systems and solutions (eFTI platforms).



2. Developing, testing and validating the **federated network of platforms** - interconnecting existing platforms and harmonising the services they offer (digital transport corridors).

According to DTLF, the most optimal solution for the required IT infrastructure in the EU for TEN-T<sup>2</sup> transport corridors could be the federal network of national and regional platforms in which interoperability and data exchange will be provided through standardized protocols and special network services. IT systems that store this data should be able to produce different types of documents from the same data set. Such distributed heterogeneous IT systems of supply chain participants contain all the information necessary for the production of the required types of electronic freight documents.

The key aspects of EU approach are<sup>3</sup>:

- data is exchanged - not documents;
- standardised data sets and protocols;
- data to be accepted by authorities as valid source of information or documents;
- federated network of platforms – no single centralized solution, connection is available with service provider and solution of choice;
- trust is ensured by platform certification;
- access is provided to the single source of truth - information can be accessed in the original certified source.

The recommendations and conclusions of the DTLF expert groups were utilized during the implementation of the SELIS and AEOLIX (see 3.2.5) projects and are currently tested in FEDeRATED (see 3.2.3) and FENIX network (see 3.2.5) projects.

## TEN-T

TEN-T European Transport Corridor Network (see 3.2.1) program implementation focuses mainly on cross-border projects aimed at eliminating bottlenecks and creating missing links in the European transport system within TEN-T network. EU aims to build an effective EU-wide transport infrastructure network through the TEN-T policy.

The development of the transport and logistics sector of the EU countries is determined by the corresponding strategy adopted back in 2011 in the form of a road map for creating a single European transport space. In 2017-2018, the European Commission decided to expand the TEN-T corridor network and join it with the Eastern Partnership (EaP) transport lines<sup>4</sup> (Image 2). A broad range of stakeholders are expected to be involved in a joint action to remove physical, technical, operational and administrative bottlenecks along these corridors by the year 2030<sup>5</sup>.

FENIX network project, mentioned above, is focused on enabling sharing of information and services needed to optimise 9 TEN-T corridors.

The mentioned initiatives – TEN-T and DTLF – and component projects are the ideological and thematical reflection for technological development in transport and logistics sector. It is important for Eastern partner countries to harmonize developed DTC solutions with EU to facilitate future interoperability of systems and align strategic approach of logistic information exchange.

## 3.2. Best practices in EU

The projects described below are the key initiatives that should be considered when developing DTC in Eastern partner countries.

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<sup>2</sup> Document on “Delivering TEN-T” prepared by the European Commission (September 2017):  
[http://www.connectingeu.eu/documents/Delivering\\_TEN\\_T.pdf](http://www.connectingeu.eu/documents/Delivering_TEN_T.pdf)

<sup>3</sup> The list was developed from consultations conducted with representatives of DG MOVE, FEDeRATED and FENIX project, analysis of DTLF’s publications as well as contributions of topic experts.

<sup>4</sup> COMMISSION DELEGATED REGULATION (EU) 2019/254 of 9 November 2018 on the adaptation of Annex III to Regulation (EU) No 1315/2013 of the European Parliament and of the Council on Union guidelines for the development of the trans-European transport network Annex 3. Retrieved from: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0254&from=EN>

<sup>5</sup> Report on “Indicative TEN-T investment action plan” prepared by the World Bank (December 2018).Retrieved from:  
[https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/ten-t\\_iap\\_web-dec13.pdf](https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/ten-t_iap_web-dec13.pdf)



### 3.2.1. TEN-T

**Country (ies):** European Union

**Year introduced:** 1996

**Transport modes:** Rail, Road, Maritime, Inland waterways, Air

#### Description

The Trans-European Transport Network (TEN-T) is a European Commission policy with the ultimate goal to close gaps and eliminate technical barriers that exist between EU Member States and create a single European transport area. The policy aims to achieve this by construction of new physical infrastructures, modernising and upgrading current infrastructures and platforms and embracing innovative digital technologies, alternative fuels and universal standards. TEN-T policy supports the completion of 30 Priority Projects, other projects of common interest and traffic management systems which will play a key role in facilitating the mobility of goods and passengers within EU.

TEN-T has two network layers: **Core Network** and **Comprehensive Network** with the latter covering all European regions and to be completed by 2050. The Core Network is represented by the nine Core Network Corridors (see Image 1) each overseen by a coordinator and each identified to streamline the further development of the Core Network. These nine corridors are complemented by two additional horizontal priorities: European Rail Traffic Management System (ERTMS) and Motorways of the Sea.

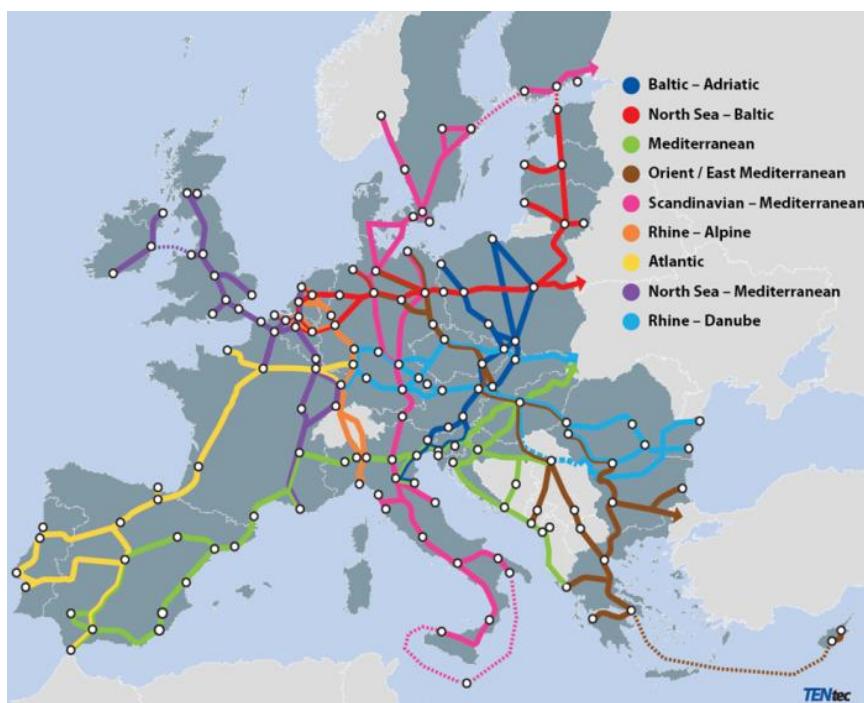


Image 4. The Core Network Corridors of TEN-T

Additionally, TEN-T has developed a public portal called [TENtec](#) which provides support for transport modelling of future policy and budgetary scenarios, briefings, the mapping of TEN-T/CEF co-funded projects and other layers.

#### Relevance to Eastern partner countries and DTC

In 2018, the European Commission released guidelines<sup>6</sup> for the development of TEN-T network in Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova and Ukraine. The guidelines included recommended roadmaps that would connect the six Eastern partner countries to the following Core corridors:

- North Sea – Baltic corridor (red in Image 1)

<sup>6</sup> COMMISSION DELEGATED REGULATION (EU) 2019/254 of 9 November 2018 on the adaptation of Annex III to Regulation (EU) No 1315/2013 of the European Parliament and of the Council on Union guidelines for the development of the trans-European transport network Annex 3. Retrieved from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019R0254>



- Orient/East – Med (*brown in Image 1*)
- Rhine – Danube (*light blue in Image 1*)
- Mediterranean (*green in Image 1*)

As the abovementioned extensions are in-line with the geographical scope of DTC analysed in this report, it is natural that DTC (or several of them) in Eastern partner countries should be developed as extensions along the TEN-T Core corridors. Moreover, the established Living Labs should consider future infrastructure investments of TEN-T to create a sustainable digital transport corridor and transportation between EU and Eastern partner countries.

**More:** [https://ec.europa.eu/transport/themes/infrastructure/ten-t\\_en](https://ec.europa.eu/transport/themes/infrastructure/ten-t_en) (TEN-T)

## 3.2.2. DTLF (Digital Transport Logistics Forum)

**Country (ies):** European Union

**Year introduced:** 2015

**Transport modes:** Rail, Road, Maritime, Inland waterways, Air

### Description

The Digital Transport Logistics Forum was established by DG MOVE of the European Commission with the aim to improve electronic information exchange in transport and logistics by removing technical, operational and administrative barriers in transport modes. DTLF consists of experts, stakeholders from public and private sectors and different transport and logistics communities to build a common vision and roadmap for digital transport and logistics. DTLF is split in to two sub-groups according to the studied topics:

1. Sub-group 1: electronic transport documents, focused on acceptance of digitalised transport documents / data;
2. Sub-group 2: corridor information systems, focused on establishment of corridor information systems.

Both DTLF subgroups have published their reports on the respective topics in 2018<sup>7</sup>, which include analysis and overviews of the topics, defined methodology as well as final conclusions and recommendations for EU.

Basic design principles for corridor information systems defined by DTLF:

- Plug and Play - Register and connect with a solution/service provider of choice.
- Technology independent infrastructure services - Seamless, secure, safe and compliant trade flows.
- Trusted, safe and secure - Governance rules, certified participants and data governance.
- Federation: network of platforms and peer-to-peer solutions - Economies of scale and network effects with standardised protocols.

Services for corridor information systems defined by DTLF:

- Market place services
- Booking services
- Ordering services
- Visibility services
- Agility services
- Resilience support services
- Chain composition services
- ETA prediction services.

### Relevance to Eastern partner countries and DTC

DTLF's defined methodology and recommendations for electronic documents / data and corridor information systems should be followed when establishing DTC in Eastern partner countries to facilitate future harmonisation

<sup>7</sup> Executive summary of the report "Towards paperless transport within the EU and across its borders" prepared by DTLF sub-group 1 (June 2018). More at: [https://www.dtlf.eu/sites/default/files/public/uploads/fields/page/field\\_file/executive\\_summary1\\_reading.pdf](https://www.dtlf.eu/sites/default/files/public/uploads/fields/page/field_file/executive_summary1_reading.pdf)

Executive summary of the report "Enabling organisations to reap the benefits of data sharing in logistics and supply chain" prepared by DTLF sub-group 2 (June 2018). More at:

[https://www.dtlf.eu/sites/default/files/public/uploads/fields/page/field\\_file/executive\\_summary2\\_reading\\_0.pdf](https://www.dtlf.eu/sites/default/files/public/uploads/fields/page/field_file/executive_summary2_reading_0.pdf)



with EU. Key initiatives of digitizing logistics information exchange in Europe are based on findings of DTLF, including developed regulation on electronic freight transport information (eFTI). The concept of the federated network of platforms and platform functionalities are foundation for developing high-level DTC architecture.

**More:** <http://www.dtlf.eu/> (DTLF)

### 3.2.3. FEDeRATED

**Country (ies):** Luxemburg, Italy, Finland, Netherlands, Spain, Sweden

**Year introduced:** 2019

**Transport modes:** Rail, Road, Maritime, Inland waterways, Air

#### Description

FEDeRATED Action is a CEF (Connecting Europe Facility) project established upon DTLF's (see 3.2.2) concept of federated network of platforms in order to validate the mentioned concept and facilitate data sharing in freight transport and logistics of EU (and possibly beyond). FEDeRATED consists of 15 partners in 6 EU Member States.

FEDeRATED Action's goal is to practically show how data sharing could work. As there are many different solutions and initiatives as well as bilateral agreements for paperless data exchange, the federated network of platforms could enable one common data sharing environment – network of independent platforms. This would allow a singular registration to solution of choice to connect with multiple actors in the trade of goods, which would reduce the administrative burden.

FEDeRATED Action consists of 4 interconnected activities: Vision, Master Plan, testing pilots & Living Labs and Consultation. As of March 2020, the project is still in development with the Vision activity finalized.

According to the FEDeRATED Vision document<sup>8</sup>, the federated network of platforms should cover data connectivity of information flows for:

- Business to Administration;
- Administration to Administration;
- Administration to Business;
- Business to Business.

The interim Master plan has been developed in March 2020<sup>9</sup> and Testing pilots together with Living Labs shall be performed in 2021. Ultimately, the project should deliver a validated Master Plan for EU federated network of platforms concept as wells as a data sharing environment prototype in 2023.

#### Relevance to Eastern partner countries and DTC

FEDeRATED Action results, findings and recommendations shall be followed for DTC implementation in Eastern partner countries, including to be developed architecture of network of platforms. Solutions in Eastern partner countries that will be in-line with EU solutions will reduce risk of barriers for future Eastern Partnership interoperability and interconnections of logistic systems.

It is recommended to follow the implementation of the Living Labs listed below<sup>10</sup> for insights on consolidated data sets, data exchange based on logistics documents and between business and government:

- TO BE COMPLETED

**More:** <http://www.federatedplatforms.eu/> (FEDeRATED)

### 3.2.4. eFTI

**Country (ies):** European Union

**Year introduced:** 2018

<sup>8</sup> "Vision document" prepared by FEDeRATED (December 2019). Retrieved from:  
<http://www.federatedplatforms.eu/index.php/library/category/1-vision>

<sup>9</sup> "Interim Masterplan" document prepared by FEDeRATED (March 2020). Retrieved from:  
<http://www.federatedplatforms.eu/index.php/library/category/2-masterplan>

<sup>10</sup> The Living Labs have been selected according to initial descriptions. The proposed list is indicative and shall not limit the future research related to FEDeRATED Living Labs.



**Transport modes:** Rail, Road, Maritime, Inland waterways, Air

## Description

On 9<sup>th</sup> of April 2020 the Council of the European Union has adopted regulation on electronic freight transport information (eFTI) which will make it easier for freight transport companies to provide information to authorities in digital form.

If confirmed by the European Parliament the eFTI policy would apply to intra-EU international transport and international transport having its origin, destination or transition in EU. All relevant public authorities will be required to accept information provided electronically on certified platforms whenever companies choose to use such a format to provide information as proof of compliance with legislative requirements. It is planned to release eFTI common data set specifications and requirements for MSs eFTI platform and service providers requirements and certification rules in 2023.

“The eFTI platforms used for processing regulatory information shall provide functionalities that ensure that:

- personal and commercial data can be processed in accordance with relevant regulations;
- a unique electronic identifying link can be established between the data processed and the physical shipment of a determined set of goods to which that data is related, from origin to destination, under the terms of a single transport contract, irrespective of the quantity or number of containers, packages, or pieces;
- data can be processed solely on the basis of authorised and authenticated access;
- all processing operations are duly recorded in order to allow, at a minimum, the identification of each distinct operation, the natural or legal person having made the operation and the sequencing of the operations on each individual data element; if an operation involves modifying or erasing an existing data element, the original data element shall be preserved;
- data can be archived and remain accessible for an appropriate period of time, in accordance with the relevant regulatory information requirements;
- data is protected against corruption and theft;
- the data elements processed correspond to the common eFTI data set and subsets and can be processed in any of the official languages of the Union.” (proposal for a regulation of the European Parliament and the Council on electronic freight transport information).

The key aspects of eFTI platforms are described in the table below.

Table 1. Key aspects of eFTI platforms

Area		EU approach based on eFTI
General information	Platform definition	“eFTI platform’ means a solution based on information and communication technology (ICT), such as an operating system, an operating environment, or a database, intended to be used for the processing of eFTI”.
	Implementation timeline (Indicative)	<ul style="list-style-type: none"><li>• entry into force – August 2020</li><li>• submission of national requirements – August 2021</li><li>• common data set and requirements for MSs – February 2023</li><li>• eFTI platforms &amp; service providers requirements – August 2023</li><li>• rules of certification for eFTI platforms &amp; service providers – November 2023</li><li>• application start (except MSs obligation to accept eFTI) – August 2024</li><li>• full application – August 2025.</li></ul>
Business	Problem that is being solved	Authorities' low and varying degree of acceptance of information or documents made available electronically by businesses.
	Solution concept	Enabling business to exchange electronic data with authorities (but not obliged) through certified platforms. eFTI regulation, requirements for platforms and service providers, data sets will be developed. According to set requirements, platforms can be developed by businesses and public entities, and certified by dedicated certification authorities in member states. These platforms then can exchange information with authorities.
	How solution works	Enabling business to exchange electronic data with authorities (but not obliged) through certified platforms.



