eCMR INDEXING PROTOTYPE
version 2.0. within DINNOCAP project
TESTING SUMMARY

SUMMARY OF TESTING OF THE eCMR INDEX REGISTRY PROTOTYPE VERSION 2.0
in DINNOCAP project in 2021

authored by the testing coordinator
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FINAL version

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Accompanying information on the prototype:
https://koodivaramu.eesti.ee/majandus-ja-kommunikatsiooniministeerium/ecmr-index-registry-prototype-2.0

Project information: https://www.dinnocapbsr.eu/ecmr

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INTRODUCTION

The report is a summary of the testing activities planned and performed on the eCMR index registry prototype version 2 within DINNOCAP[1] project in Estonia, Latvia, Lithuania, Poland and between other project partners. The direct testing works were performed between September 2021 and December 2021, coordinated by **Ulrika Hurt** and a team alongside the partners of DINNOCAP project, other private and public sector testing partners and supported by Digilogistika Keskus and Catapult Labs OÜ.

The testing results build upon the concept suggestion of the prototype in 2019, the application for funding and project evolution during 2019 within the DIGINNO project[2], the development and testing of the prototype during 2020 within DIGINNO-Proto[3] project and the upgrade to version 2 of the prototype in 2021, all of which are described in the current report.

The testing comprised of following testing activities:
- prototype assessment and evolution of technical updates in cooperation with the developers to perform all functionalities,
- coordination and support for the business operators' as well as eCMR service providers in uploading the eCMR information, for that requiring user access (to indexing node or data upload via API), XML file type use, API application, guidance on permissions to be given to each dataset,
- the competent authorities' information and query support, user access codes, instructions and support, live ride coordinated testing,

In addition, following supportive actions were undertaken:
- administrative matters on coordination of active ride dates as well as registration of the ride information and sharing of the information to partners,
- communication and information dissemination events, kick-off sessions and demo days, results reviews for various stakeholders.

To support the main testing activities - the arrangement of affairs from the business operators to make their datasets/documents available and the public authorities to be ready to make queries on eCMRs - a series of one-on-one actions were undertaken. A number of preparatory, support and operational actions were planned and performed in order to support the IT development to match the procedures of smooth testing, from creation of coordinated usernames as well as rules and arrangements to set the permissions given for each document, from CMR collection coordination to making the lists available for testing purposes. Key effort was placed into review of readiness of the developed prototype version 2.0, providing immediate feedback, testing of features and requesting bug fixes for functionalities to support both the upload as well as viewing/queries from the index registry prototype.

The testing in 2021 also aimed to engage more partners around the table than in previous year (2020), among which also a higher number of private sector actors, among them a number of possible future eCMR service providers and eFTI platforms.

The work on the prototype testing supports both the evaluation of the functionalities of the current eCMR indexing prototype as well networks of access points in general as it validates and proves the functionalities of the distributed data architecture. The prototype and testing of it reflects and caters to the work of Digital Transport and Logistics Forum[4] supporting European Commission and EU member states in preparing for the implementing and delegated acts for the eFTI Regulation[5] .

The eCMR indexing prototype has been developed taking into account the UNECE CMR Convention[6]'s additional protocol on electronic CMR[7]. Also, the outlook of application of the eFTI Regulation has been counted and the project works as a testbed for both eCMR and future eFTI datasets/ subsets alike. For testing, the eCMR subset of MMT Business Requirement Specifications (BRS)[8] and Reference Data Models (RDM)[9] were used and tested. Work on a dedicated version of UNECE MMT standard subset and testing-use-case based sample eCMR was evolved, implemented as well as API integrations evolved and implemented for the use of the dedicated file type.

The evolution and testing of the prototype resulted in observations and suggestions for further activities and observations towards the next version of the prototype alongside with learnings and takeaways for eFTI preparation.

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[1] DINNOCAP project, https://www.dinnocapbsr.eu/ecmr
[2] DIGINNO project, https://www.diginnobsr.eu/
[3] DIGINNO-Proto project, https://www.diginnobsr.eu/diginno-proto
[4] Digital Transport and Logistics Forum, https://www.dtlf.eu/
[5] Regulation (EU) 2020/1056 on electronic freight transport information (eFTI), https://eur-lex.europa.eu/eli/reg/2020/1056/oj
[6] Convention on the Contract on the Contract for the International Carriage of Goods by Road (CMR Convention), LINK
[7] Additional Protocol to the CMR Convention (2008), LINK
[8] UNECE, Business Requirement Specifications (BRS), LINK
[9] UNECE, Reference Data Models (RDM), LINK

1. BACKGROUND AND RELEVANCE OF THE PROTOTYPE

A shift from paper to electronic documents is a great opportunity for both businesses and government authorities to gain efficiency and transparency. Cross-border B2B and B2G electronic freight initiatives represent a high potential as practical input for eFTI technical rules and standards, and also prepare the market for offering and using relevant business services. The digitalisation and trusted sharing of road freight data is a key solution for reducing the administrative burden and mitigating negative environmental impacts. But also, to allow the increase in the efficiency and benefits of the private sector by moving away from paper documentation.

