



Nordic Council
of Ministers

Handbook of cross-border data exchange

within the Nordic and Baltic countries



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<https://pub.norden.org/temanord2023-542>

Preface by the Finnish HNG-Digital member Jarkko Levasma

The Nordic Council of Ministers has a vision that the Nordic countries will be the world's most sustainable and integrated region by 2030. For this ambitious vision, the Nordic Council of Ministers has launched joint projects and initiated cooperation to support the selected strategic priorities: mobility, green approaches, and social sustainability.

During the Finnish Presidency in 2021, a three-year project, Achieving the World's Smoothest Cross-Border Mobility and Daily Life through Digitalisation was launched to provide a step in the right direction on the path towards these goals. Focusing on data exchange across borders, cooperation in different sectors and between different authority organisations was built in the project structure. The project promotes the mobility of data by putting the needs of people's everyday lives at the centre.

The goal of digitisation has long been to improve public administration services and the customer experience. This is also taken into account in local government programmes, highlighting ways to improve the quality, efficiency and availability of public services.

On cross-border and national data exchange, one of the most visible areas of future development is the EU's common digital wallet. It enables ease and speed of business processes. The digital wallet concept also offers the possibility to combine different services in one place, which reduces unnecessary paperwork and saves time.

In their new development work, the authority organisations in the Nordic and Baltic countries retain their focus on development of digital security. The public administrations share a firm commitment to information security so that citizens' personal information and privacy are protected.

All these goals offer citizens even better services and reduce the administrative burden. In the midst of all this, however, we must not forget the already existing digital solutions that make our lives easier. Commitment to shared standards, exchanging experiences, and further developing already existing solutions have built a strong foundation for Nordic and Baltic cooperation.

This Handbook aims to strengthen the flow of data, share good practices, and support creating operating models for cross-border data exchange. To become the world's most sustainable and integrated region by 2030, we must work together and support the formation of the Nordic-Baltic voice.



Jarkko Levasma

Finnish HNG-Digital member

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1. Introduction

The Nordic Council of Ministers has a vision of **the Nordic region being the most sustainable and integrated region in the world by 2030.**^[1] The vision contains three strategic priorities for action to achieve this objective: mobility, green approaches, and social sustainability.

Already today, people frequently move and travel from one Nordic or Baltic country to another for reasons related to work, studies, and family. Together the Nordic and Baltic countries form an active region, even by global standards, where it is important to ensure that not only people and businesses but also data moves in an agile manner across borders. Hence the goal of regional integration is mutual for the Nordic and Baltic countries.

Certain border regions in the Nordic and Baltic countries already witness especially close and active cross-border cooperation, where everyday life revolves around working, living and consuming services on both sides of the border. In this handbook they are called “hot spot” areas. While the degree of integration varies depending on the region, the regions are tied together economically, culturally, and linguistically, and are often formed by a long, mutual history.

The cross-border mobility of people sets new demands on digitalisation. As a person moves from one country to another, whether for a longer or a shorter period, there is **an increasing need for information** on the social system, healthcare services, taxation, and various public services in the country of destination, as well as the **use of a person’s healthcare information and educational credentials**, for example. In the modern digital world, all the relevant information should be made more easily, more comprehensively, and more accurately available for citizens, companies, and public administrations.

The Nordic and Baltic countries aim to be the first region in the world to **follow the ‘cross-border by default’ principle in all development of digital services.** During the Finnish Presidency in 2021, the Nordic Council of Ministers launched a three-year project, *Achieving the World’s Smoothest Cross-Border Mobility and Daily Life through Digitalisation*,^[2] with the goal to study and promote experiences and best practices to improve and increase the strength and effectiveness of cross-border data exchange especially within the Nordic and Baltic countries.