Area		EU approach based on eFTI
	<b>Participating parties</b>	Mainly B2A, does not prevent usage B2B.
	<b>Paper vs electronic</b>	Paper documents can be submitted if allowed by national legislations.
Technological	<b>Data or documents</b>	Data, information; not documents.
	<b>How solution works</b>	<ul style="list-style-type: none"> <li>Independent platforms. May be single solution for government authorities or a component of a bigger platform.</li> <li>Business entity stores information in eFTI certified platform and grants access to authorities. If eFTI is a component of a bigger platform, only the eFTI component needs to be certified.</li> <li>Authorities can access the information needed in eFTI platform via reference code. All relevant authorities should have direct real-time access to information provided in eFTI platforms.</li> <li>Data shared through reference codes.</li> </ul>
	<b>Interoperability</b>	Technology neutral, implementation guided by specifications which should be in line with current ICT systems and EU building blocks.
	<b>Owner of solution</b>	Business and government.
Organisational	<b>Participating authorities</b>	All authorities granted access to eFTI platforms
	<b>Data storage: where and what data is stored in platforms</b>	<ul style="list-style-type: none"> <li>Data storage is decentralized.</li> <li>Data related to cargo, not specified yet.</li> </ul>
	<b>How is it regulated</b>	MS will be obligated to accept electronic submission of information according to acts issued by eFTI regulation
Legal	<b>Impact to regulation</b>	Review of regulation should be carried out in 2028 August to see if adjustments are required
Access	<b>How public authorities get data</b>	eFTI will require unique shipment number (reference code). By sharing the number, logistic parties (sender, freight forwarder, etc) share the required information.
	<b>Trust</b>	Certification of business platforms, by certification body accredited in the country. Ministries of MSs keeps track of certified platforms. The certification is valid in all EU. Moreover, government authorities have access rights to the information in the eFTI platforms only if that information is relevant to the authority.

## Relevance to Eastern partner countries and DTC

The eFTI regulation will make a tremendous impact to Digital Transport Corridor between EU and Eastern partner countries as authorities of the EU Member States would be obligated to process and confirm data provided by the transport operators electronically. Eastern partner countries shall follow eFTI regulation and specifications when developing national platform solutions for cross-border multimodal information exchange in order to move forward in line with EU and ensure possible future interoperability of systems. Also, the EU approach of standardized data could be reused in Eastern partner countries.

More: [http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRI\(2018\)630263](http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRI(2018)630263)



## 3.2.5. SELIS, AEOLIX and FENIX network projects

**Country (ies):** European Union

**Year introduced:** 2016 (SELIS and AEOLIX) and 2019 (FENIX)

**Transport modes:** Rail, Road, Maritime, Inland waterways, Air

### Description

**SELIS** (Shared European Logistics Intelligent Information Space) was a network of logistic communities deployed in 8 Living Labs and sharing specific intelligent information spaces - SELIS Community Nodes. SELIS Community Nodes were constructed by individual logistics communities to facilitate collaborative, responsive and agile green transportation chains which linked existing participants' systems through a secure infrastructure. Using the established consortium of logistics stakeholders and ICT providers (leveraging EU IP from over 40 projects) SELIS created a proof of concept for Common Communication and navigation platforms on a regional level.

The project was finalized in August of 2019 and became part of the FENIX network project.

**AEOLIX** was a technological project which delivered a platform solution for logistics business communities at federal level. Moreover, the project had [12 Living Labs](#) aimed at testing, validating and demonstrating the collaboration of the logistics ecosystem. The Living Labs covered all of the nine TEN-T Core Corridors. The AEOLIX Living Labs were:

#### Intelligent Hubs:

- Living Lab1 – Port of Hamburg, Frankfurt Airport
- Living Lab2 – TermiLab
- Living Lab3 – Thessaloniki
- Living Lab4 – ICOOR Intermodal e-customs
- Living Lab11 – Mondelez

#### Supply chain visibility:

- Living Lab5 – Teamnet
- Living Lab6 – Geoloc
- Living Lab8 – Northampton

#### Network optimization:

- Living Lab9 – JandeRijk
- Living Lab10 – Galicia

#### Other:

- Living Lab7 – FMCG Lab
- Living Lab12: e-CMR

#### **TO BE COMPLETED**

The project was finalized in August of 2019 and became part of the FENIX network project.

Synergized combination of technological solutions for the regional (SELIS) and federal (AEOLIX) levels appeared to be the ground for the new EU project **FENIX network**, which received funding for 2019-2021 as part of the CEF Transport program. Its' main goal is to support the development, validation and pilot deployment of digital information systems along the TEN-T European Transport Corridor transport base network (see 2.1). The 11 pilot sites will roll out in 9 European countries and 9 TEN-T corridors involving 43 beneficiaries.

During FENIX project, a federated data exchange architecture should be developed that would serve the European logistics community of shippers, logistics providers, mobile infrastructure providers, government agencies to ensure interoperability between any existing and future e-logistics platforms. FENIX will use the tools and modelling environment, based on information interaction mechanisms and technical solutions of the AEOLIX and SELIS projects, as building blocks of the federated network.

### **Relevance to Eastern partner countries and DTC**

SELIS, AEOLIX and FENIX results are likely to be reflected in system specifications of eFTI (see 3.2.4); therefore, the results of the projects can be used as foundation for further DTC development.



The success of Living Labs in these projects suggests that it is more beneficial to test and develop Digital Transport Corridor by testing various solutions and building on Living Labs.

**More:** <https://www.selisproject.eu/> (SELIS), <http://aeolix.eu/> (AEOLIX), <https://fenix-network.eu/> (FENIX)

## 3.2.6. TRADELENS

**Country (ies):** Worldwide

**Year introduced:** 2018

**Transport modes:** Road, Maritime

### Description

TradeLens is an open and neutral industry platform jointly developed by Maersk and IBM and supported by major players from global shipping industry. The platform leverages blockchain technologies to enable digital collaboration across multiple parties in international trade. Freight forwarders, port and terminal operators, inland transportation, shippers, shipping lines and customs authorities can interact more efficiently through real-time access to shipping data and shipping documents, including Internet of Things and sensor data indicating measures such as temperature control and container weight.<sup>11</sup> Additionally to the platform, TradeLens is comprised of two more components:

1. Network – the network consists of ecosystem participants (ocean carriers, ports, inland transportation) and Customs authorities. The network members are connected through the platform by providing data, whereas TradeLens consolidates and secures the information and makes it available to users who have permission to access it.
2. Application & services – an open marketplace which facilitates TradeLens and third parties to publish tailored services outside of the TradeLens platform scope.

### Relevance to Eastern partner countries and DTC

Georgia has a fully integrated terminal with TradeLens in Poti, whereas Ukraine and Azerbaijan each have a port / terminal contributing data to TradeLens in Odessa and Baku. On the eastern shore of the Baltic Sea, there are 6 ports / terminals contributing data to TradeLens: 3 in Poland, 1 in Lithuania, Latvia and Estonia each.

TradeLens provides a platform for tracking and supply chain management in multi-modal logistics (between carriers and ocean liners), therefore, it is a great business case example for DTC platform. Moreover, TradeLens involves its network to support the platform which is truly important in creating a sustainable Digital Transport Corridor. TradeLens facilitates involvement of third-party players to provide additional functionalities atop its platform – this principle is foreseen in DTC vision of EaP.

**More:** <https://www.tradelens.com/> (TradeLens)

## 4. Digital state of play in logistics

This section provides information about current status of existing information exchange and electronic documents in logistics sector in Belarus, Ukraine and Lithuania - countries in the geographical scope of testing and establishing Digital Transport Corridor from the Baltic sea to the Black sea. The objective of the analysis was to evaluate the level of maturity of documents, data, technologies and services required in the supply chain at all stages of goods delivery within given countries. The digital maturity of national components is crucial for Digital Transport Corridor development and cross-border information exchange.

The analysed categories are as follows:

- Key and supporting logistics electronic documents for rail, road and maritime;
- Other additional electronic documents used in transport sector;
- Connecting European Facility (CEF) standards focusing on eInvoicing;
- Other Logistics Components: UN/CEFACT single window and New Computerized Transit System (NCTS)
- Technological solutions: Block chain and Green transport corridor;
- Monitoring systems, including RFID (Radio frequency Identification), QR code, smart containers.

<sup>11</sup> Article "Maersk and IBM Introduce TradeLens Blockchain Shipping Solution" published by IBM (August 2018). Retrieved from: <https://newsroom.ibm.com/2018-08-09-Maersk-and-IBM-Introduce-TradeLens-Blockchain-Shipping-Solution>



The analysis was carried out with involvement of local Eastern partner countries' and topic experts as well as stakeholders of Belarus, Ukraine and Lithuania by:

- Conducting interviews of multiple stakeholders based on questionnaire for assessment of as is status of electronic document use in Eastern partner countries;
- Conducting country workshops<sup>12</sup> in:
  - Minsk, Belarus on 25<sup>th</sup> of November 2019;
  - Kyiv, Ukraine on 26<sup>th</sup> of November 2019;
  - Vilnius, Lithuania on 28<sup>th</sup> of November 2019;
- Research by topic experts;
- Consultations with eTrade network;
- Additionally, the initiatives in countries related to development of national electronic logistics platforms in Ukraine and Belarus were reviewed, including consultations with representatives of Ukraine's e-consignment note pilot project<sup>13</sup> overseen by Ministry of Infrastructure and Ministry of Digital Transformation.

The following conclusions for further DTC development were made after the country workshops:

- DTC could be implemented as 3-level heterogeneous information space (federated network of national and business eLogistics platforms). Transnational (EaP regional) platform cannot be accepted due to potential conflict regarding ownership and recognition of electronic data / documents. It should be only data transferring layer.
- Key barriers for development of federated network of National eLogistics Systems:
  - Not clear ownership (could be government / business / public-private partnership)
  - Not aligned standards and regulations (Corridor will cross EU and EAEU)
  - Trust. As a solution, Belarus uses Third Trusted Party for validating all signed documents that are exchanged nationally and cross-border
- Key principles:
  - Digital (data) sovereignty (data should be stored on the country level, DTC - only for cross-border exchange without data saving)
  - Common technical standards and synchronized legislation (for data, data exchange and trust)

The following conclusions for further DTC development were made after the as-is analysis:

- Eastern partner countries started creating National eLogistics System related solutions for document exchange; however, no practical solutions are implemented yet. Moreover, Eastern partner countries lack alignment and cooperation between different modes of transport on a national level. Therefore, to establish a functioning Digital Transport Corridor it is essential to firstly develop and test solutions on a national level that would include multiple stakeholders and their cooperation models. Also, the owner on the national level should be assigned which could be customs or government authorities.
- Digital information / document exchange between countries is performed on bi-lateral basis, however there is a shortage of easy adaptable technological solutions to enable those agreements. Consequently, DTC should be developed on a basis of bi-lateral agreements by providing and sharing easy adaptable technological solutions.
- There is the problem of implementing mechanisms for recognition of "foreign" electronic documents due to the different cryptography used within EaP countries and EU. Therefore, a common solution is required for electronic exchange of information to be considered legitimate between countries.
- Monitoring cargo systems are mainly developed and used by private sector as business to business information exchange is more advanced than business to government or government to government information exchange. Therefore, to develop the monitoring aspect of DTC for authorities it is useful to build on top of existing business owned cargo monitoring solutions.

<sup>12</sup> More at: <https://eufordigital.eu/digital-transport-corridor-workshops-take-place-in-belarus-ukraine-and-lithuania/>

<sup>13</sup> More at: <https://en.interfax.com.ua/news/economic/658182.html>



**Table 2. Definitions of key electronic documents and related technologies in logistics sector for selected countries analysed**

Term	Definition
eCMR	Usage of electronic consignment note under the Convention on the Contract for the International Carriage of Goods by Road
eSMGS/eCIM	Usage of eSMGS/eCIM in rail transport
eBill of Lading	Usage of consignment note in sea transportation
eManifest	Usage of electronic manifest in sea transportation
ePacking list	Usage of electronic packing list which details the contents of each package or container
eATA carnet	Usage of international customs and temporary export-import document
eCertificate of Origin	Usage of electronic exchange of Certificate of Origin
eInsurance	Insurance for cargo using only electronic modes for cargo movement.
eInvoice	Usage of invoices which are sent and received electronically with automated processing, in line with the European standards
UN/CEFACT single window	Usage of any single window established on UN/CEFACT recommendation for efficient exchange of information between transport trade and government
Green Transport Corridor	Utilization of European concept denoting long-distance freight transport corridors where advanced technology and co-modality are used to achieve energy efficiency and reduce environmental impact
NCTS	Usage of New Computerized Transit System – customs system for processing of transit declarations electronically
Cross-border electronic data exchange in customs	Usage of electronical information exchange between customs of neighbouring countries
Block chain in transport sector	Usage of blockchain technology in logistics sector (using a list of transactions that are stored without a central authority among logistics operators)
Monitoring systems (RFID, Electronic seals, GPS, QR code)	Usage of any technology for monitoring of cargo during transportation
Smart container	Usage of shipping containers equipped with Internet of Things devices for monitoring purposes in rail and sea transport.

Table 3 illustrates the overall state of play of the countries regarding key electronic logistic documents and related technologies.

**Table 3. Status of key electronic documents and related technologies in logistics sector for selected countries**

	Red colour indicates the areas where no practical or legal solution is implemented.
	Yellow colour indicates where legal background settled or pilot ongoing, but no official practical usage.
	Green colour indicates high level of digitisation with functioning cases.



eLogistics components		BY	LT	UA
Key Logistics Documents	eCMR			
	eSMGS/eCIM			
	eBill of Lading			
Supporting Documents	eManifest			
	ePacking list			
	eATA carnet			
	eCertificate of Origin			
	eInsurance			
CEF Building Blocks	eInvoice			
Other Logistics Components	UN/CEFACT single window			
	Green transport corridor			
	NCTS			
	Cross-border electronic data exchange in customs			
	Block chain in transport sector			
Monitoring systems	RFID, Electronic seals, GPS, QR code			
	Smart containers			

Source: results of workshops and interviews conducted in Belarus, Lithuania and Ukraine by EU4Digital DTC and national experts (November 2019)

#### 4.1. Detailed overview of key electronic documents and related technologies in logistics sector

##### Belarus

Electronic logistic documents are not used extensively in Belarus due to regulatory and willingness barriers. Key barrier is trust in the mechanism for recognizing an electronic document and electronic signature of a foreign state. Such a mechanism in Belarus has been launched, but there are no practical examples of implementation, since such a mechanism has not been launched in the neighbouring countries. Also, lack of obligation and practice to use electronic data and low penetration of Belarusian exporters into the European market are one of the barriers for electronic information exchange. Moreover, there is the problem of implementing mechanisms for recognition of "foreign" electronic documents due to the different cryptography used within Belarus and EU. The most advanced mode in terms of electronic documents is rail where eSMGS is used and bilateral cooperation with Lithuania is progressive. Belarusian Railways is planning to complete the implementation of the Electronic Transportation system, including paperless technology tools, in 2020. Least developed is maritime logistics due to small network of inland ports and no direct access to the sea.