To address the need for cross-border legislation, eFTI Regulation has been adopted by the European Commission in July 2020 and further delegated and implementing acts are being prepared and adopted during 2022/2023. At the side, the expert group DTLF is making their suggestions and operations to map and suggest options and alternatives for EU member states. Several project initiatives in the logistics sector are in the initiation or implementation stages that work on similar affairs and have bee mirrored when developing and testing the prototype: CEF projects FEDeRATED[10] and FENIX[11], EU4Digital Digital Transport Corridor[12] and upcoming NDPTL network project[13] to name a few which among other topics have and will be eFTI architecture or eCMR-focused.

1.1. The eCMR index registry (indexing) prototype

The Baltic-Nordic-Polish eCMR indexing/ index registry prototype motivation and evolution within DIGINNO project as well as DIGINNO-Proto projects address the same freight transport digitalisation and eFTI application agenda and DINNOCAP project aimed to channel the outcomes of the previous two. The evolution of the prototype and testing built upon the concept proposal in 2019 and works of Baltic Sea Region cross-border cooperation projects DIGINNO (2018-2020), DIGINNO-Proto (2020-2021) and DINNOCAP (2021).

The scope of the eCMR indexing/index registry prototype is creating an framework for indexing and querying the eCMRs - electronic versions of the consignment notes for international transport (CMR) from relevant and ready eCMR service providers or other services creating an eCMR in a dedicated machine-readable file format or for testing purposes, made available in any other electronic format (PDF).

The method of indexing uses the metadata indexing and structure of national/regional access points or nodes to mediate the metadata registration and linking as well as later stage mediation of queries being highly relevant in discussions over access points and sharing of linked data allowing eFTI platforms to disseminate the foreseen information only in cases of queries by public authorities.

The prototype is aimed to test and validate an concept and IT system network architecture for exchange of information over eCMRs (and eFTI datasets in the future) and making the documentation available for queries by public authorities without the necessity of disseminating the CMRs further than eCMR service providers' platforms or economic operators' relevant ERP systems, in the future, eFTI platforms.

1.2. Regional motivation for having the prototype developed and tested

Between the Baltics and Poland, thousands of shipments are made daily. All those shipments are accompanied with documentation, licenses and other information/ data relevant to both cargo owners, transport companies as well as public authorities. All those documents are available on paper despite the information often being available and used digitally between partners.

The prototype architecture and testing of the prototype supports the wider aim of preparations towards the application of eFTI Regulation, establishment of possible access points and networks of access points (national access points) and showcases a possible solution for cross-border interoperability.

Regionally, the prototype allows local testing and regional cooperation in digitalisation of freight transport information, cross-border visibility of documents, preparations towards live data sharing and building of trust networks between businesses and authorities cross-regionally.

Platforms or networks of index registries, functioning in principle as the eCMR index registry prototype, can successfully act as access points, mediators and gateways between various Government IT systems, businesses (eFTI platforms) and other member states access points.

For that matter, the DINNOCAP prototype serves as a great tool - allowing to actually examine foreign road transport documents without being near the truck or needing to stop it across borders. Also, without the necessity of eCMR service platforms needing to upload eCMRs to central database, but providing key metadata and URL instead.

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[10] FEDeRATED project, http://www.federatedplatforms.eu/
[11] FENIX Network, https://fenix-network.eu/
[12] EU4Digital project, https://eufordigital.eu/
[13] NDPTL network, https://www.ndptl.org/

Technologically, the prototype is not yet near to what is needed for actual data exchange, but it has been connected to eCMR service providers and competent authorities have been able to test the user interface and check live data provided by eCMR service providers.

Though the regional businesses might not have all that's needed for XML file type application, data exchange levels or business process, the readiness to publish the digital information is high as long as the documents would not be uploaded to international databases. The public administrations/competent authorities prove ready to trust a jointly validated online environment as an authentic source of freight transport data in case the rules would be commonly set for all participating countries.

1.3. CMR and eCMR application relevance

The growing progress of eCMR ratification of the Additional Protocol to the Convention on the Contract for the International Carriage of Goods by Road (CMR) concerning the Electronic Consignment Note[14] of 2008 has led to a situation where despite the eFTI Regulation, EU member states are looking towards digital options of cross-border document exchange, validation and transfer.

Options of eCMR data exchange having a distributed and data-at-source principle network might become a key in cross-border eCMR application in addition to the upgrade of file standards. Index registries or access points instead of a global central database or a national central databases seems to be a feasible option. For easy application, a unified rule of both the file type, but also data exchange/query mechanism has to be agreed. For that, the eCMR index registry concept and prototype provide relevant observation material.