1. <https://www.norden.org/en/our-vision-2030>

2. <https://vm.fi/en/world-s-smoothest-cross-border-mobility-and-daily-life-through-digitalisation>

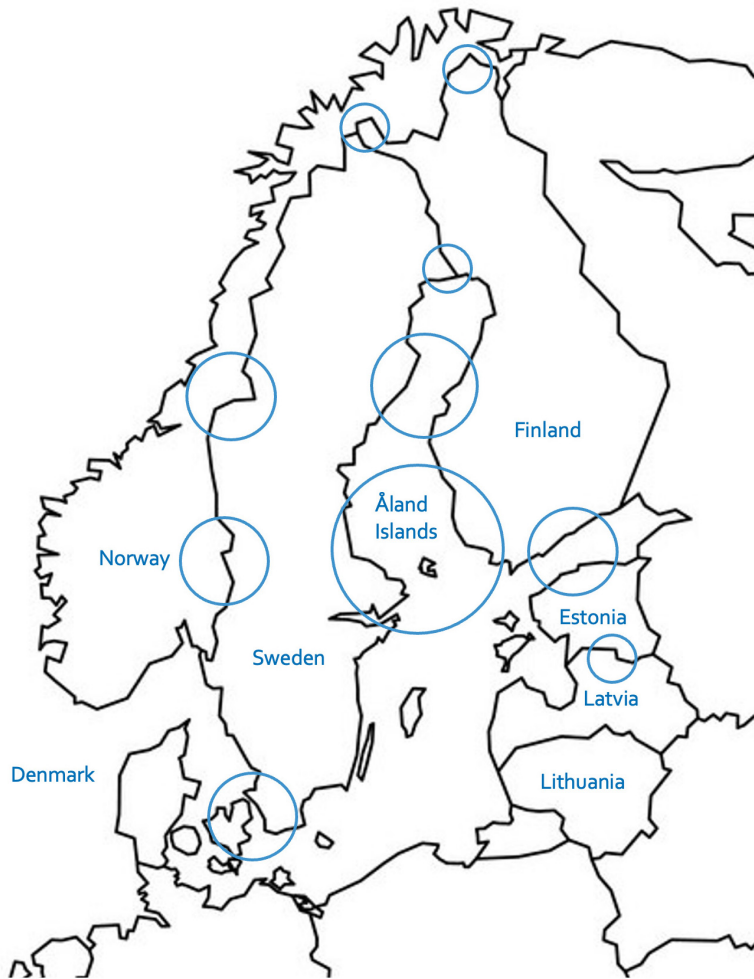


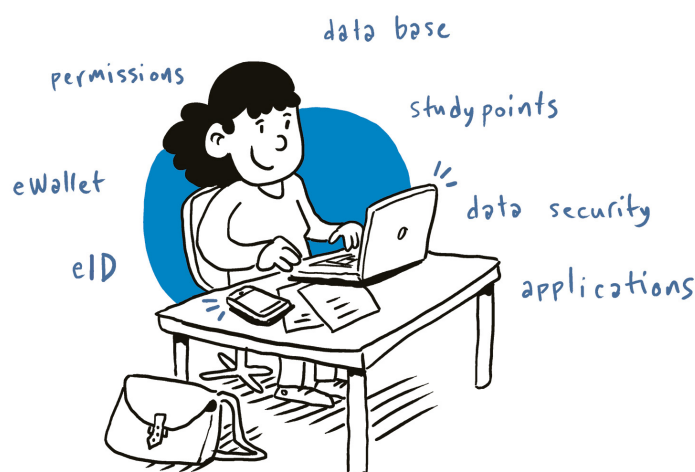
Figure 1. "Hot spot" areas in the Nordic and Baltic countries.

To gather a general understanding of the current situation of cross-border data exchange in the Nordic and Baltic countries and their shared everyday life, the project started by conducting a baseline study in 2021 focusing on three selected life events. The life events were further studied during the project as project work packages.

The selected life events were:

1. **Studying** in another Nordic or Baltic country
2. **The use of health services** in another Nordic or Baltic country
3. The versatile use of Nordic and Baltic **legal databases**

The baseline study investigated the key parties, data exchange needs and requirements, current services and data repositories, and bottlenecks for data exchange from the perspective of cross-border everyday lives of people and businesses. In the baseline study the data interoperability was assessed through European Interoperability Framework (EIF)'s layers: legal, organisational, semantic, and technical interoperability.