In 2019, Belarus Ministry of Transport and Communication conducted study project for digitalization of transport corridors in the country and developed the functional specification of the corresponding national digital logistics platform. In 2020, by the decision of the Council of Ministers of the Republic of Belarus Ministry of Communications and Informatization set up the Interagency Expert Group uniting representatives of the core DTC governmental



and business stakeholders in Belarus to streamline and coordinate the activities for DTC national segment development and deployment.

At the same time, various business initiatives are launched to implement certain elements of the Digital Transport Corridors: transport documents on the railway (Belarussian Railway), monitoring of transit goods (BELNEFTEGAS), exchange of commercial data and documents for the supply of goods (EDI-provider CTT), transport and logistics platforms (TRANSINET, LogistLab), and others. Also, a project on cross-country exchange of commercial and transport documents within the framework of the Eurasian Economic Union (namely "Minsk initiative") is actively developing. The Great Stone industrial park in Belarus is gradually turning into the largest transport and logistics hub of the Eurasian region as active work is continuing to develop land container transportation in China-Europe traffic within the framework of an agreement between the railway administrations of China, Belarus, Germany, Kazakhstan, Mongolia, Poland and Russia.

**Table 4. The status of eLogistics components in Belarus**

	<b>eCMR</b> - Belarus has already accepted the Additional Protocol to the CMR concerning eCMR. However, eCMR is not used yet in road transport for cargo movement. As of July 2019, working group has been formed to start development of the eCMR project at the level of government agencies.
	<b>eSMGS/eCIM and eSMGS</b> - are used in practice for railway cargo between Belarus and Lithuania, Latvia and Russia. Also, pilot projects are in process with Ukraine.
	<b>Bill of lading</b> - there is no practice of using electronic bill of lading for sea transport in Belarus.
	<b>eManifest</b> - there is no practice of using eManifest for sea transport in Belarus.
	<b>ePacking list</b> - there is no practice of using electronic packing list for sea transport in Belarus.
	<b>eATA Carnet</b> - there is no practice of using electronic ATA carnet for all transport modes in Belarus.
	<b>eCertificate of Origin</b> - there is no practice of using electronic certificate of origin in Belarus by Belarus Chamber of Commerce and Industry (BCCI).
	<b>eInsurance</b> - there is no practice of using electronic insurance for all transport modes in Belarus.
	<b>eInvoice</b> - is used inside Belarus by a national standard INVOIC in full compliance with UN/CEFACT standards. However, there is a lack of international cooperation for recognizing eInvoices from foreign countries.
	<b>UN/CEFACT Single window</b> - Belarus has developed national single window, that reflects national transportation requirements.
	<b>Green transport corridor</b> - there is no Green transport corridor in Belarus.
	<b>NCTS</b> - there is no practice of using a NCTS system. Belarus has not signed the convention on accession to the agreement on the application of the NCTS yet.
	<b>Cross-border electronic data exchange in customs</b> - the legal framework for cross-border electronic data exchange between customs in Belarus is setup, but several issues prevent from usage in practice: recognition of a "foreign" electronic document signed by a "foreign" signature; international agreements are not in place. Nevertheless, there is information exchange with Ukraine using PRINEX <sup>14</sup> (Electronic System of Pre-arrival Information Exchange).
	<b>Block chain in transport sector</b> - several cargo monitoring projects using blockchain technology were launched in Belarus.
	<b>RFID, Electronic seals, GPS, QR code</b> - the official monitoring of the transit of goods using electronic seals via GPS is carried out by private company, which is the national sealing operator. In rail transport, private monitoring is carried

<sup>14</sup> Video about the PRINEX system: <https://www.youtube.com/watch?v=6UfGRw2fPKA>



	out by various Chinese and European cargo owners.
	<b>Smart containers</b> – there are some practical cases using containers with geolocation positioning devices, burglar alarms and sensors for temperature in railway transportation. Information from these devices is transmitted via cellular communication to the server of the operator of the refrigerated containers and relevant stakeholders.

## Lithuania

Electronic logistic documents use in Lithuania is directed and encouraged by digitalisation in EU. The electronic waybills for road and rail as well as single window approach in customs are used in Lithuania. Key barrier for electronic documents use identified by business is a lack of customized technical infrastructure for the most electronic documents used in transport sector as well as the difference in processes between EU and EaP as Lithuanian serves as a border between the both regions. The most advanced modes in terms of electronic documents are rail (both eSMGS and eCIM are used in practice) and road. The least developed mode is maritime logistics due to small network of ports.

The systems related to logistic processes in Lithuania will most likely get certified as eFTI platforms in the future.

**Table 5. The status of eLogistics components in Lithuania**

	<b>eCMR</b> - Lithuania has joined CMR by national law and ratified eCMR protocol. eCMR is used by business internally and to some extent internationally, however the carrier still needs to have paper copies on board.
	<b>eSMGS/eCIM and eSMGS</b> - are used in practice between Lithuania and Belarus.
	<b>Bill of lading</b> - there is no practice of using electronic bill of lading for sea transport in Lithuania.
	<b>eManifest</b> - there is no practice of using eManifest for sea transport in Lithuania.
	<b>ePacking list</b> - there is no practice of using ePacking list for sea transport in Lithuania.
	<b>eATA Carnet</b> - there is no practice of using eATA Carnet for all transport modes in Lithuania.
	<b>eCertificate of Origin</b> - there is no practice in Lithuanian Chambers of Commerce and Industry to issue electronic certificates of origin, but Lithuania has signed bilateral agreement with Canada and Japan, therefore, imported goods from these countries can have eCO accepted.
	<b>eInsurance</b> - there is no practice of using electronic insurance for all transport modes in Lithuania.
	<b>eInvoice</b> – is used in Lithuania as recommended in CEF building block.
	<b>UN/CEFACT Single window</b> – Customs Single window is implemented in Lithuania by Customs Department.
	<b>Green transport corridor</b> - there is no green transport corridor in Lithuania.
	<b>NCTS</b> - Lithuania is using NCTS system.
	<b>Cross-border electronic data exchange in customs</b> - the pre-arrival information for all means of transport inside Lithuania is exchanged electronically via following systems: NCTS, MDAS <sup>15</sup> , eKrovinys <sup>16</sup> , KIPIS <sup>17</sup> . Data is exchanged mostly with country stakeholders and EU and is limited in exchange with neighbouring non-EU countries.
	<b>Block chain in transport sector</b> – there is no practice or pilot projects involving block chain technology related to transport and logistics.
	<b>RFID, Electronic seals, GPS, QR code</b> – pilot projects using RFID were performed in rail mode.

<sup>15</sup> MDAS – customs owned declaration management system

<sup>16</sup> eKrovinys – Lithuanian Railways owned management and accounting control information system. More at: <http://cargo.litrail.lt/en/it-sprendimai>

<sup>17</sup> KIPIS – Freight and Goods Information System owned by Klaipeda State Seaport Authority. More at: <https://www.portofklaipeda.lt/kipis-freight-and-goods-information-system/>



	Smart containers – are not used in Lithuania.
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## Ukraine

Electronic logistic documents are well developed in Ukraine for use within the country but are not so widely used in cross-border trade due to existence of gaps in the legislation. However, Ukraine is advancing in digital solutions and electronic document exchange in maritime logistics as well as the Ukrainian Railways has a sustainable IT solution for logistic documents processing. Electronic Customs documents are used in Ukraine. Also, the law for usage road consignment note for internal transportations as an electronic document was adopted in 2019 and the pilot project for implementing it has already started by Ministry of Infrastructure. Later, based on the pilot, National eLogistics System for electronic documents for all kinds of transport is planned to be developed by Ministry of Infrastructure.

However, a generally adopted architecture of digital trade and transportation domains is missing in Ukraine. Therefore, a range of specific solutions is developed and implemented in certain aspects of digital trade, while they may have difficulties with integration, interoperability, and harmonisation with the EU standards and technological solutions.

**Table 6. The status of eLogistics components in Ukraine**

	<b>eCMR</b> – Convention on the Contract for the International Carriage of Goods by Road (CMR) and the Additional Protocol to the CMR concerning the Electronic Consignment Note has not yet been signed and ratified.
	<b>eSMGS/eCIM and eSMGS</b> – eSMGS is used in practice for railway cargo between Ukraine and Russia. Also, pilot projects are in process with Belarus.
	<b>Bill of lading</b> - exchanged as a PDF document with scanned copy and Digital Electronic Signature in Port Community System (IPCS). It is not used as an electronic document.
	<b>eManifest</b> – is used in XML format (on containerized cargo) or pdf format (all types of cargo) with digital signature. It is implemented as preliminary information from shipping agents to Customs via Port Community System (IPCS).
	<b>ePacking list</b> - there is no practice of using ePacking list for sea transport in Ukraine
	<b>eATA Carnet</b> - there is no practice of using eATA Carnet for all transport modes in Ukraine
	<b>eCertificate of Origin</b> - there is no practice of using electronic certificate of origin by Ukrainian Chamber of commerce and industry (UCCI) in all transport modes in Ukraine.
	<b>eInsurance</b> - there is no practice of using eInsurance for all transport modes in Ukraine.
	<b>eInvoice</b> – is developed based on Ukrainian National Standard (based on EU standard) but used not extensively.
	<b>UN/CEFACT Single window</b> - Port Community System IPCS (Maritime Single Window) covers all seaports in Ukraine and is used on B2B, B2G, G2B and partially on G2G processes. It is implemented by private-public partnership. Customs Single Window is implemented as a government-only Single Window and only authorities are connected to the system. Electronic documents exchange on B2C and C2B is implemented via different information systems as commercial (private) solutions. There is no National Single Window project or projects for air, rail and road transport sectors.
	<b>Green transport corridor</b> - there is no Green transport corridor in Ukraine.
	<b>NCTS</b> - Ukraine is in a very early stage of implementing NCTS and has signed the convention recently.
	<b>Cross-border electronic data exchange in customs</b> - procedures for cross-border exchange of electronic data between customs are specified by bilateral agreements on the exchange of pre-arrival information with Belarus, Slovakia, Hungary, Kazakhstan, Georgia, Azerbaijan, Republic of Moldova and others. About 95% of customs declarations are in electronic form.
	<b>Block chain in transport sector</b> - pilot project is being developed by private companies in maritime mode between Ukraine and Israel focused on maritime electronic Bill of Lading.



	<b>RFID, Electronic seals, GPS, QR code</b> - Customs Code of Ukraine requires the use of electronic seals with GPS technology for transit movement of cargo regardless of transport means used. Also, there are cases of RFID usage for security control on port's borders and on some cargo terminals.
	<b>Smart containers</b> – pilot tests had been done using smart containers in maritime mode. However, the functionality is not in use now.

## 5. Concept of Digital Transport Corridor (DTC) in Eastern partner countries

### 5.1. Basis for Digital Transport Corridor concept development

The conceptual development of approach to the digitalization of transport corridors in the Eastern partner countries was started in 2014-2015. The topic of electronic logistics and the DTC was recognized as a priority and included in the Ministerial Declaration of the EU and Eastern partner countries on the digital economy<sup>18</sup>. This declaration noted the importance of cross-border connections between transport infrastructure and transport corridors between the EU and partner countries, as well as the interoperability of multimodal electronic logistics platforms. Such platforms are able to provide a portfolio of integrated value-added services for key participants in the supply chain, thus contributing to the development of pan-European digital transport corridors.

In 2017-2018, the study project<sup>19</sup> on electronic trade and logistics was prepared and implemented in the Eastern partner countries. In the course of research, the level of development of digital market infrastructures, regulation and development of electronic services in the Eastern partner countries were evaluated for the implementation of paperless trade and electronic logistics processes. Besides, the feasibility analysis was undertaken, and approaches were developed to create a digital multimodal transport corridor between the Black and Baltic Sea with the possibility of its expansion to other Eastern partner countries in the Trans Caucasus region.

Later, DTC concept was adopted by the European Commission and the corresponding pilot project has been included in the EU staff working document “20 Deliverables for 2020” for Eastern partner countries program in 2018-2020 under the “7. The harmonisation of digital markets (HDM)”<sup>20</sup>. Additionally, DTC development in EaP will contribute to The Eastern Partnership beyond 2020<sup>21</sup> policy objective “A Partnership that Creates” by increasing the trade and further regional and bilateral integration of economies.

### 5.2. Concept of DTC

Based on the aforementioned initiatives and developments in logistics information exchange in EU, the concept of DTC in EaP has been developed:

- Established as a federated network of platforms in Eastern partner countries. It should support information exchange among participating countries while providing different types of services. Firstly, focusing on developing of visibility-administrative (storing and sharing key logistics data) and visibility-physical (transport progress, location details) services; later expanding to information, quotation/ marketplace, booking and ordering services, etc.
- Developed on the planned extensions of TEN-T to Eastern partner countries. The concept that EU4Digital developed for a corridor Baltic Sea – Black Sea complements the extension of North Sea – Baltic TEN-T corridor. The concept could be adapted and implemented to complement extension of other TEN-T

<sup>18</sup> Article on „Eastern Partnership: promoting stronger digital economies for the EU's six Eastern Partners“ prepared by DG CONNECT (February 2019). Retrieved from: <https://ec.europa.eu/digital-single-market/en/news/eastern-partnership-promoting-stronger-digital-economies-eus-six-eastern-partners>

<sup>19</sup> Study on ‘the Harmonisation of the digital markets in the Eastern Partnership: eTrade, eLogistics & Digital Transport Corridors’ prepared by the KANTOR Management Consultants Consortium (March 2018). Retrieved from: <https://europa.eu/capacity4dev/file/74753/download?token=hL3FXRWe>

<sup>20</sup> Document on “Eastern Partnership - 20 Deliverables for 2020 Focusing on key priorities and tangible results“ prepared by the European Commission (June 2017). Retrieved from: [https://eeas.europa.eu/sites/eeas/files/swd\\_2017\\_300\\_f1\\_joint\\_staff\\_working\\_paper\\_en\\_v5\\_p1\\_940530.pdf](https://eeas.europa.eu/sites/eeas/files/swd_2017_300_f1_joint_staff_working_paper_en_v5_p1_940530.pdf)

<sup>21</sup> Press release on “Eastern Partnership: Commission proposes new policy objectives for beyond 2020“ prepared by the European Commission (March 2020). Retrieved from: [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_20\\_452](https://ec.europa.eu/commission/presscorner/detail/en/IP_20_452)



corridors in additional corridor Black Sea – Caspian Sea, involving Armenia, Azerbaijan, Georgia and Republic of Moldova.

- Built in accordance with EU existing requirements (DTLF, eFTI) and ongoingly adapted based on new specifications. Up to date knowledge is ensured through Eastern partner countries representatives' engagement in DTLF (the format of involvement to be decided).
- Built on National eLogistics Systems (NeLS) as core components. NeLS are central national platforms facilitating provision of information for authorities and cross-border exchange. NeLS shall perform as eFTI platforms in the long term.
- Established and tested through multiple Living Labs (LL) initiated based on priority logistic documents in Eastern partner countries (data not documents to be exchanged). After Living Labs are tested (piloted) and adjusted from technical, organizational and legal perspectives, they go live and build DTC gradually.
- Connected with EU; no central platform development is planned in EU MSs (i.e. Lithuania), the connection is planned with existing government or private systems.

To implement these principles, it is proposed that the DTC in Eastern partner countries shall consist of federated network of national centralized solutions called National eLogistics Systems (NeLS). NeLS provides a single point of truth, enabling entities to submit regulatory information electronically and authorities to access it electronically on a single platform.

Accordingly, EU countries connecting to an EaP Digital Transport Corridor are not foreseen to develop NeLS in the scope of this concept; however not limited to establishing national systems based on NeLS concept. EU countries shall connect to NeLS in EaP with separate solutions e.g. private business platforms, national platforms for specific information, etc.

The visual representation focusing on corridor Lithuania - Belarus – Ukraine is presented below.