As eFTI will be providing the framework for any data exchange, incl. eCMR, the CMR developments of UNECE and the eFTI developments of the European Commission have to be coordinated to allow support and avoid duplication.

1.4. Access Point-related discussions

In planning the future application of the eFTI Regulation, the EU member states have initiated discussions on possibly developing or implementing the Access Points as per Rec 13 and 23 of the Regulation. On that matter, a number of member states are discussing, whether such access point should be created or how to best plan it.

In the eCMR index registry test countries - Estonia, Latvia, Lithuania, Poland - the discussion over access point has been accompanying the prototype evolution and testing.

Inspired by the successful operational proof and testing of the prototype, Estonian Ministry of Economic Affairs and Communications has formed a strong position towards possibly establishing a national access point, other region's countries are mapping the necessity, ownership and operational models as well as possible joining actions on (national) access point. Estonia, among the frontrunners on eFTI preparations, has initiated a research study (procurement[15] under the Ministry) on the matter, whilst the motivation and possible outcomes directly building upon the learnings and takeaways from the eCMR indexing prototype developed within the DIGINNO-Proto project and further evolved within the DINNOCAP project.

2. PROTOTYPE ARCHITECTURE AND DEVELOPMENT

2.1. The eCMR index registry architecture

The concept and architecture ensures the digital availability of a CMR document and a mechanism of indexing such documents across the partner countries via an indexing scheme that uses metadata sharing and query mechanism based on identifiers.

The query mechanism allows the nodes to be queried at once and response to be provided by relevant eCMR service providers (eFTI platforms).

For government access, the queries can be made either via a portal (graphical user interface) or via oAuth supported data exchange that allows data to be retrieved by the Competent Authority directly.
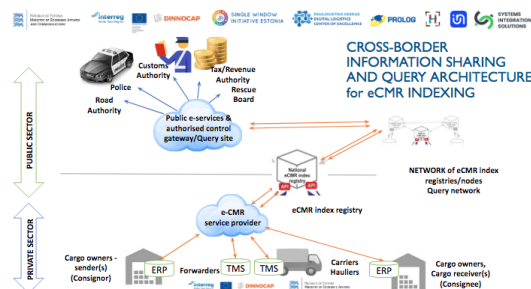

Figure 2. Cross-border information sharing and data query architecture
Source: DINNOCAP project documentation

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[14] United Nations, Treaty Collections, LINK
[15] Ministry of Economic Affairs and Communications (2021) on the procurement of study on assessment of the operational model of eCMR access point in Estonia, LINK

The participants of the eCMR indexing network are:
- the economic operators with their ERP/TMS systems,
- the eCMR service providers (EDI platforms), which in the future would be eFTI platforms,
- index registries /platforms/nodes (future access points or data query nodes),
- competent authority information systems, registries and databases.
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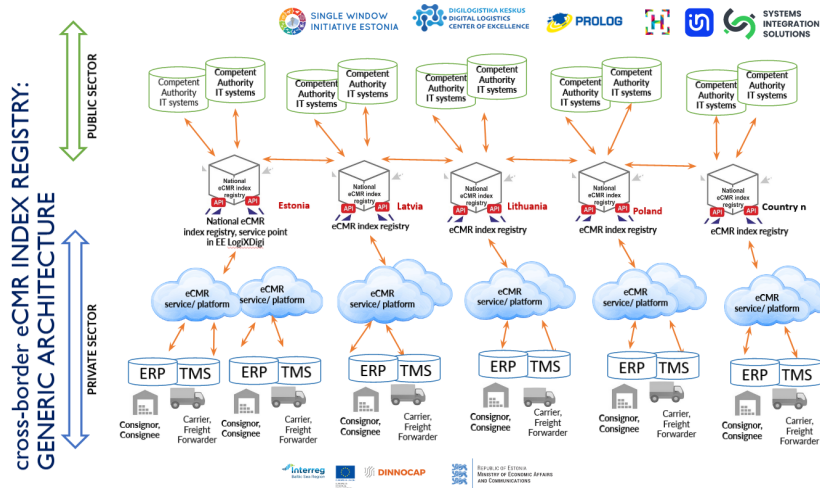The architecture for the eCMR index registry network and ecosystem is as follows:

Figure 1. Cross-border eCMR indexing ecosystem architecture
Source: eCMR index registry testing documentation

3. PROTOTYPE version 1 and version 2 - comparison and outcomes

3.1. Development of the prototype

The concept and architecture for eCMR indexing or network of index registries has been proposed by Ulrika Hurt in 2018/2019 during DINNOCAP eCMR meetings based on progress of DTLF discussions on preparation towards eFTI Regulation. The concept was welcomed by DINNOCAP WP3 partners and evolved further within proposal preparation for DIGINNO-Proto project in 2019. Technical requirements for the prototype were set within the procurement procedure of DIGINNO-Proto, and prototype developed and validated within 2020 testing. For DINNOCAP project, the concept was evolved further whilst the technical requirements were specified for the tender of developing the prototype version 2.