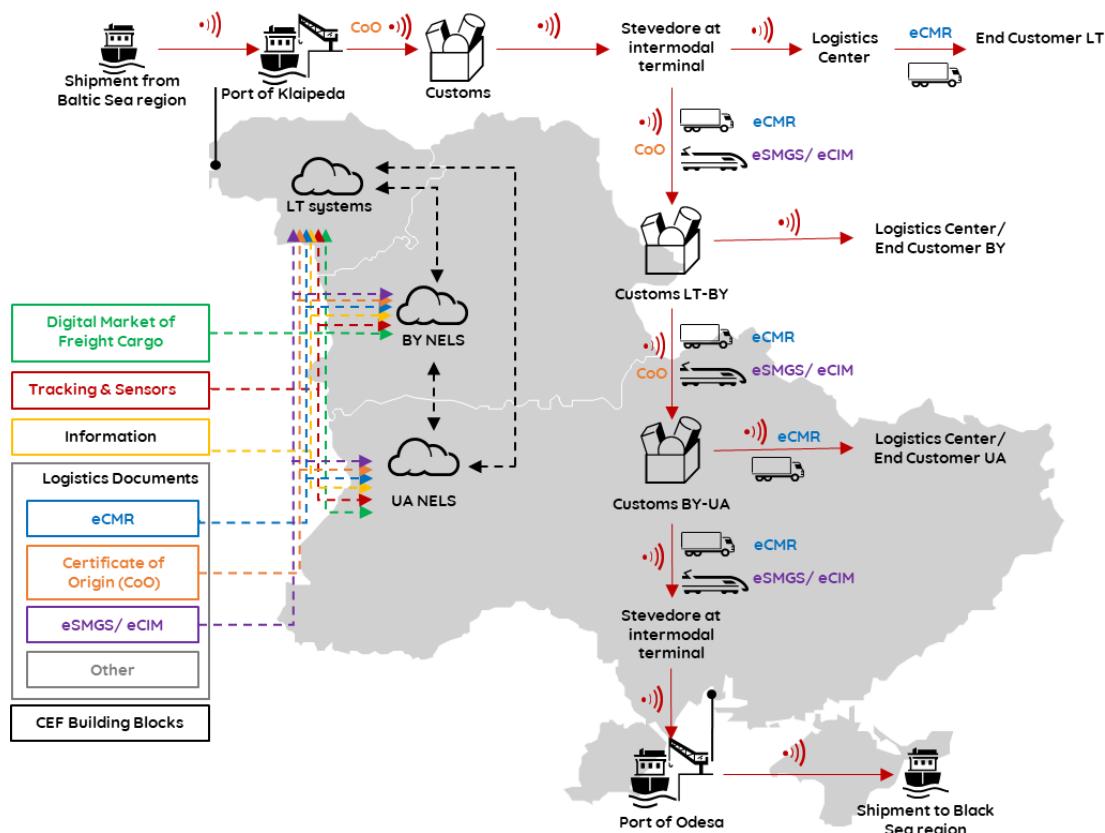


Image 5. Concept of DTC focusing on corridor Lithuania - Belarus – Ukraine

DTC vision and geographical visualization in image above represents key features of DTC:

- Network of national platforms (NeLS) and other logistics systems in the market.
- NeLS in each country gather and distribute data locally and cross-border NeLS to NeLS between logistics stakeholders such as railway companies, road freight companies, seaports, customs, etc.
- Data is stored on a local level. Data controllers are source (local) systems and data is exchanged or processed in and between NeLS depending on agreed regulations.



- Corridor created by NeLS exchanging information creates supply chain visibility by access to tracking and waybill data.
- Technology independent.
- DTC (and accordingly NeLS on a local level) can integrate CEF building blocks or other ready-made solutions/ modules to expand provided services (plug & play approach).
- Initial services include exchange of logistics information for cargo transportation (data sets based on eCMR, eSMGS, etc) and tracking information for border crossing, providing trust and facilitating regulatory information submission to authorities.
- By developing DTC further, the services can be expanded to digital market services, booking or ordering, payment services, etc

The levels of information exchange from the local level to cross-country DTC level are presented in the picture below:

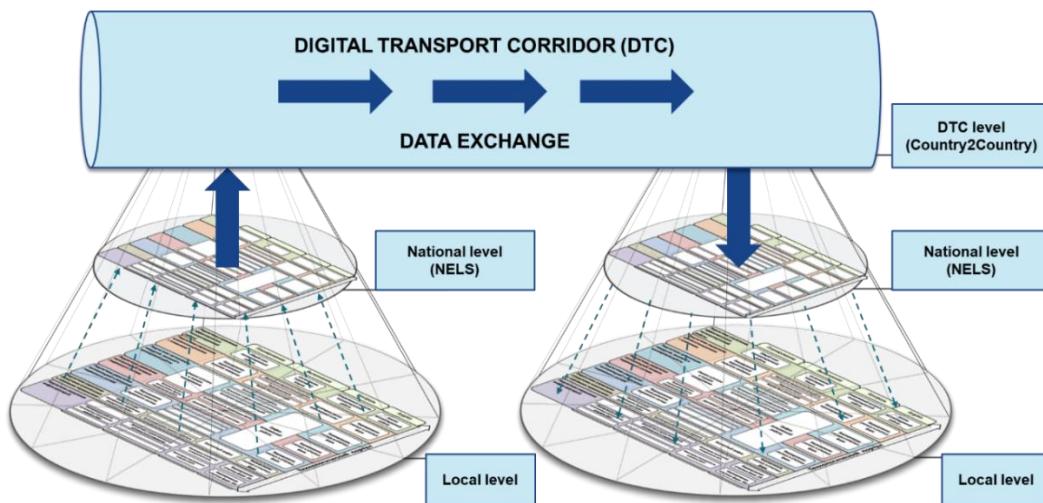


Image 6. DTC data exchange

Based on the analysis of the best practices and specialized projects in the EU and Eastern partner countries, the following DTC technical vision has been developed:

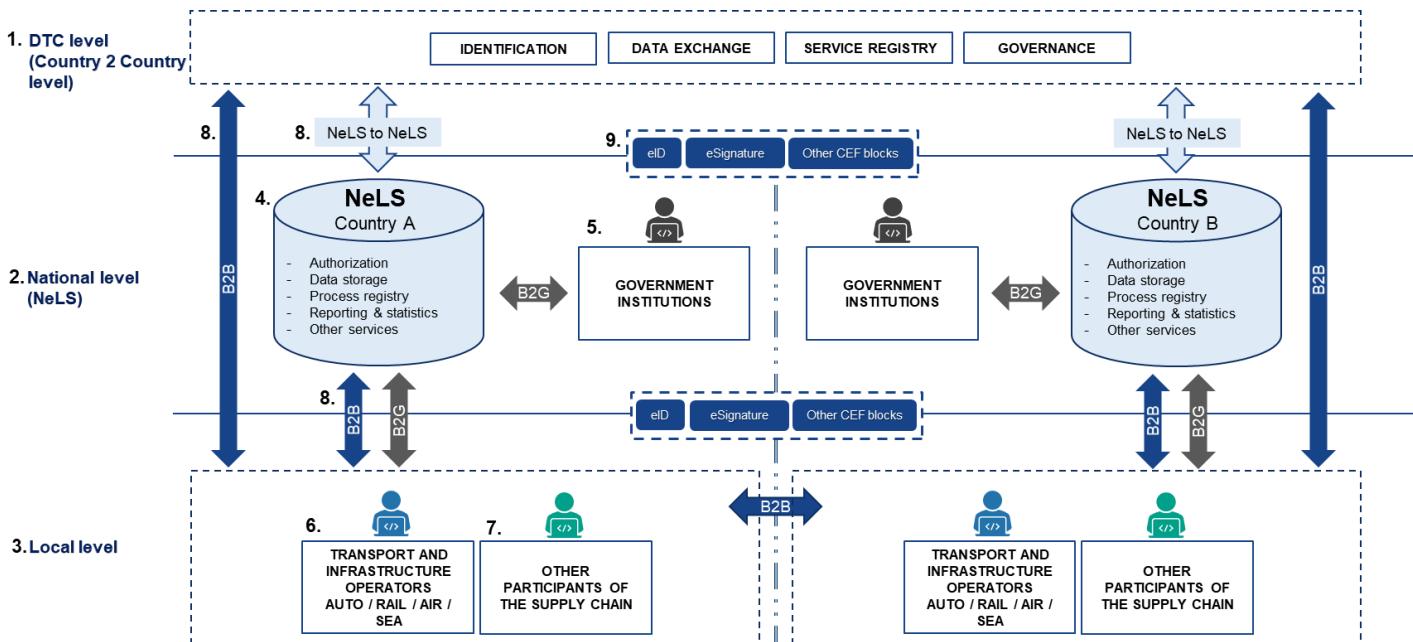


Image 7. DTC vision technical scheme



1. DTC level (country to country) is cross-border exchange of information in real time for more efficient interaction of participants in the supply chain of goods and flow of passengers. It is a system-to-system interaction between federated systems (platforms) from one specific participant in one country to a specific participant in another country.  
Only 4 basic services should be located at the DTC level:
  - a. Identification of NeLS, various transport and logistics platforms, companies, individuals, etc.;
  - b. Data exchange without storing the data itself, routing and transmission only;
  - c. Service registry for data transfer to a specific service;
  - d. Governance.
2. National level is a trade facilitation area including NeLS and governmental institutions. At this level, the main set of transport and logistics services is concentrated, and regulatory compliance is performed.
3. Local level – business to business and business to government operations, processes for exchanging information that results in logistics actions, documents, allowances/prohibitions to proceed.
4. NeLS – National eLogistics System of a country (more information in 5.3 *National eLogistics System*). It provides authorization, data storage, registry of performed operations, logistics data exchange, monitoring and tracking services and other. The set of services will be gradually developed starting with basic components for specified sets of logistics data exchange and may be developed to include such services as digital marketplace, insurance and more.
5. Government institutions – country authorities performing regulatory functions or requiring logistics information to be submitted via NeLS.
6. Transport and infrastructure operators – multimodal transport operators including road, rail, air or seaways.
7. Other participants/Intermediaries of supply chain - other participants or platforms, that support similar features and could be integrated to exchange data.
8. Information flows:
  - a. B2B: businesses are exchanging information entity to entity inside countries and cross-border. This exchange shall not be constrained, but business to business exchange via NeLS shall be made possible. Information exchange via NeLS can provide trust, reduce administrative burden (e.g. if the same information shall be provided to authorities and business partners) and make available services for business processes in the future (e.g. digital marketplace).
  - b. B2G: information for regulatory and statistics purposes is made available/ submitted to government institutions via NeLS as single solution. Information exchanged with business partners can be made available to authorities in the same system.
  - c. NeLS 2 NeLS: the logistics information needed for foreign authorities or business partners and submitted to local NeLS of country A is exchanged with NeLS of country B and then distributed to recipients in country B locally.
9. CEF building blocks – digital ready-made solutions to deliver digital public services. CEF building blocks can be used to facilitate information exchange in EaP DTC because they are already interoperable with EU solutions and already developed for use. CEF building blocks identified most relevant for basic DTC implementation:
  - a. eID<sup>22</sup> – building block extending the use of online services to citizens of other EU Member States.
  - b. eSignature<sup>23</sup> –building block creating and verifying electronic signatures.

## Key features of the DTC level are considered to be as follows:

- Data acquisition and distribution.
- Interoperability with logistics supply chain stakeholders' information systems at the technological level.
- Interoperability with continually developed standardized formats.
- Technical distributed open system through configurable plug & play approach using technologies as blockchain, API, web-services, eDelivery or other.
- Legal data access, privacy, identification, authentication.
- Legal secure, resilient, entrusted, environment procedures.

<sup>22</sup> More at: <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eID>

<sup>23</sup> More at: <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eSignature>



- Enabling low-complexity and low-cost connectivity.
- Communities open to all stakeholders across modes within and across related supply chains.
- Moving towards a Single European Transport Area.

## Impact of DTC implementation

- Exchange of logistics information is harmonised with EU.
- Increased digital maturity in various transport modes inside Eastern partner countries and cross-border.
- Living Labs building up a consolidated solution – NeLS (fragmentation avoided).
- Tested and live DTC solutions.
- Created data pipeline.
- Stronger collaboration and networking between different logistics stakeholders in Eastern partner countries.

## 5.3. National eLogistics Systems

National eLogistics System is a centralized solution for information exchange between private and public entities on a national level as well as cross-border. It provides a single point of truth, enabling entities to submit regulatory information electronically and authorities to access it electronically on a single platform.

NeLS is considered to be a “building block”, forming Digital Transport Corridor, that serves multi-modal supply chain stakeholders in the country and is interoperable with NeLS in other countries. It reduces overall transaction costs, digitalizes logistic business processes and improves the efficiency of supply chains.

In each Eastern partner country NeLS is to perform the functions of an integrator of information flows and the system that processes data from the participants and controllers of DTC local level multimodal transportation, as well as converts them into standardized formats of international electronic documents and data used to handle transit cargo.

Key functional features of NeLS are considered to be as follows:

- Data sovereignty, quality and integrity.
- Data capture, storage & processing for the subsequent data sharing and information exchange with DTC participants.
- Supply chain visibility, including cargo tracking and goods tracing.
- Connectivity and interoperability of other systems used with NeLS.
- Cross-border interoperability between NeLS.
- Unification of standards for the exchange of logistics data based on structured electronic messages in G2B, B2G and B2B transactions.
- Provision of information security.
- User authorization and management with corresponding set of client services.
- Governance of supply chain and information processes with corresponding set of analytics.
- Information support of transport, logistics and import/export processes with corresponding set of services for public and private sector.
- National logistics marketplace with payment services.
- Reporting and statistics.

The initial set of NeLS modules are related to information security, authorization, data exchange and storage for exchange of different sets of data for different modes, including eCMR, eSMGS/CIM, eCertificate of Origin and eTIR. The roadmap for its implementation is provided in section 6. *DTC Implementation*.

NeLS implementation is gradual – the initial set of modules shall be expanded with more modules for services in the future as per DTLF direction: marketplace, booking and ordering and information services.

The two countries of focus (in the scope of EU4Digital activity) have initiated nation-wide initiatives for eLogistics platform establishment, i.e. Belarus and Ukraine. Countries plan government owned national eLogistics platforms which can be used as NeLS if proven to be capable and secure:

- Ministry of Infrastructure in Ukraine is developing national platform - Central Data Base - for exchange of data and electronic documents in road and later all kinds of transport.
- Belarus government adopted in December 2017 the state concept for the development of Belarus logistics system including the creation of the national digital logistics platform.

NeLS are foreseen to take the role of eFTI platforms for the countries after eFTI regulation is fully enforced in 2025.



## 6. DTC Implementation

Based on the findings described above, it is recommended to develop centralized solutions in countries for information exchange with series of Living Labs to test legal, organisational and technical barriers for multimodal and cross-border DTC implementation. The Living Labs are aimed at strengthening digital maturity in the Eastern partner countries and incentivising collaboration and networking in and between the Eastern partner countries and EU. The multimodality shall be increased gradually, starting with road and rail and finally – introducing maritime after 2025.

The concept is presented below and composed of 3 components:

- Component no.1: Visibility-administrative processes. It includes establishment of NeLS and Living Labs facilitating exchange of different sets of data for different modes, including eCMR, eSMGS/CIM, eCertificate of Origin and eTIR.
- Component no.2: Visibility-physical processes. It includes usage of tracking information for faster border crossing.
- Component no.3: Harmonisation with EU.

These components are to be implemented in a 5-year programme during the following phases:

- Phase 1 – Establishment of DTC Living Labs in 2021 – 2022.
- Phase 2 – Development of DTC in 2022 - 2023 (second half).
- Phase 3 – Harmonization with eFTI in 2023 (second half) – 2025.