The development of the prototype was coordinated within projects managed by Estonian Ministry of Economic Affairs and Communication. Development works on the prototype were carried out by FITEK EDI in 2020 (public procurement of 2020[16]) and SIS Solutions in 2021 (public procurement of 2021[17]). The testing was prepared during the period of the prototype development period and carried out in direct activities in August 2020 for the version 1 and in November-December 2021 for the version 2.

3.1. Development of the prototype

The development of the prototype version 2 was carried out within DINNOCAP project with the aim to arrange further development of functionalities and additional testing of the cross-border eCMR prototype based on DIGINNO-Proto project outcomes. The aim of works procured in 2021 was the further development of eCMR cross-border index registry prototype through expanding functionality, raising data security, carrying out additional testing.

DIGINNO-Proto project (2019-2020) had been initiated to develop and test an eCMR indexing prototype, and to achieve the international exchange of eCMR data between partner counties: Estonia, Latvia, Lithuania and Poland.

eCMR prototype 1.0 in scope of DIGINNO-Proto project was implemented and tested in following stages:
- Architecture development: the concept was evolved with the project team between August 2019 and January 2020, with the mapping of the functioning of the proposed solution and drafting the requirements and tender documentation.
- Technical development took place between April and September 2020 by contractual partner FITEK EDI, selected through international public procurement.

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[16] Public procurement 218902 as of 10.02.2020, "Development and testing of eCMR prototype"in Estonia, LINK
[17] Public procurement no. 2021-663839 as of 30.07.2021 "DIGINNO-Proto/DINNOCAP eCMR Index Registry Prototype version 2.0 Development and Testing" in Lithuania, LINK

- Prototype testing took place in four countries connecting both businesses, eCMR service providers and public authorities in remote and live testing.

A procurement procedure was undertaken to develop a selected number of functionalities further and add new functionalities to the DIGINNO-Proto prototype with the aim of evolving it to version 2.0.

Most important evolution during the 2021 was the wider implementation of the XML file type use to the prototype. That included the use of the dedicated eCMR file type by several eCMR service providers (not only one like in 2020) and that authorities could check the files through an on-screen visualiser of an XML file.

Using standardised and machine-readable files, the logic of actual future implementation of machine-to-machine queries and responses was better represented in 2021 testing. It allowed the participating businesses as well as competent authorities to better assess the benefits of information being synchronised/connected to existing/future viewing and analytics tools.

Table 1. Comparison of eCMR indexing prototype versions 1 and 2. Source: 2021 procurement documentation

REQUIREMENT	Prototype version 1 (2020)	Prototype version 2 (2021)
	Realized in DIGINNO-Proto	**Developed in DINNOCAP**
1. DATA EXCHANGE MODEL	• Indexing solution and Application Programming Interfaces (API-s) developed to upload information to index registry. • Machine-to-machine as well as only URI link of any format documents for indexing of eCMR documents. • Machine-readable and any other file upload possible	• The data exchange model and principles will remain, storage API-s to be further developed. • Machine-to-machine upload and document storage to different countries shall be developed. Document accessing function to be added based on rules to be defined with the assessment tool (XML file control, XSD Schema). • Machine-readable files will be accepted only.
2. AUTHENTIC-CATION MODEL	• OAuth 2.0 protocol for authentication and authorization of systems. • Accounts and passwords created for prototype users (administration, upload and search)..	• Authentication model principles will remain, OAuth to be possibly revised. • Accounts and passwords for index administration and use remains.
3. DATA STANDARD	• UN/CEFACT eCMR format was preferred (and used by Estonia), various other file types (PDF, scan, .jpg, xls were used).	• UN/CEFACT MMT-RDM CMR subset will be the format of the files in the original location.
4. USER INTERFACE (UI)	• UI for prototype testing developed outside the scope of the project, but is part of the indexing mechanism (UI solution was not handed over within the project results by Fitek EDI). • Query mechanism allowed search based on predefined criteria (truck nr, trailer number and eCMR unique ID). • Access to the user interface was based on user names and passwords on the same prototype environment.	• an UI with at least the same functionality to be developed. • Query mechanism to allow search based on predefined criteria and history/changes of the index record to be presented in various sorted and filtered ways (chronological order, changes only or changes and accesses). • Access to user interface to be upgraded, especially in case of new solutions being developed. Creating user accounts and query mechanisms, such as EDI Service Providers and Competent Authorities are able to create users, functions to be added/amended.
5. PROTOTYPE DEPLOYMENT	• Cross-border deployment carried out in Lithuania, Latvia, Estonia, Poland and Kaliningrad	• Cross-border deployment to be carried out at least in Lithuania, Latvia, Estonia, Poland, possibly Kaliningrad and other partner regions to be considered.
6. PROTOTYPE TESTING	• Cross-border testing carried out in Lithuania, Latvia, Estonia, Poland and Kaliningrad	• Cross-border testing to be carried out by an external team of experts at least in Lithuania, Latvia, Estonia, Poland, possibly Kaliningrad and other partner regions to be considered. The Supplier shall cooperate with this team and update/improve the prototype by the comments of the experts.

REPUBLIC OF ESTONIA
MINISTRY OF ECONOMIC AFFAIRS
AND COMMUNICATIONS

Interreg
Baltic Sea Region

DINNOCAP

Table 2. Outcomes and links to final reports.

	Prototype version 1 (2020)	Prototype version 2 (2021)
OUTCOMES	• eCMR index registry[18] Standardized Application Programming Interfaces (API-s) developed, based on Distributed Ledger Technology (DLT) and shared under the MIT software license.	• Further development of eCMR cross-border index registry prototype through expanding functionality, raising data security, carrying out additional testing.
TESTING	• Live cross-border testing carried out in four project countries to prove the functioning of the index as well as mapping the benefits for all parties.	• Cross-border testing both remotely and live carried out by an external team of experts in Lithuania, Latvia, Estonia, Poland, Kaliningrad and other partner regions to be considered. The Supplier shall cooperate with this team and update/improve the prototype by the comments of the experts.
SOURCE CODE	• Source code, install instructions and documentation: https://koodivaramu.eesti.ee/majandus-ja-kommunikatsiooniministeerium/ecmr-prototype-testing	• Source code, install instructions and documentation: https://koodivaramu.eesti.ee/majandus-ja-kommunikatsiooniministeerium/ecmr-index-registry-prototype-2.0

4. SCOPE AND AIMS OF THE TESTING of the PROTOTYPE version 2 in 2021

4.1. Testing aims

The aims of the 2021 prototype testing were:
- engage business partners to make their eCMR information available for indexing,
- to support eCMR service providers in making necessary files available in XML format,
- upgrade and maintain a dedicated XML standard master file for testing exchange purposes,
- to moderate and support the index queries by competent authorities,
- to validate both the technical and functional architecture and processes for business partners as well as government authorities to make eCMRs available for queries,
- test and validate, suggest and coordinate improvements to the prototype's technical and functional elements by the developers necessary for the testing purposes,
- validate the concept of eCMR indexing as well as show the concept of XML file distribution live as a functional on-screen feature in the future context of digitalisation of transport information flows, within the eFTI Regulation implementation and beyond,
- prove and evolve the concept and architecture of making CMR and eCMR data of active freight transport rides available for competent authority queries without needing to stop the truck in operations,
- map the regional business and public sector readiness, trust level and technical capacities towards an uptake of regional or international cross-border eCMR and eFTI dataset query network principle.

4.2. Detailed testing activities

Actions around testing provided by the testing team of version 2 in 2021 were:
- work and analysis on **information architecture, business processes** of eCMR creation and indexing in general between businesses, eCMR service providers and index as well as business processes of competent authority queries;
- **interaction design and functional architecture** of the upload process as well as query mechanisms in technical terms (access,permission, GUI, buttons, visuals)
- **stakeholder readiness, necessary innovation** to engage partners and provide an insight to conceptual idea of access points beyond the technical tool available
- **technical prototype development tests,** evolution and feedback to validate or out-rule some pre-selected options, map and practice alternatives and evolve functionalities to better fit customer needs as well as the needed architecture principles of both technical and functional nature, fine-tune the prototype functionalities.
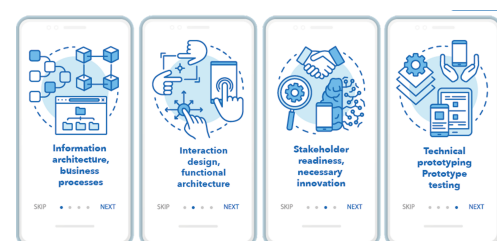

Figure 7. Illustration scheme of Prototype testing 2021 goals structure.

Source: ProtoTesting 2021, author's illustration

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[18] Estonian National Code Repository, Koodivaramu, LINK

Actual testing with rides comprised of the following testing activity:

- the business operators' information and upload of information, including the coordination and technical administration of uploading of CMR and eCMRs from business operators and eCMR service providers both directly to the environment and using API, support on creating validation-proof eCMR XML file types and access permissions, permission adding to documents/index queries, URL creation for data referencing and metadata extraction,
- coordination and technical support to competent authorities in making queries over the user interface (query environment) or possibly, for authorities, in later stages making a query via their own working environments, preparing and disseminating usernames;
- the competent authorities' information and query support in live testing
- administrative matters on coordination of active ride dates as well as registration of the ride information and sharing of the information to partners
- information channel preparation and maintenance, including an entry site preparation.