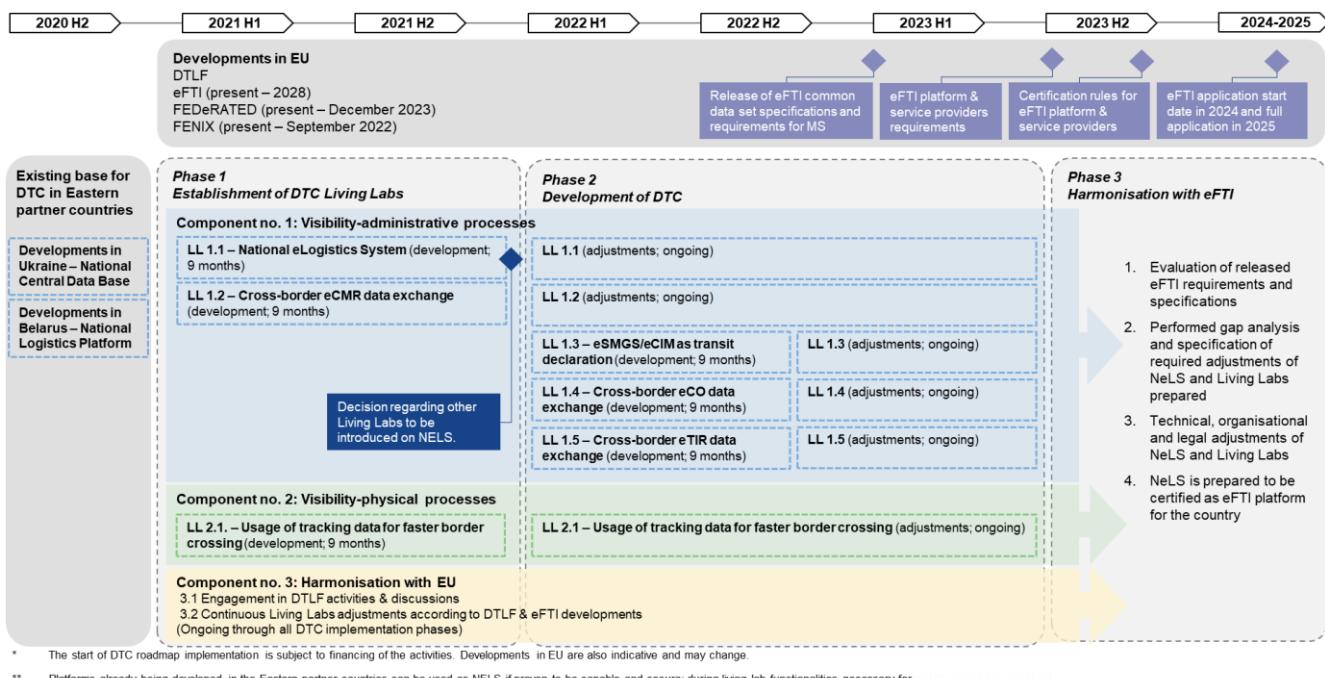


Image 8. DTC implementation roadmap

The detailed descriptions of Living Labs are provided below in section 6.1 *List of DTC Living Labs*. The list of Living Labs was developed taking into consideration the state of play analysis and country workshops in Belarus, Ukraine and Lithuania, interviews with state organizations and business stakeholders and eTrade network workshops involving Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova and Ukraine. The suggested list of Living Labs is considered to be firstly applied between Ukraine, Belarus and Lithuania to complement the North Sea – Baltic corridor of TEN-T.

The core of DTC roadmap is a Living Lab for a centralized solution – National eLogistics System. In Living Lab 1.1, only necessary parties shall be connected and basic modules of NeLS shall be developed to facilitate exchange of information foreseen in Living Labs 1.2 - 1.5. These modules are related to information security, authorization, data exchange and storage. NeLS implementation is gradual – results of Living Labs 1.1-1.5 shall be expanded later to connect wider range of public and private institutions.



## Phase 1 – Establishment of DTC Living Labs

### Component no. 1: Visibility-administrative processes

Phase 1 begins with the establishment of NeLS (LL 1.1) and implementation of cross-border eCMR data exchange (LL 1.2). Existing platforms shall be used to build up NeLS (currently observed in Ukraine and Belarus).

NeLS core functionalities and modules are developed for testing Living Labs between two EaP countries as well as with EU. NeLS shall be adjusted during phase 1 to function as full solution in phase 2.

After phase 1, the specification for LLs (LL 1.3-1.5) is prepared, NeLS assessment performed (compliance with EU requirements, functionalities that need to be introduced for new LLs, etc.) and recommendations for national regulations are provided to facilitate legal acceptance of exchanged electronic data via NeLS.

### Component no. 2: Visibility-physical processes

In parallel to NeLS development and eCMR data exchange, a separate solution for Usage of tracking data for faster border crossing is developed (LL 2.1).

### Component no. 3: Harmonisation with EU

During all phases of DTC implementation, representatives of Eastern partner countries participate in DTLF sessions and public events to be informed about developments in EU and facilitate harmonisation in Eastern Partnership.

EaP country representatives shall observe developments of DTLF, FEDeRATED and FENIX network to develop and adjust NeLS accordingly during all phases. Connections can be established, and site visits organized through EU4Digital networking activities.

## Phase 2 – Development of DTC

### Component no. 1: Visibility-administrative processes

During phase 2, NeLS (including LL 1.2) is adjusted for cross-border exchange of eSMGS/eCIM, eCO and eTIR data (LL 1.3-1.5) and to adhere any regulatory changes and EU developments.

DTC is continued to be developed by:

- Development of LL 1.3: eSMGS/eCIM as transit declaration;
- Development of LL 1.4 Cross-border eCO data exchange;
- Development of LL 1.5 Cross-border eTIR data exchange.

Every Living Lab is tested and adjusted during phase 2.

### Component no. 2: Visibility-physical processes

The results of LL 2.1 are evaluated and adjusted. If considered successful, tracking data is used for faster border crossing as live solution.

### Component no. 3 Harmonisation with EU

Activities ongoing.

## Phase 3 – Harmonization with eFTI

To facilitate future interoperability of systems in Eastern partner countries and EU Member States, the evaluation of released eFTI requirements and specifications is done during phase 3. Gap analysis is performed and required technical, organisational and legal adjustments of NeLS and Living Labs are made.

To facilitate cross-border exchange with EU countries, NeLS would also take on the functions of eFTI platforms after all eFTI specifications are released.

In order to minimize any changes needed, NeLS and Living Labs shall be continuously developed according to DTLF & eFTI as per Component no. 3.



## 6.1. List of DTC Living Labs

### 6.1.1. Living Lab 1.1 – National eLogistics System (NeLS)

#### Context of NeLS

The logistic sector developments in EU are moving towards establishing interoperability between standardized platforms and systems of different countries or supply chain participants to facilitate digital logistic information and document exchange.

Digital Transport and Logistics Forum (DTLF) has developed basic design principles to the proposed federative network of platforms solution as well as it is working on regulation on electronic Freight Transport Information (eFTI) which will include common requirements for service providers and platforms and technical specifications foreseen to be issued in 2022. In addition, various projects are carried on to develop and test the infrastructure solutions for digital transport corridor concept as SELIS, AEOLIX, FENIX and FEDeRATED (see 3.2 *Best practices in EU*).

Eastern partner countries are taking similar approach by moving towards national platforms, e.g. Ministry of Infrastructure in Ukraine is developing national platform - Central Data Base for e-consignment note data exchange - for exchange of data and electronic documents in road and later all kinds of transport. Belarus government adopted in December 2017 the state concept for the development of Belarus logistics system including the creation of the national digital logistics platform. Platforms already being developed in the Eastern partner countries can be used as NeLS if proven to be capable and secure.

In order for Eastern partner countries to move forward in line with EU and ensure possible future interoperability of systems, the existing EU guidance, best practice and direction shall be followed when establishing NeLS for cross-border multimodal logistics information exchange.

Therefore, EU4Digital Facility has developed the DTC concept in EaP according to the EU best practices and direction. The concept is based on a federated network of data exchange platforms along the physical transport corridor. It provides different types of services: visibility-administrative (storing and sharing key logistics data), visibility-physical (transport progress, location details), information, quotation/ marketplace, booking and ordering services.

Developed DTC vision consists of three levels:

1. Local level;
2. National level, including National eLogistics Systems (NeLS);
3. DTC level (country to country).

Segments of DTC national level are National eLogistics Systems (NeLS) which shall serve multi-modal supply chain stakeholders in the country as a trade facilitation tools. It shall enable country exporters to submit regulatory documents at a single location and/or single entity. The initial set of NeLS services includes visibility - administrative and visibility - physical processes for exchange of different sets of data for different modes, including eCMR, eSMGS/CIM, eCertificate of Origin and eTIR.

The core technological solution for NeLS platform shall be developed for testing technological and organizational capacities of cross-border information exchange in EaP countries involved. NeLS is built up from Living Lab to a living solution by developing Living Labs facilitating exchange of different sets of data for different modes, including eCMR, eSMGS/CIM, eCertificate of Origin and eTIR. The mentioned Living Labs are adjusted to be live solutions on NeLS and complement NeLS functionality.

**Benefits:** Establishment of NeLS Living Lab scales and facilitates digitalization in logistics information exchange, border crossing and administration: reduced administrative burden, reduced costs of printing and archiving paper documents, easier check and processing, improved security and data quality, easier access, environmentally friendly. Development of the core technological solution for NeLS platform as the building block of digital infrastructures in the Eastern Partner countries will ensure interoperability of DTC national segments. Interconnection of NeLS platforms and formation of data pipeline between them shall prove the basic principles of DTC concept.

#### Parties involved

The following parties were considered to be involved in the NeLS establishment with eCMR data exchange – Living Labs 1.1 and 1.2:



- Authorities as owners of NeLS – a government institution or institutions assigned to facilitate, control and administrate NeLS (e.g. ministries, agencies).
- Exporter – the company consigning goods as specified in a contract of carriage by road (eCMR) and referred as Sender in the CMR Convention.
- Importer – the company receiving a consignment of goods as specified in a contract of carriage by road (eCMR).
- Carrier / subsequent carrier – the company which provides transport services as specified in a contract of carriage by road (eCMR).
- Government authority (-ies) – any supervisory or controlling government body that carries out activities to control the movement of goods or makes notes in accompanying documents and are potential users of eCMR.
- Customs office (if eCMR is usually checked at the border) – regulatory institution that receives data and checks the consignment and carrier at border crossing points.

## Business requirements and processes

Key functional features of NeLS Living Lab are considered to be as follows:

- Data sovereignty, quality and integrity.
- Data capture, storage & processing for the subsequent data sharing and information exchange with DTC participants.
- Connectivity and interoperability of other systems used with NeLS.
- Cross-border interoperability between NeLS.
- Unification of standards for the exchange of logistics data based on structured electronic messages in G2B, B2G and B2B transactions.
- Provision of information security.
- User authorization and management with corresponding set of client services.
- Governance of supply chain and information processes.

In Living Lab 1.1 only the core technological solution for NeLS shall be developed and living solutions is later built up by establishing subsequent Living Labs for data exchange and any necessary modules determined needed during evaluation and adjustments.

First NeLS platforms are foreseen to be built on existing national platforms with several requirements to broaden the idea of the platform in order to harmonise with EU, e.g.: cross-border exchange, multimodality, exchange of full sets of data as waybills, acting as eFTI platform, etc.

The system architecture described below includes the client's block of modules and the complete integration layer with modules providing NeLS connectivity and data storage, management, security, validation and exchange. NeLS service modules shall be developed at the subsequent stages of Living Labs development.

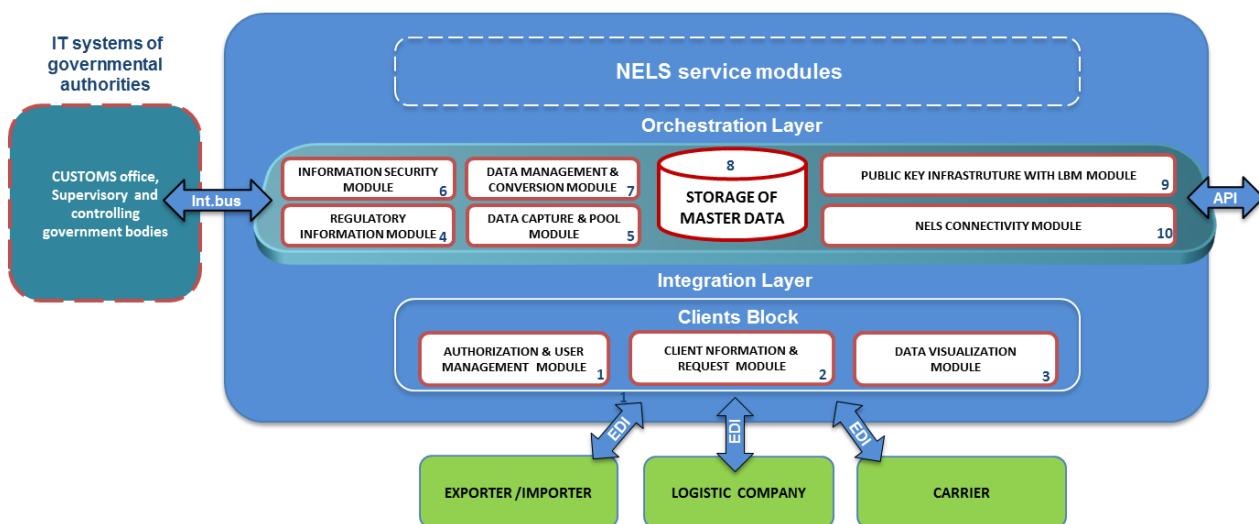


Image 9. NeLS Living Lab with the core functional architecture



**Client's block of modules** shall provide the NeLS users authorization and management as well as processing of their data requests, information transfers and visualization. Depending on the individual country solutions, the parties involved can interact with NeLS through EDI connection.

**The integration layer** shall provide the connectivity and interoperability with local information systems by various modes of transport as well as interoperability with NeLS in other EaP countries and DTC level platforms. The following modules are to be developed for this layer:

- Data capture and pool module acquires the original data from external sources and fill the NeLS data pool.
- Data management and conversion module processes data from the pool and upload it in NeLS storage of master data as well as convert it to standardized formats of electronic documents or structured data elements.
- Information security module ensures data protection and integrity.
- Public key infrastructure with logistics blockchain module (LBM) provides trusted information exchange between NeLS, data sovereignty, validation and authorized access.
- NeLS connectivity module provides interconnections with local IT systems of DTC participants and interoperability with the DTC level platforms in other countries.
- Regulatory information module provides regulatory and reference information about national DTC segment.

**Orchestration layer** shall provide NeLS service modules established by other Living Labs (1.2-1.5) facilitating exchange of different sets of data for different modes, including eCMR, eSMGS/CIM, eCertificate of Origin and eTIR. The business processes of logistics data exchange are presented below: Cargo is being transported from Company 1 in Country A (e.g. Lithuania) with the goods exported via transit Country B (e.g. Belarus) to Company 2 in receiving Country C (e.g. Ukraine).