The main output of the eCMR prototype during the testing phase was the enabling controlling institutions to check the availability of CMR transport documents of the foreign carriers driving through their territory in a secure and trustable way. For that, exchange of information and data between the public and private sectors during testing and the arrangement of information upload and coordinated test days was undertaken. For preparing the testing, series of suggestions for immediate improvement of the prototype for testing both with business partners' upload of data were made and upgrades done (i.e. the user interface adjustments for functional upload, unique ID creation, structure and adding of permissions).

For business partners data upload, a series of negotiations took place, user names were created and disseminated. For public authorities and businesses alike, usernames and access rights were prepared. For giving access to information, an intra-system tool was evolved and adjusted to support the functionality of adding permissions to view the documents.

Testing was delayed due to the delay of functional solution to add permissions to documents, but was performed successfully within the project timeframe.

This year, the structure of testing was different national coordinators officially assigned to collect and coordinate the setup of rides and provide national support to users. Under the time pressure that proved to be a bottleneck to wider partner engagement. To overcome the administrative gap, series of direct meetings were arranged in addition to cross-partner kick-off meetings on 3rd of November and demo day on 25th of November, presentations and advisories during WP3 meetings as well as direct attendance on national partner meetings.

4.3. Testing Partner countries

Available parties in testing of 2020 testing were:
- Estonia
- Latvia
- Lithuania
- Poland

Available and included in 2021 testing were:
- Estonia
- Latvia
- Lithuania
- Poland
- Russia (Kaliningrad region)
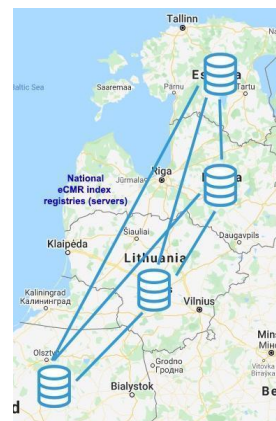- Denmark (observer)
- Sweden (observer)

Whilst Denmark remained passive observers. Additionally, Finland, European Commission partners were invited to become observers.

Figure 5. DINNOCAP project key index nodes and participating as well as observer countries[19]
Source: DINNOCAP project documentation

4.4. Testing Timeline

MONTH	ACTIVITIES
AUGUST 2021	• contracting, • observations of prototype procurement
SEPTEMBER 2021	• preparations with partners, project team
OCTOBER 2021	• preparations with partners, testing partners • prototype development observations and review of the developments
NOVEMBER 2021	• kick-off events for public sector and business sector partners on 3rd of November 2021 • prototype development follow-up

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[19] Ukraine is the system user beyond the DINNOCAP project

	● bug and discrepancy detection, adjustment arrangements for testing purposes ● kick-off meetings for public sector and private sector (3rd of November) ● data uploads by business participants ● issuing of user names and access rights to public sector participants ● preparation of video and shooting of clips, interviews ● coordination of explanatory animated clip
	● prototype demo day (25th of November)
DECEMBER 2021	● arrangement of last updates to the prototype to even better manage business partner data upload, launch of data upload by business partners in scale, ● company CMR documents upload, single queries by single authorities by informing them on single rides and giving them one-on-one single access (Latvia, Poland, EU)
	● Live testing with customs check on active ride via road camera and distance check, ● Estonian customs road check (border check with camera), Latvian revenue service check with coordinated live ride, Lithuanian revenue service check with live ride, Polish customs check, ● live ride showcase for representatives of project partner, observer countries and
	● information dissemination about the project, session held on testing results on RTE conference and in dedicated partner and DINNOCAP project events, news, ● preparation of the final report and its procedural and technical annexes (annexes have been preparing for the whole project time).

4.5. User Groups and Accounts, Testing Environment

The system has three roles:
- Administrator (person, belonging to an organisation)
- eCMR/EDI service provider (organisation, represented by persons)
- Competent authority (organisation, represented by persons)

Competent authorities user groups were divided to following sub-groups:
- Customs/Revenue
- Police
- Road Authority
- Rescue Board

Testing was made available via machine-to-machine option or via user interface (GUI). The same site remained open and available for both business and government queries.
For users, also alternative gateway sites remained open:
- https://www.logixdigi.eu/proto
- https://www.prototesting.eu

Figure 6. Access Page for the prototype
Source: DINNOCAP project documentation

Use over API and on GUI for selected country 'eCMR index registry' in roles were provided.

4.5. Use cases

There were in total 36 rides with 52 CMRs in the active testing pool during November and December.
Highlighted use cases:
Use case 1: From Tallinn (EE) to Riga (LV).
Use case 2. From Bialystok (PL) to Riga (LV).
Use case 3. From Kaliningrad (RU) to Kaunas (LT).
Use case 4. Poland (PL) to Riga (LV)
Use case 5. From Helsinki (FI) to Vilnius (LT).
Use case 6. From Vilnius (LT) to Warsaw (PL)
Use case 7. From Tallinn (EE) to Grossbeeren (DE)

Two of the rides also included dangerous goods.

Figure 8. Screenshot of Access Page for the prototype
Source: DINNOCAP project documentation

4.6. Review of testing per testing country

ESTONIA. From businesses, carriers and cargo owners were engaged to testing. One of partners was the DIgital Logistics Centre (http://www.dlk.ee) which serves as both data merger/gateway as well as Estonian hub for the index. The exchange of information and data between the public and private sectors during testing and the arrangement of roadside test days in Estonia were coordinated with Tax and Customs Board (Https://www.emta.ee) alongside Estonian Police and Border Guard Board, Estonian Road Administration and as a new partner, the Rescue Board 112 service.
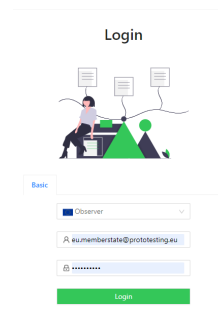
LATVIA. The key partners in we're LIKTA (www.likta.lv) and Latvia State Radio and Television Centre (https://www.lvrtc.lv/). Business partners provided CMR documents and supported the testing course. Key testing authority was the State Revenue Service (https://www.vid.gov.lv/en). With Latvian partners, two separate sessions dedicated on eCMR and testing took place during events (webinars).

LITHUANIA. The key partners in Lithuania were Infobalt (www.infobalt.lt), Tiasoc and SIS. Business partners provided CMR documents and supported the testing course. Key partner public authority was State Tax Inspectorate under the Ministry of Finance of the Republic of Lithuania (https://www.vmi.lt/).

POLAND. The partner in Poland was KIGEIT (https://kigeit.org.pl/). Business partners, including CMR service providers provided CMR documents and supported the testing course. Key testing Partners from public authorities were ITD Road Transport Directorate and National Revenue Administration.

KALININGRAD, RUSSIA. The partner in testing was the Association of SME Support Centres in Kaliningrad Region. Rides originating from Kaliningrad were presented for testing.

SWEDEN, DENMARK, NORWAY. Observers in testing as DINNOCAP project partners. Opportunity provided to check the selected ride documents remotely, testing performed with representatives of stakeholders.

FINLAND. Observers informed on the prototype, interest grown.

GERMANY. Observers informed on the prototype.

EUROPEAN COMMISSION OBSERVERS. Opportunity provided to check the selected ride documents remotely, testing performed with representatives of stakeholders.

UKRAINE. Highly interested in participating in index registry prototyping in future stages. Has been participating in 2020, not 2021 on their own capacity and as a node within other projects besides DINNOCAP..

5. TAKEAWAYS FROM TESTING AND SUGGESTIONS FOR FURTHER TESTS

The summarised feedback, takeaways from testing and suggestions based on 2021 testing for further evolution of the prototype.

	SUGGESTIONS BASED ON TESTING 2021 for version 3
DATA EXCHANGE MODEL	• Architecture of nodes to be kept and new nodes established based on new participating countries/regions. • Data exchange model should be kept as such, • Improvement of URL/URI use in Storage section, • Machine-to-machine upload mechanism and API to be further evolved, • XML validation scheme to be further evolved for the file type version(s).
AUTHENTIC-CATION MODEL	• Creation of user names, accounts and setting their identifiers logic to be upgraded, • User groups to be upgraded and more categories to be added, • eIDAS, EBSI or other user authentication/identification tools to be integrated to the model, • OAuth to be improved, used over API for delegations.
DATA STANDARD	• MMT subset eCMR versions to be continued to be used, • Other files aside MMT XML to be continuously accepted, to better engage new participants,
METADATA AND UNIQUE ID	• Unique ID standard agreement and evolution for the community, • EDI provider instructions on possible ID creation to be established,, • GUI and API to support new unique ID creation, validation and query for consecutive uploads,
PERMISSIONS	• add function codes and adjust rules for adding selected user groups (both in GUI and for API) • upload and adding permissions at once and to several documents at a time in GUI.,
USER INTERFACE (UI)	• GUI to be further evolved based on observations and feedback from the users, • business user upgrade for revisiting the search towards uploaded documents, truck numbers,

	• creating a history (closed rides) view, • allow same trucks and transports to be visible for both closed and open view for testing reasons, • report downloading options, • differentiation of government view history, • keep and evolve summary section of how many documents per ride • mobile view of the testing user interface incomplete
PROTOTYPE DEPLOYMENT	• deployment to be planned in a higher number of countries.
PROTOTYPE TESTING	• support provided by the developer to the testing team to be continued as in 2021, • support IT structure to be kept for testing reasons as in 2021.

6. SUGGESTIONS FOR FURTHER WORKS ON POLICY AND COOPERATION

The eCMR index registry prototype has high relevance to the mapping of options for the eFTI architecture as well as the analysis of possible creation of access points or network of access points. In other words, the evolution and the testing of the prototype has set out steps to test the possible architecture of access points (either national or common access points or other interoperability measures serving the same aim).