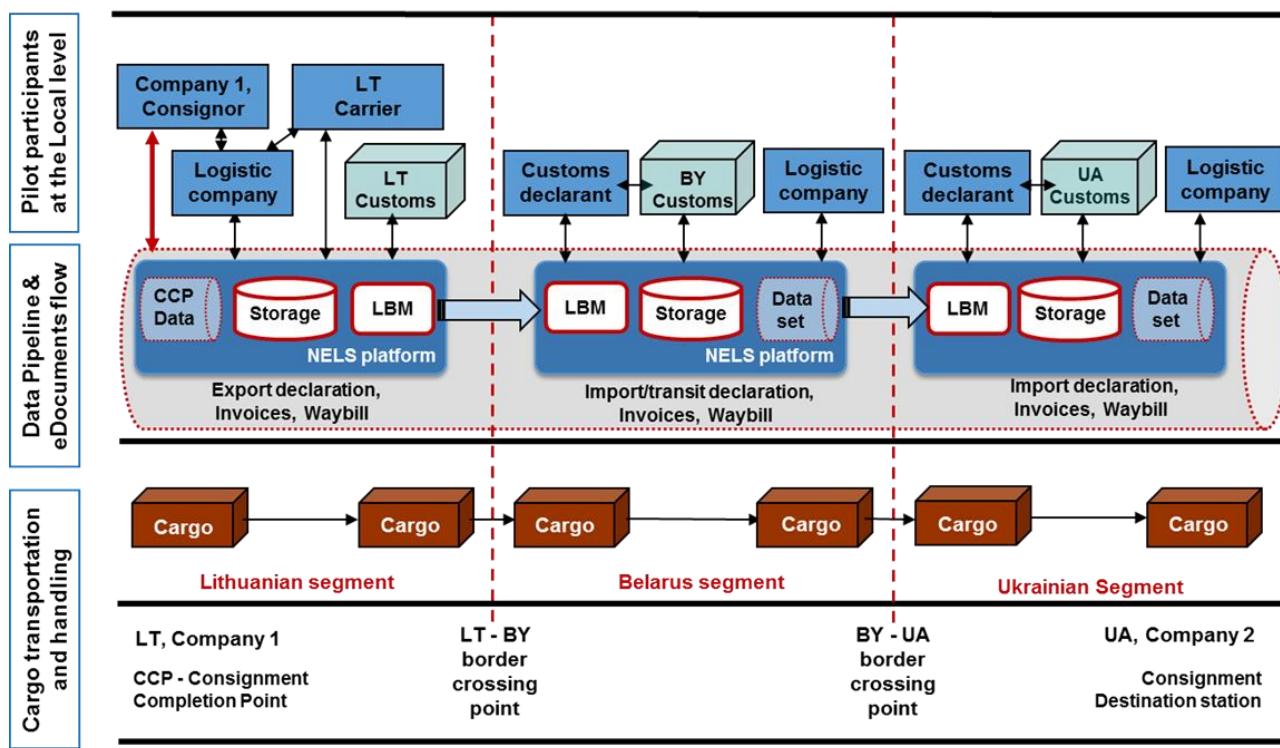


Image 10. DTC information exchange

## Business process

The business processes of data exchange via NeLS after NeLS Living Lab is established are described in descriptions of Living Labs 1.2-1.5 below.

The process of development of the core technological solution for NeLS Living Lab:

1. Development of technical architecture and specification for NeLS Living Lab including their endorsement by stakeholders in the Eastern partner countries.



2. Forming the software development team, development of the core software modules and their integration layer. Adjustments of existing bases systems if NeLS is built on any national existing system.
3. Testing NeLS connections with the selected Living Lab participants from business sector, its integration with the Customs authorities and governmental bodies involved.
4. Testing of technical and organizational capacity for NeLS Living Lab in the countries involved. At this stage data transactions shall be tested between NeLS Living Lab and the local parties involved.
5. The organisational model for NeLS Living Lab information exchange cross-border has to be discussed and agreed with the governmental bodies of the participating countries.
6. With the Living Lab 1.2 Cross-border eCMR data exchange, Goods are being transported from Company 1 in Country A (e.g. Lithuania) to Company 2 in receiving Country B (e.g. Belarus) by using data of electronic consignment note (eCMR) (see 6.1.2. *Living Lab 1.2 – Cross-border eCMR data exchange*).

## Prerequisites for Living Lab

- Follow DTLF principles for the creation of information systems for the EU transport corridors:
  - Plug and play – each NeLS user should be able to register and connect to the integration platform and select the services needed;
  - Technology independent infrastructure services – the services shall be designed to offer solutions that best fit end-users and to support different technologies for realising the services;
  - Integration principle – NeLS platform shall establish harmonized connectivity and interoperability of different solutions and local systems of different service providers, whereas these systems can also operate in an enterprise domain, thus creating peer-to-peer solutions in the national DTC segment;
  - Trusted, safe and secure – the solution and its integration with end-users shall be trusted, data sharing shall be safe and secure.
- Follow the EU direction and developments of eFTI regulation and requirements for eFTI platforms. The eFTI platforms used for processing regulatory information shall provide functionalities that ensure that:
  - personal data can be processed in accordance with Regulation (EU) 2016/679;
  - commercial data can be processed in accordance with Article 6 of eFTI regulation;
  - a unique electronic identifying link can be established between the data processed and the physical shipment of a determined set of goods to which that data is related, from origin to destination, under the terms of a single transport contract, irrespective of the quantity or number of containers, packages, or pieces;
  - data can be processed solely on the basis of authorised and authenticated access;
  - all processing operations are duly recorded in order to allow, at a minimum, the identification of each distinct operation, the natural or legal person having made the operation and the sequencing of the operations on each individual data element; if an operation involves modifying or erasing an existing data element, the original data element shall be preserved;
  - data can be archived and remain accessible for an appropriate period of time, in accordance with the relevant regulatory information requirements;
  - data is protected against corruption and theft;
  - the data elements processed correspond to the common eFTI data set and subsets and can be processed in any of the official languages of the Union.
- EaP core ministries (EU4D stakeholders of DTC preparatory actions) support NeLS development.
- Transport operator's willingness to participate in the Living Lab.
- Customs and Border Committee willingness to participate in the Living Lab.
- Identify exporting and importing entities, Logistic company and Carrier which are willing to participate in the Living Lab.

## EU and global best practices

- **Optimodal European Travel Ecosystem project (Eutravel)<sup>24</sup>**

The project was implemented in the framework of H2020 programme in 2015-2017 with one of the objectives to develop the EU Optimodality Framework offering an open infrastructure that allows

<sup>24</sup> More at: <https://cordis.europa.eu/project/id/636148>



organisations to set up cost-effective integration of existing systems. In the course of the project Technology Ecosystem Architecture was developed with API of APIs solution enabling interoperability and fuller operational integration of IT systems of logistics and travel organisations. As result API centered IT architecture was proposed and tested for the Optimodality Framework, that allows the combination of different APIs through a common interface.

Eutravel project results recommended to adopt for NeLS Living Lab – application and customization of API of APIs solution for the integration layer of NeLS platform.

- **CORE project<sup>25</sup>**

CORE results recommended for adoption in NeLS Living Lab - approach for supply chain information security and concept for data pipeline solutions based on blockchain which can provide exchange of all transport electronic documents and data via the digital platform.

- **SELIS project (see 3.2.5)**

SELIS results recommended for possible adoption in NeLS Living Lab - solution for the creation of a shared information space based on the regional logistic community nodes which integrate technological systems of participants of transport and logistics processes in the country thus providing end-to-end visibility of DTC national segment in the supply chain.

- **AEOLIX project (see 3.2.5)**

AEOLIX results for possible adoption - solutions for a cloud-based collaborative logistics ecosystem configuring and managing logistics-related information pipelines.

- **FEDeRATED project (see 3.2.3)**

Adoption of FEDeRATED project vision and requirements to data sharing platforms and recommended technology solutions.

- **FENIX network (see 3.2.5)**

NeLS platforms in the EaP shall be interoperable with FENIX data exchange infrastructure.

## 6.1.2. Living Lab 1.2 – Cross-border eCMR data exchange

### Context of eCMR

Electronic consignment note (eCMR) for road transport serves as a contractual paper document that harmonises general conditions for the international transport of goods by road while taking into account the carrier's liability and responsibilities. Moreover, it confirms that the carrier has received the goods and a contract of carriage exists between participating parties.

Currently, several EU MS are already using the eCMR consignment note for national and international transport operations. Following best EU practise, Eastern partner countries recognise the efficiency and benefits of eCMR: Ministry of Infrastructure in Ukraine is developing national platform - Central Data Base for eCMR data exchange, Belarus has already accepted the Additional Protocol to the CMR concerning the Electronic Consignment Note and it is under consideration by Azerbaijan government. This could harmonise the information contained in the eCMR consignment note and bring it in line with the EU baseline in EaP countries.

“Europe on the Move” Mobility Package I published by EC on 31 May 2017 calls for the use of electronic documents, such as the eCMR consignment note, as a means to enforcing cabotage rules. The CMR consignment note is also referred to in the revision of Directive 92/106/EEC (Mobility Package II) on the establishment of common rules for certain types of combined transport of goods between Member States, which introduces the option of providing evidence through the CMR consignment note and its electronic version for the initial and final road transport leg of a combined transport operation.

The set of data based on eCMR shall be exchanged between cross-border partners via NeLS in Living Lab 1.2.

**Benefits:** CMR consignment note harmonises contractual conditions for goods transported by road. eCMR solution would remove paperwork, positively impacting the environment, improving the speed and reliability of the information exchange, and reducing costs. By investing in eCMR consignment notes, transport operators will be able to input data electronically in a number of different languages, therefore limiting the risk of making mistakes,

<sup>25</sup> More at: <https://cordis.europa.eu/project/rcn/188515/factsheet/en>



enabling logistics information to be stored more effectively, handling a multilingual environment more efficiently, and exchanging data in real time.

eCMR can easily be integrated with other services used by transport companies, such as customs declaration or transport and fleet management services.

## Parties involved

- Exporter – the company consigning goods as specified in a contract of carriage by road (eCMR) and referred as Sender in the CMR Convention.
- Importer – the company receiving a consignment of goods as specified in a contract of carriage by road (eCMR).
- Carrier / subsequent carrier – the company which provides transport services as specified in a contract of carriage by road (eCMR).
- Government authority (-ies) – any supervisory or controlling government body that carries out activities to control the movement of goods or makes notes in accompanying documents and are potential users of eCMR.

## Business process

Goods are being transported from Company 1 in Country A (e.g. Lithuania) to Company 2 in receiving Country B (e.g. Belarus) by using electronic consignment note (eCMR) to confirm that the goods were received:

1. Company 1 (Exporter) being the buyer of transport services prepares the goods for dispatch, generates and sends eCMR data to the Carrier via NeLS. The Carrier can access the data in NeLS through a provided reference or integration with own system.
2. The Carrier checks the cargo and fills its part of the eCMR data in NeLS before the transportation of goods (acceptance or correction of data).
3. Company 1 (Exporter) (or authorized provider on behalf of the exporter) submits (if required) data to an authorized government authority in NeLS.
4. During the border crossing, the Customs checks and (if necessary) fills in its part of eCMR data and submits the data to the authorized government authority in NeLS and all participants of the transportation process (through the system of the authorized logistic / EDI-operator).
5. Before acceptance of the goods, Company 2 (Importer) fills in its part of the eCMR data and sends it to the Company 1 (Exporter) and the Carrier via NeLS.
6. The remaining necessary data on the acceptance of goods and acceptance of the eCMR by the Company 2 (with its consent) are distributed and made accessible in NeLS to all participants, including the authorized state body in the country of the Company 2.

## Prerequisites for Living Lab

- Establishment of Living Lab 1.1 – National eLogistics System (NeLS).
- Acknowledgement of CMR and eCMR Conventions for Living Lab establishment purposes. Parties shall be familiar and agree with the conventions; formal adoption not required.
- Identify exporting and importing entities which have high trade volumes and require electronic consignment note (eCMR) to be issued.
- Parties participating in the Living Lab shall have technical capabilities to connect to NeLS to be able to issue, receive, review and edit eCMR.
- Identify any third government authorities (e.g. tax inspectorate, customs) in the participating country that would be interested to receive eCMR data.
- The identified government authority's willingness to acknowledge eCMR data as valid.

## EU and global best practices

- **eCMR: Benelux pilot electronic freight note**

*Background:* The objective of the Benelux Pilot is eCMR usage within Belgium, the Netherlands and Luxembourg. The pilot is based on Order M (2017) 12 of the Committee of Ministers of the Benelux Union concerning an intra-Benelux pilot project with the electronic consignment note.

*Concept:* The project started in 2017 for three years and the scope includes transport between Benelux countries as well as national transport, incl. cabotage.



The pilot only applies to transport within the Benelux. The aim of the pilot is to examine, on a cross-border level, if an eCMR can be as reliable and safe as the paper consignment note for public control purposes. Results can also be applied on a broader level than Benelux.

The specific eCMR data is only accessible to those parties that have a specific role on the specific eCMR. It offers apps to access the data, to sign for transfer of the goods. The system offers a portal that allows parties to view their freight documents and to retrieve them for printing or forwarding purposes.

Moreover, this software should be accredited by all state bodies of the countries through which goods will be delivered. Currently there are four accredited suppliers: Collect + Go, Transfollow (The Netherlands), Pionira (Belgium), and Truckfly (France / Luxembourg).

*Suitability for DTC Living Labs:* One of the possible implementation options in EaP countries is to use a single platform for the exchange of eCMR by all participants of the Living Lab, including government authorities.

- ***TransFollow's eCMR: between the United Kingdom, France and the Netherlands***

*Background:* TransFollow's eCMR digital consignment note has been used in practice for the first time on the route between the United Kingdom, France and the Netherlands in a pilot project in February and March of 2019. The eCMR is part of a broader strategy to digitize international trade to achieve increased profitability, more efficiency and better supply chain visibility.

*Concept:* Fiolet in France, International Road Ferry in the Netherlands and Brian Yeardley Continental in the United Kingdom were all involved in the implementation of the pilot. It was carried out in cooperation with FNTR<sup>26</sup> (France), FTA<sup>27</sup> (United Kingdom), TLN / Beurtvaartadres<sup>28</sup> (Netherlands) and the Department for Transport in the United Kingdom. The UK government supported the initiative to reduce the administrative burden on carriers and recognized the benefits of the digitization of waybills.

*Suitability for DTC Living Labs:* The good practice of international use of eCMR in TransFollow's project can be reused when establishing eCMR Living Lab in EaP.

- ***eCMR for road feeder services***

*Background:* The Luxembourg government has signed off on the first electronic consignment note (eCMR) for road transportation operated by Arthur Welter trucking on behalf of CargoLux Airlines. The trucking service will run between Luxembourg (LUX) and Amsterdam Schiphol (AMS) airports.

*Concept:* The transport orders are received from customers digitally, forwarded to the driver and then stored in a central database. The consigner, consignees and driver are all able to use smart devices to sign the documents. The use of eCMR was also identified as beneficial because the use of it can significantly reduce administrative and environmental costs and increase the efficiency of trade facilitation.

*Suitability for DTC Living Lab:* The good practice of international use of eCMR in Benelux countries can be reused when establishing eCMR Living Lab in EaP.

- ***AEOLIX Living Lab12: eCMR***

*Background:* Living Lab 12 (LL 12) shows the potential of digitalization in transport and its contribution in increasing the visibility across the supply chain of national and cross-border operations across Europe through the use of digital freight transport documents.

LL12 focused on several corridors in Europe which, from recent AEOLIX investigations, have resulted as network-wise critical for freight transport operations in Europe in order to address the greater scope of digital freight transport documents:

- facilitation of trade to the East;
- integrating the Balkans;
- from Med to central Europe;
- the Central Europe axis.

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<sup>26</sup> Fédération Nationale des Transports Routiers

<sup>27</sup> Freight Transport Association

<sup>28</sup> Transport en Logistiek Nederland



**Concept:** LL12 explored and piloted the use of electronic freight transport documents focusing on eCMR, and the multi-faceted benefits entailed therein.

As electronic freight transport documents are not accepted by all involved stakeholders and entities in the supply chain, paper documents are still dominant in freight transport operations. LL12 raised the awareness on the current barriers and deploy activities to support the acceptance and the use of electronic freight transport documents through its testing across 4 European corridors.