The prototype also provides support and validation of eCMR MMT schema application and possible eFTI dataset exchange, grow the understanding and empower the discussions on standards, data models and interoperability as well as metadata use and access point/access node integration to eFTI architecture.

For the successful eCMR solution launch in the real environment, it is recommended to map the opportunities of deeper regional and European cooperation, both in terms of interoperability of existing prototypes and solutions as well as discussions upon the possible integration of multiple future regional live solutions.

The suggestions of further work for the region in relation to eCMR index registry or eFTI data exchange:
- Apply further funding and cooperation activities to the coordination of cooperation for cross-border eCMR and eFTI dataset exchange with an access-point like approach, tested via indexing prototype,
- Extend eCMR initiative and prototype testing to:
  - other BSR countries;
  - Nordics/Scandinavia in bigger scale
  - EU neighbourhood countries (e.g. Belarus, Ukraine)
  - eCMR countries beyond EU membership
- Possibly scale up current eCMR index registry to be compliant with EBSI infrastructure

Beyond the Nordic-Baltic-Poland region:
- Cooperation and integration of already merged or locally developing regional solutions by evolving the interoperability and integration between them, not necessarily overriding regional or project solutions.
- Scaling up eCMR testing with another on-going eCMR, CEF and eFTI-related projects and initiatives:
  - EU level via DTLF;
  - the Benelux eCMR project;
  - FEDeRATED and FENIX projects,

Beyond prototype development and testing:
- Align the outcomes of the prototype testing with existing initiatives and legal frameworks:
  - eFTI Regulation
  - UNECE eCMR application guidelines
  - Digital Transport and Logistics Forum discussions
- Evolve and develop harmonised approach to trust services, technological solutions and API integrations based on already existent cooperation use cases of other domains.
- Scaling up of eFTI datasets
  - to include eCMR as one of the eFTI subsets
  - to better map the needs of metadata consolidation to eCMR dataset and eFTI dataset
- Scale up UNECE MMT and GS1 standards to include unique identification number to the code, alignment and integration of the various standards,

In policy domain:
- Highlight the importance of eCMR for business processes for public authorities and institutions

- Possibly sign a memorandum on the integration of eCMR rules and access points as well as eFTI developments and eFTI platforms taking into account the role of CMR and eCMR in freight transport..

As the testing validated the importance of interbounding topics, the following discussions should remain a part of the further work on eCMR and the validation of the eCMR index registry concept and architecture: security and trust, economic arguments, technological arguments, legal arguments, data models and semantics, interoperability, organisational arguments.

7. VISIBILITY AND COMMUNICATION

DEDICATED INFORMATION SESSIONS FOR PARTNERS
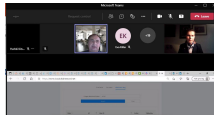
3rd of November, Kick-off session for government partners and for business partners
25th of November, DEMO DAY for public authorities

PUBLIC EVENTS/CONFERENCES WEBINARS
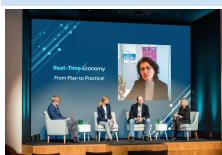
8th of December 2021, DINNOCAP final conference - RealTime Economy "From Plan to Practice", EVENT Programme
Presentation on index summary by Egidijus Skrodenis (Infobalt), LINK
Presentation by Lia Potec (European Commission), LINK
In the panel: Lia Potec, Heiti Mering, Eva Killar, Ulrika Hurt , moderated by Johannes Tralla, LINK

15th of December 2021
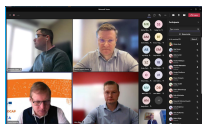Single WIndow Conference, Single Window and Digitalisation, LINK

PARTNER REVIEWS AND DINNOCAP PROJECT REVIEWS
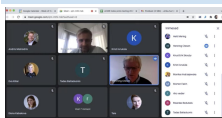
DINNOCAP WP3 meeting in October and December 2021,
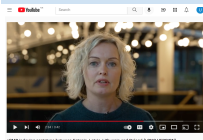DINNOCAP Design Sprint meeting testing review, December 2021

KIGEIT conference
5 Decemeber 2021
Elektroniczny dokument w transporcie międzynarodowym – czy jesteśmy gotowi? - YouTube

LIKTA
Prototype testing summary event on 28th of December 2021

INTRODUCTORY VIDEO (SHORT AND LONG), ANIMATION

Introductory video of the eCMR indexing prototype version 2 of year 2021 long version and short version
LINK: eCMR indexing prototype between Estonia, Latvia, Lithuania and Poland (LONG VERSION) - YouTube
LINK: eCMR indexing prototype between Estonia, Latvia, Lithuania and Poland (SHORT VERSION) - YouTube

SUMMARY ARTICLE

Dinnocap news of the testing completion as of 29th of December 2021:
https://www.dinnocapbsr.eu/post/ecmr-indexing-prototype-testing-2021-now-completed