It is through AEOLIX that the involved entities will gain visibility and be able to share and access business related data and information in a secure way in a trusted environment. AEOLIX acts as the enabler of this information transaction and will facilitate the access of the related entities to it. As with all data that will be handled in AEOLIX, the ownership remains with the entities involved and not with the platform. The same is for the eCMR service. The eCMR service used in LL12 offered through the AEOLIX toolkit where approx. 100 freight transport operations are envisaged to be conducted for each respective corridor involving the consignor (shipper, freight forwarder), the carrier (transport operator) and the consignee.

**Suitability for DTC Living Labs:** The pilot is a good example of how involved parties are able to use eCMR service. The platform concept can be reused in eCMR DTC Living Lab in EaP and in the future - integration of platforms between regions.

- **DIGIINNO project “Digitalization of cross-border government to business (G2B) public services”**

**Background:** Digitalization of cross-border government to business (G2B) public services is a work package within the framework of Baltic-Nordic cooperation DIGIINNO project<sup>29</sup>, ran between 2017-2020. The overall goal of DIGIINNO project is to advance the digital economy, focusing on developing innovative digital cross-border public services and to speed up the process of moving towards the digital single market, Baltic Sea Region (BSR).

In 2019 a feasibility study has been conducted to evaluate the implementation of e-CMR in the Baltic-Nordic region, considering mainly the cross-border aspects in the DIGIINNO project partners countries (Denmark, Estonia, Latvia, Lithuania, Norway, and Poland). The analysis supports the further outlook that eCMR would be legally accepted and used by each participating country in the Baltic Sea Region.

The implementation of complex cross-border e-CMR solution could be separated into four phases: (1) prototype implementation, (2) the installation of simplified fully working solution, (3) the establishment of advanced solution and (4) provision of solution covering Single Window concept. The realization of first two phases could last around 2-3 years. The achievement of advanced solution could take 5-6 years.

**Concept:** Each participating country should legally accept eCMR data exchange, signing and storage policies. It is expected that private logistics companies (carriers, receivers, brokers, etc.) and governmental organizations would have tools to access e-CMR documents/data and accept them as paper analogues. National e-CMR indexing systems shall be established by using the list of technical standards on already existing technical solutions and state systems in each country.

**Suitability for DTC Living Labs:** National e-CMR indexing systems are likely to be exchanging eCMR data with NELS in EaP. The used standards, data set for eCMR and insights from prototype implementation and further stages shall be considered when developing the Living Lab for eCMR for future interoperability between these solutions. Also, the national interconnected solutions concept can be reused in cross-border data exchange between systems.

## 6.1.3. Living Lab 1.3 – Rail consignment note acknowledged as a transit declaration

### Context of Rail consignment note

**Rail consignment note** is used for the shipments transported via railway. The document is prepared by a carrier (railway operator) or a shipping agent and includes mandatory data i.e. point of destination, point of origin, shipper, consignee, weight, dimensions, EORI number, description of shipment and other relevant data necessary to

<sup>29</sup> DIGIINNO. Baltic Sea Region project DIGIINNO (Digital Innovation Network), <https://www.diginnobsr.eu/about>



process a shipment. CIM<sup>30</sup> is regulated by Intergovernmental Organization for International Carriage by Rail (OTIF) and is typically used in EU, whereas SMGS<sup>31</sup> is regulated by Organization for Cooperation of Railways (OSJD) and typically used in EaP and Asia. However, Ukraine, Georgia and Azerbaijan are accepting both CIM and SMGS consignment notes.

**Common CIM/SMGS Consignment Note** is created by International Rail Transport Committee (CIT) in 2006. Freight consignments transported between Europe and Asia and passing from the CIM to the SMGS must be re-consigned. The CIM/SMGS combines information required by both CIM and SMGS regimes, enabling legal interoperability between them and less interruption of freight traffic movement.

**Transit declaration** must be submitted to corresponding customs for cargo put under the transit procedure, when goods are provisionally exempted from duties, taxes and commercial policy measures applicable to imports. Standard process for submitting transit declaration is done via NCTS (new computerized transit system) or paper-based document during border crossing. NCTS is used in all EU Member States and the common transit countries. CIM consignment note (paper) is used for import or export to / from the EU as a transit declaration.

This Living Lab case is oriented at B2G i.e. railway operator and customs where rail consignment note data is acknowledged as transit declaration. The data based on eSMGS or the common eCIM/SMGS consignment notes may be used. The data set and type of consignment note used for basis are to be clarified during Living Lab development. The exchanged shall be performed between cross-border partners via NeLS in Living Lab 1.3.

**Benefits:** While accepting the consignment note data as a transit declaration the customs procedures are simplified and the processes that are in place to control transit operations are not breached. The essential instrument for expediting transit operations is the option for the economic operator to send – and the customs administration to receive – information on the goods in transit prior to their arrival. Based on the information received the customs administration can evaluate the risk profile of the operator and his or her goods and make a decision on any control measures needed in advance.

## Parties involved

- Exporter – company which has high export volumes with EU or Eastern partner countries, that route via transit countries.
- Importer – company which receives transported goods.
- Carrier – railway operator transporting goods via transit country.
- Customs office – regulation institution that needs to receive the transit declaration to verify transit process.

## Business process

Goods are being transported via railway through at least one transit country: Company 1 in Country A (e.g. Lithuania) exports goods using rail consignment note data via transit Country B (e.g. Belarus) to Company 2 in receiving Country C (e.g. Ukraine).

1. After Exporter (or agent) provides all the necessary data, the electronic rail consignment note (eSMGS or common eCIM/SMGS) is prepared by a carrier (railway operator) or a shipping agent and forwarded further to exporter, importer and customs via NeLS. All parties can access the data in NeLS through a provided reference by carrier or integration with own system, e.g. NeLS may push information to NCTS for customs in live NeLS solution.
2. Cargo is transported via railway from Country A through Country B. Rail consignment note data is received and authorized by customs as the transit declaration.

## Prerequisites for Living Lab

- Customs Office to acknowledge the electronic rail consignment note (eSMGS or common eCIM/SMGS) as a transit declaration during Living Lab.
- Availability to connect to NeLS and review electronic rail consignment note data by Customs Office at a Border Crossing Point.
- Customs information system adaptation for integrating the rail consignment note data points to corresponding relevant data points of transit declaration.
- Railway operator and rail transport company willing to participate in the Living Lab.

<sup>30</sup> CIM - Uniform Rules Concerning the Contract of International Carriage of Goods by Rail

<sup>31</sup> SMGS - Electronic consignment note of the Agreement on Direct International Goods Transport by Rail



- Identify exporting and importing entities which have high trade volumes including transit with EU or Eastern partner countries and obtain confirmation of willingness to participate in the Living Lab.
- Optional: acknowledgement of transit manual for goods carried by rail (TAXUD/A2/TRA/008/2018)<sup>32</sup> by all participants.

## EU and global best practices

- **"Legal Interoperability CIM/SMGS" project**

*Background:* Up to 2006, all rail freight consignments between Europe and Asia were re-consigned as they passed from the CIM (applied in Europe) to the SMGS (applied by EaP, Russia, China and further Asian countries). This re-consignment was time-consuming and incurred additional expenses with no value added and sometimes led to incorrect data being entered on documents.

In 2006 the Common CIM/SMGS Consignment Note was adapted by the International Rail Transport Committee (CIT), substantially decreasing the administrative burden and time needed for railway transit between Europe and Asia. A new version of the electronic Common CIM/SMGS Consignment Note is published on 1 July 2019.

*Concept:* The first stage of the project involved producing a new Common CIM/SMGS Consignment Note and the respective legal, functional and technical specifications for the use of an electronic version. During the second stage of the project, a new and standardised claim handling procedure was drafted. The third phase included the creation of standard rules for uniform rail transport law on a contractual basis.

The joint CIM/SMGS consignment note is widely used in all countries Members of both OTIF and OSJD. For example, according to Ukrainian Railways (UZ) 76,128 shipments were processed using the CIM/SMGS consignment note in 2015, out of which 18,040 were transit shipments. Generally speaking, these figures indicate a 10% increase in the use of the common CIM/SMGS consignment note compared with 2014.

*Suitability for DTC Living Labs:* The Living Lab results would be relevant to all EaP countries which are bordering CIM and SMGS regimes. Goods transported from Asia to EU in transit cover trans-Siberian corridor and the silk road, including Russian Federation, People's Republic of China, Kazakhstan countries. The geographical scope represents a large portion of goods being transported via railway and covers the DTC area including EU and Eastern partner countries.

## 6.1.4. Living Lab 1.4 – Cross-border electronic Certificate of Origin data exchange

### Context of Electronic Certificate of Origin (eCO)

Certificate of Origin is one of the required documents for import customs clearance in most of the importing countries. The purpose of this document is to authenticate the country of origin where goods were manufactured / produced. Certificate of Origin is usually issued by local Chamber of Commerce and sometimes by export council agencies if the buyer requests issued GSP (Generalized System of Preference) certificate.

Certificate of Origin is connected to many trade supporting documents as waybill (CMR, SMGS, CIM, AWB, etc.) also financial documents such as invoice and other.

Electronic Certificate of Origin can be provided digitally through electronic application instead of physical document application, that is completed using digital stamps and electronic signatures of authorized officials. During the eCO Living Lab, the module in NeLS shall be developed for eCO application and exchange between business entities, national chambers of commerce and customs. If any existing digital solution for eCO application is developed before eCO Living Lab in Eastern partner countries, it may be embedded with NeLS instead of developing a separate module.

**Benefits:** Chambers of commerce offer online CO services to expedite the application and issuance process, as well as security. Electronic Certificates of Origin (eCO) systems include safeguard measures, such as online verification. They also offer electronic application, in addition to issuance, complete with digital rubber stamps of the chamber and signatures of authorised officials. Electronic Certificate of Origin would reduce administrative

<sup>32</sup> Document "TRANSIT MANUAL AMENDMENT Goods carried by rail" prepared by DG TAXUD (May 2019). Retrieved from: [https://ec.europa.eu/taxation\\_customs/sites/taxation/files/union-common-transit-goods-carried-by-rail\\_en.pdf](https://ec.europa.eu/taxation_customs/sites/taxation/files/union-common-transit-goods-carried-by-rail_en.pdf)



burden, costs, increase transparency and save time among customs administrations, exporters, importers, banks and stakeholders.

## Parties involved

- Exporter – company which has high export volumes with EU or Eastern partner countries and is able to issue Certificate of Origin.
- Importer – company which has high import volumes with EU or Eastern partner countries requiring Certificate of Origin.
- National chamber of commerce – issuing or approving the Certificate of Origin providing authentication for goods manufacturing / production place.
- Customs office – regulation institution that checks Certificate of Origin at border crossing point.

## Business process

Goods are being transported from Company 1 in Country A (e.g. Lithuania) to Company 2 in receiving Country B (e.g. Ukraine); there may be transit countries in between:

1. Company A (Exporter) creates the Certificate of Origin form in NeLS module or online if any separate system is developed and submits it to the national chamber of commerce through NeLS. The national chamber of commerce can access the form in NeLS through a provided reference or integration with own system.
2. The national chamber of commerce reviews and certifies the electronic Certificate of Origin.
3. Company A (Exporter) then provides the electronic Certificate of Origin to Company B (Importer). The importer can access the eCO in NeLS through a provided reference or integration with own system.
4. Cargo is transported from Country A to Country B. Customs checks and verifies Certificate of Origin for cargo during cross-border procedures.

## Prerequisites Living Lab

- Identify exporting and importing entities which have high trade volumes and require Certificate of Origin to be issued.
- National chamber of commerce willing to participate in Living Lab.
- Customs office willingness to acknowledge electronic Certificate of Origin as a legal document during Living Lab.
- Customs Offices at Border Crossing Points shall have technical capabilities be access and review electronic Certificate of Origin via NeLS.
- Usage of electronic signature by signing parties which shall be acknowledged as legal by Customs offices during Living Lab.

## EU and global best practices

- **New Blockchain initiative - issuing Certificate of Origin in Georgia**

*Background:* Revenue service of Georgia (Tax and Customs administration - GRS) and University of Georgia has developed the electronic issuing of Certificate of Origin using blockchain.

*Concept:* After the business entity submits the required documentation to GRS for issuing CO, GRS will issue a hard copy of CO to be submitted to relevant country including QR code. This QR code gives opportunity for relevant country to validate Certificate of Origin by a link of transaction of Ethereum public blockchain (hash (digest value) of data, which is calculated from XML of CO is written in Ethereum blockchain).

The country end user, e.g. Customs Office uses special application for identification and validation of paper version of the CO. With this application, QR code can be scanned or if there is no QR reader plugged in application, it is possible to search for CO manually with ID number, which is written on all paper versions of CO.

Finally, all data is visualized in the application and end user (Customs Office) can see the CO as well as the fact that it is issued by GRS.

*Suitability for DTC Living Labs:* Blockchain enables greater level of transparency and security, reduce costs and save time for stakeholders. Georgia is the only EaP country using blockchain for CO verification purposes, therefore, the approach taken provides insights about applicability of electronic measures for Certificate of Origin in the EaP region.

- **Electronic Certificate of Origin in Finland**



**Background:** Finnish Chamber of Commerce is providing electronic export document service, including Certificate of Origin. The main benefit for electronic version of the Certificate of Origin is that it is more secure than paper-based document due to the following security features: (a) online eCO authenticity verification (b) digital rubber stamps of the Chamber (c) electronic signatures of authorized officials (d) 2-D barcode to ensure data integrity (e) PKI technology to ensure data security and authenticity.

**Concept:** To obtain for eCO in Finland the applicant needs to apply via website ([www.e-Vientiasiakirjat.fi](http://www.e-Vientiasiakirjat.fi)) by filling in the online form or the word document. The applicant shall register and get authorized for the e-Export documentation service beforehand. The completed forms are then submitted online to the Chamber of Commerce for approval. The confirmed CO is stamped electronically.

**Suitability for DTC Living Labs:** In Eastern partner countries Certificate of Origin is issued only in paper form. Testing electronic Certificate of Origin is an alternative Living Lab for DTC in EaP and good practices of eCO implementation in other countries could be reused.

## 6.1.5. Living Lab 1.5 Cross-border eTIR data exchange

### Context of eTIR

Established in 1959 and administrated by the United Nations Economic Commission for Europe (UNECE) the TIR Convention proved itself as an efficient facilitation tool for handling TIR Carnet. TIR Carnet is an issued document for permitting sealed shipment via road transport to traverse European TIR-members countries without undergoing customs inspection until reaching the country of destination.

Due to the fast-paced development of technologies, the use of paper TIR Carnet is becoming outmoded. To improve the TIR processes eTIR project<sup>33</sup> created a concept of eTIR system to provide an exchange platform for all parties involved in international trade. Currently, pilot projects are being implemented for eTIR system.

The system should be able to guarantee secure data exchange between national Customs systems related to international transit, as well as allow management of data on guarantees.

During the eTIR Living Lab, the module in NeLS shall be developed to interconnect with eTIR international system.

**Benefits:** eTIR provides additional security and risk management opportunities, reduces administrative burden and improves supply chain management as a result of international cooperation. Also, it enables faster TIR procedures.

### Parties involved

According to the specifications of eTIR (version 4.1a)<sup>34</sup>, there are 5 main parties involved that perform a role in the processing of eTIR:

- Guarantee Chain – composed of an international organization, the Guarantee Chain provides the holder with an international guarantee and uploads required information to the eTIR international system.
- Customs authorities – reviews and certifies declarations according to national regulations; reviews, complements and forwards the required information in the eTIR international system; and assesses risk of each TIR transportation.
- eTIR international system – secures and facilitates the circulation of standardized information on guarantees at international level between Customs administrations and the Guarantee Chain.
  - Exporter / Importer – also referred as the “Holder”, the exporter / importer requests the guarantee from the Guarantee Chain; performs the TIR transport and is responsible for providing the related declaration data electronically to relevant Customs offices by referencing the guarantee issued by the Guarantee chain.
  - Freight carrier – presents the goods to relevant Customs offices.

<sup>33</sup> More at: <https://www.unece.org/trans/bcf/etir/background.html>

<sup>34</sup> Document “eTIR Reference Model” prepared by Economic Commission for Europe - Inland Transport Committee - Working Party on Customs Questions affecting Transport (February 2015). Retrieved from:  
<https://www.unece.org/fileadmin/DAM/trans/bcf/wp30/documents/ECE-TRANS-WP30-2011-4r1e.pdf>

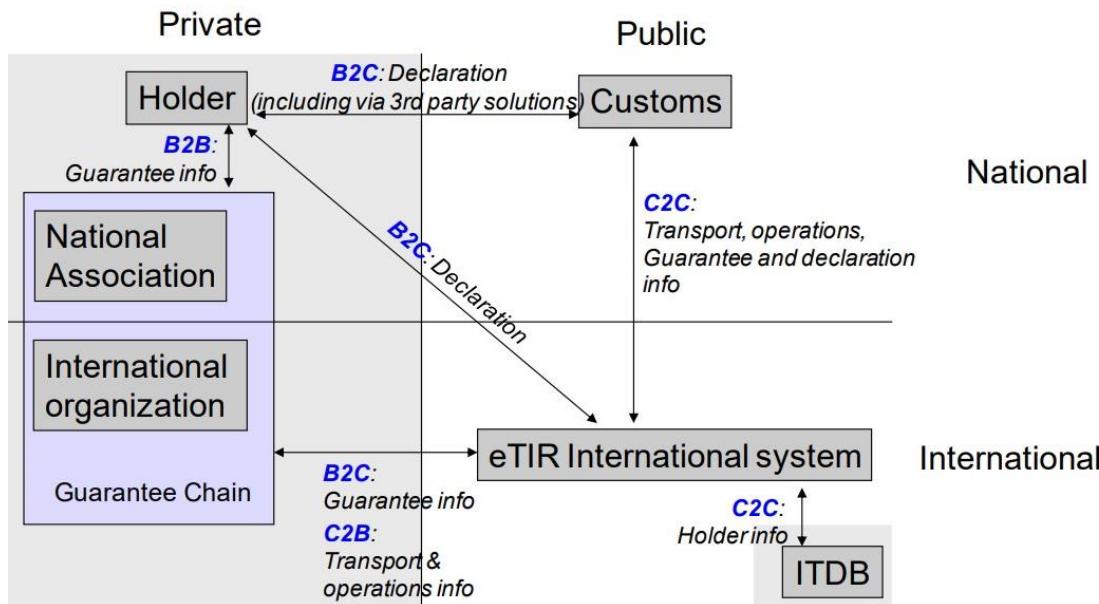


Image 11: "The information exchange between the actors in the eTIR system"<sup>35</sup>

### Business process

1. The Exporter / Importer requests a guarantee from the Guarantee Chain, which decides if the guarantee can be issued. If the guarantee can be issued, the process continues.
2. The Guarantee Chain provides a guarantee reference number of the issued guarantee to the Exporter / Importer and registers the guarantee in the eTIR system by sending a standard electronic message.
3. The Exporter / Importer sends a standard advanced cargo information message to the departure office Customs authorities using national declaration mechanism.
4. The Exporter / Importer presents vehicle, goods and guarantee reference at the Customs office of departure for the purpose of placing the declaration.
5. The Customs office of departure inspects the vehicle and goods and, once it accepts the declaration, it sends a message via NeLS to the eTIR international system with TIR transport data specified in the agreed requirements. The eTIR international system would then store the declaration information and link it with the appropriate guarantee information, which is then sent to all Customs authorities involved in the TIR transport process. The eTIR international system sends notifications to the Guarantee Chain about all new information on TIR transports and TIR operations related to the issued guarantees (except the information which is restricted to Customs).
6. Upon arrival at the consecutive Customs of entry (as well as all further Customs offices of exit and destination), the procedure is repeated based on available information in the eTIR international system and the risk assessment of the involved Customs authorities.

### Prerequisites for Living Lab

- Identify an international organization which would ensure the proper functioning of the guarantee chain for a TIR transport.
  - The international organization should be approved by AC.2 (Administrative Committee of TIR Convention) to centrally distribute TIR Carnets.
  - The international organization should have member associations, which are approved to issue TIR Carnets and are approved by national Customs authorities.
- Identify exporting and importing entities which have high trade volumes and are authorized by competent Customs authorities.
- The Holders willingness to send their advance cargo information to countries of departure of the TIR transport.

<sup>35</sup> Document "eTIR Reference Model" prepared by Economic Commission for Europe - Inland Transport Committee - Working Party on Customs Questions affecting Transport (February 2015) – Version 4.1a. Figure 2.1 "The new public private partnership" (page 85). Retrieved from: <https://www.unece.org/fileadmin/DAM/trans/bcf/wp30/documents/ECE-TRANS-WP30-2011-4r1e.pdf>



## EU and global best practices

- **UNECE-IRU eTIR pilot project between the Islamic Republic of Iran and Republic of Turkey**

**Background:** This was the first eTIR pilot project and was implemented by UNECE and IRU (International Road Transport Union)<sup>36</sup>. The project started in 2015 March and was carried out in the beneficiary countries Islamic Republic of Iran and Turkey until 2017 February. Due to success of the pilot, the usage of eTIR is still ongoing with the intent to extend the geographical scope to neighbouring countries.



Image 12: Map of eTIR pilot between Republic of Iran and Turkey<sup>37</sup>

**Concept:** The pilot project was aimed to effectively facilitate the launch of paperless TIR procedures between the two pilot countries while maintaining a rapid pace and minimum costs; as this constitutes first step towards implementing eTIR system worldwide.

According to the informal document GE.1 No.2 (2017)<sup>38</sup> during the course of the pilot project, the participants were able to:

- issue 84 eGuarantees;
- complete 64 transports (with 20 eGuarantees remaining unused).

Moreover, according to an eTIR presentation in 2016 September, 15 Customs offices were already involved<sup>39</sup> in the projects second phase.

To achieve this result, two countries had their domestic TIR operations already computerized and were connected to the Real Time SafeTIR and TIR Electronic Pre-Declaration (TIR-EPD) systems of IRU, which allowed real-time data exchange of declarations and status of guarantee. The implementors, Customs administrations and the guaranteeing associations agreed to use their existing IT systems in both countries to exchange TIR data. In addition, a lightweight version of the eTIR systems was developed, however, some of its tasks had to be performed by the IRU system. Nevertheless, this did not prevent the

<sup>36</sup> Document "eTIR: Towards Paperless Cross-border Trade" prepared by Veronika Marinova, Masato Abe, Jens Hügel and André Scie (September 2016). Retrieved from: <https://www.irus.org/sites/default/files/2016-09/eTIR-report-towards-paperless-cross-border-trade-iru-unescap-unece.pdf>

<sup>37</sup> Presentation on "UNECE-IRU eTIR Pilot Project between Iran and Turkey" prepared by Thierry Kunz & Raphaël Hirt – IRU (September 2016). Slide 17. Retrieved from: [http://www.unece.org/fileadmin/DAM/trans/bcf/adhoc/conc\\_tech/documents/Kunz\\_Hirt\\_200916.pdf](http://www.unece.org/fileadmin/DAM/trans/bcf/adhoc/conc_tech/documents/Kunz_Hirt_200916.pdf)

<sup>38</sup> Informal document on eTIR pilot projects UNECE-IRU eTIR pilot project between Iran and Turkey prepared by Economic Commission for Europe - Inland Transport Committee - Working Party on Customs Questions affecting Transport (May 2017). Retrieved from: [https://www.unece.org/fileadmin/DAM/trans/bcf/adhoc/conc\\_tech/documents/id17-02e.pdf](https://www.unece.org/fileadmin/DAM/trans/bcf/adhoc/conc_tech/documents/id17-02e.pdf)

<sup>39</sup> Presentation on "UNECE-IRU eTIR Pilot Project between Iran and Turkey" prepared by Thierry Kunz & Raphaël Hirt – IRU (September 2016). Retrieved from: [http://www.unece.org/fileadmin/DAM/trans/bcf/adhoc/conc\\_tech/documents/Kunz\\_Hirt\\_200916.pdf](http://www.unece.org/fileadmin/DAM/trans/bcf/adhoc/conc_tech/documents/Kunz_Hirt_200916.pdf)



stakeholders from receiving all required data in real-time. The delivery of advanced cargo information was done via TIR-EPD, as it was able to link issuance of eGuarantees at IRU and allow authentication using username and password of the transport operators. Moreover, due to lack of legal basis for authentication of mutual transport operators, print-at-home TIR Carnets had to be used for manual signatures of transport operators.

*Suitability for DTC Living Labs:* In terms of geographic scope, the UNECE-IRU eTIR pilot project is highly applicable to the DTC Living Labs project as expansion of the eTIR pilot project to the neighbouring countries of Iran and Turkey in other regions including the EaP region is planned. Pilot project between Azerbaijan and Iran has already been launched and the first eTIR transport between the countries took place on June 2019, whereas Ukraine, Georgia and Azerbaijan together with Kazakhstan are initiating another eTIR pilot project in the so-called “Batumi corridor”.

A good practice of introducing the system can be seen: at the stage 1 of the pilot project, 4 customs offices and 2 holders were participating, whereas at stage 2 the pilot project expanded and had 15 customs offices and 6 holders in total. To ensure the effectiveness, the Living Lab should 1) also start with a few participants to lay the foundation; 2) establish itself in the piloting countries by involving more participants; 3) only then expand to other countries.

## 6.1.6. Living Lab 2.1 Usage of tracking data for faster border crossing

### Context of tracking in logistics

Tracking of cargo, goods, vehicles and containers is widely used in private logistics sector. Tracking companies offer services such as real-time vehicle monitoring, driving history (route, distance, driving time), reports on the parameters of the devices (temperatures, door opening), possibility to attach and exchange logistic documents via tracking system and other.

The use of this information between exporters, importers, carriers and logists enables them to use vehicle fleets more efficiently, reduce administrative burden by exchanging logistic documents in the same system and enable trust as the route and history of driver's actions can be observed.

This pilot case is oriented at Customs office at border crossing point. Customs office can assess in advance the checks needed for a vehicle by information available in advance from tracking system: when the vehicle shall arrive to a border crossing point, what was the route of the vehicle, was the container/door of consignment opened during transportation as well as customs officers can review the logistic documents attached in advance and only check their originality upon vehicle arrival.

This Living Lab is tested with third party tracking and monitoring solution and not embedded in NeLS in the scope of Component no.1: Visibility-administrative processes. However, visibility module is foreseen in DTC vision in the future and such functionality shall be provided by living NeLS solution after further developments.

**Benefits:** Such usage of tracking data as described above may enable faster border crossing. By providing data about key consignment transportation aspects and possibility to review the logistic documents attached in advance the border crossing procedures may be simplified and trust increased. By having data about incoming consignments, the management of queue at the border can be improved.

### Parties involved

- Exporter – company which has high export volumes with EU or Eastern partner countries.
- Importer – company which receives transported goods and tracking information.
- Logistic company and Carrier – company or separate companies transporting goods through countries.
- Tracking company – company providing tracking services. Logistic company may also provide tracking services, in which case involvement of separate tracking company is not required.
- Customs office – regulation institution that receives tracking information and checks the consignment and carrier at border crossing points.

### Business process

Goods are being transported via road: Company 1 in Country A (e.g. Lithuania) exports goods while using tracking system via transit Country B (e.g. Belarus) to Company 2 in receiving Country C (e.g. Ukraine). There may be no transit countries in between.

1. The Logistic company or Tracking company installs tracking system in the vehicle and provides log ins to the system to all related parties: Exporter, Importer, Carrier, Customs office and Logistic company if Tracking company is involved.



2. The Exporter, Logistic company and Carrier provides all the necessary data and available electronic documents to the tracking system.
3. Cargo is transported via road from Country A through Country B to Country C. Customs offices at border crossing points can see tracking information and evaluate the coming cargo in advance: the journey of cargo, vehicle information, time when cargo will arrive to border crossing point and any available electronic documents attached.
4. Cargo arrives at border crossing point from Country A to Country B, customs performs remaining procedure and authorizes cargo.
5. Cargo arrives at border crossing point from Country B to Country C, customs performs remaining procedure and authorizes cargo.

## Prerequisites for Living Lab

- Access to tracking system for all participating parties: Exporter, Importer, Logistic company, Carrier and Customs office at border crossing point.
- Identify exporting and importing entities, Logistic company, Carrier and Tracking company which are willing to participate in the Living Lab.
- Customs willingness to use tracking information for border crossing procedures.

## EU and global best practices

- *The "e-Carriage" service in Poland.*

*Background:* In 2017 Polish Customs and Tax Authorities adopted the regulation for monitoring system for the road carriage of goods<sup>40</sup>. The "e-Carriage" service is one of the electronic services provided by the National Revenue Administration via the Electronic Services Portal of the Tax and Customs Service (PUESC). This requires the entities that carry sensitive goods and are exporting from, importing to or transiting via Poland to report information about each individual transport to PUESC. The list of sensitive goods includes such items as biodiesel, tobacco, various oils etc. The "e-Carriage" service is imposed by the Act of 9 March 2017 on the monitoring system for the road carriage of goods (Journal of Laws, No. 2332<sup>41</sup>).

*Concept:* The notification to PUESC can be submitted by the sender, the receiver or in case of transit - the carrier. The carrier must submit and update the information, including details of carrier, dates of the actual commencement of the carriage of goods, planned date of completion of the carriage of goods, various registration and permits numbers, and other. The purpose of this is to eliminate loopholes in the Polish tax collection system. "e-Carriage" services can be provided using other IT systems that fit specific technical specifications.

*Suitability for DTC Living Labs:* The Polish Customs and Tax Authorities are using electronic data about consignment movement through Poland which is a good practice of movement monitoring used for ensuring trust and control by public institutions.

<sup>40</sup> Document on "Information concerning the monitoring system for the carriage of goods by road" prepared by Polish Customs and Tax Authorities (2017). Retrieved from:

<https://puesc.gov.pl/documents/10180/75428865/SYSTEM+MONITOROWANIA+angielski.pdf/bbc6a14b-cc4b-481f-868a-cda09f6256c6>

<sup>41</sup> <http://dziennikustaw.gov.pl/DU/2018/2332/1>



## 7. Organisational actions

As part of DTC development, the following organisational preparation will be required:

- On a national level:
  - Appoint a responsible institution for facilitating and coordinating DTC development in the country.
  - Appoint a responsible institution for supervising NeLS development (potentially - future NeLS operator).
  - Adjust legal base during DTC establishment and implementation phases.
  - Develop and adjust NeLS in line with the principles of EU developments, namely DTLF recommendations, eFTI regulation, requirements and specifications as well as results of FEDeRATED and FENIX network living labs.
- On a cross-border level:
  - Connect and agree with partner country on testing cross-border information exchange in Living Labs: NeLS to NeLS for exchange between two Eastern partner countries; NeLS to corresponding existing government or private systems between Eastern partner country and EU member state (no central platform development is planned in EU MSs, i.e. Lithuania).
  - Establish DTC working group facilitating DTC implementation on a regional level (could be considered under eTrade Expert Network in Eastern partner countries).
  - In addition to the Living Labs recommended in this report, develop other initiatives to test organizational capacity, improve collaboration between countries and strengthen digitalisation.
  - Assign the representatives and participate in DTLF activities & discussions (*the format of involvement to be decided*).

Continuously follow the developments of DTLF, FEDeRATED and FENIX network to adjust NeLS in order to minimize any changes needed.