1.1 Why this handbook

This handbook aims to **summarise the findings** of the three-year project into a compact and coherent form, utilising the project deliverables, events and working groups as well as interviews conducted in relation to this project. The aim is to **provide the reader with insights and ideas** for future development by pinpointing identified networks, interesting initiatives, and potential funding mechanisms, as well as highlighting case examples that could be utilised in the development of cross-border collaboration in different fields and on different levels.

This handbook is *not* the final report of the project. The handbook does not report the project timeline, workshop participants, nor the fruitful discussions or even the inspiring interviews. The actual project deliverables are described in detail in separate reports that can be found through the project website^[3]:

3. <https://wiki.dvv.fi/pages/viewpage.action?pageId=117377490>

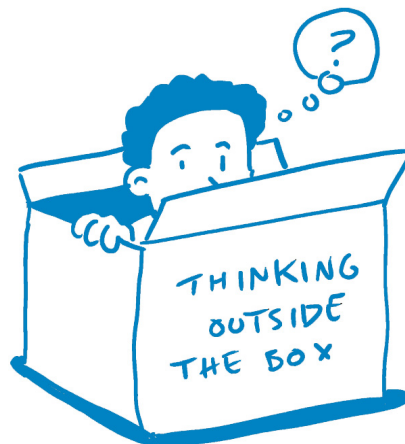
- **Baseline study** of cross-border data exchange^[4]
- Overview of **potential funding**
- Overview of **machine translation services**
- **Cost-benefit analysis** of improved cross-border **digital services for studying abroad**
- **Cost-benefit analysis** of cross-border **healthcare data exchange**
- **Legislative data proof-of-concept**
- **FI-Platform—Interoperability training material, describing technical interoperability**
- **Review of data exchange concerning population data registration**
- **Workshop documentation**

The overall goal of this handbook is to draw a **big picture on cross-border data exchange**. The handbook is about **highlighting the interesting initiatives and pinpointing existing standards and networks** to help organisations and professionals more easily take **cross-border aspects into consideration** when developing either processes, responsibilities, or IT systems.

The handbook also wants to **encourage Nordic-Baltic officials** in all fields **to actively participate in European development activities** on multiple levels. That is the way the Nordic-Baltic voice will get best heard in policymaking on both national and international levels.

This handbook especially aims to support all Nordic-Baltic officials who

1. **are developing processes or information systems** within their own organisations, or between organisations within one or many countries, or
2. **are promoting digitalisation on the national or international level** (policymaking).



4. <https://www.norden.org/en/publication/baseline-study-cross-border-data-exchange-nordic-and-baltic-countries>

1.2 The structure of this handbook

This handbook is a collection of some of the most interesting themes, topics, and case examples from the Nordic-Baltic countries concerning cross-border data exchange. The handbook is not a full manual on data exchange but rather aims at guiding the reader towards interesting sources, materials, and networks. The pinpointed website links will become obsolete at some point, but the names of the standards, networks, and initiatives will hopefully guide the reader forward even after a while. With that said, the handbook aims to **encourage readers to be curious and active and to participate in collaboration** on different levels, both nationally and internationally!

The reader of this handbook can choose the most suitable way of using the handbook: the structure is designed so it can be read as one book, or the reader can pick headlines that are of interest at a specific point in time.

Here are short descriptions of the chapters of this handbook:

Chapter 2 The ballpark and the key players describes the framework: what we already know, what the playground is currently like, who the key players are, and with whom the reader might want to continue the game.

Chapter 3 Findings of work package 1: Studying in another Nordic or Baltic country highlights the key findings of the project work package 1, what has been done in the field of supporting student mobility through digitalisation, and where the Nordic-Baltic as well as EU level development seems to be heading.

Chapter 4 Findings of work package 2: Use of health services in another Nordic or Baltic country highlights case examples in the healthcare sector and the future development steps in the implementation of e-prescriptions and cross-border exchange of patient summaries.

Chapter 5 Findings of work package 3: Versatile use of the Nordic and Baltic legal databases suggests that while legal information may not be needed to transfer with people from country to another, machine readable legislative data would help provide Nordic-Baltic as well as EU citizens with real-time info on valid national legislation that could influence anyone working or studying in another country.

The scope of this project was on three pre-selected points-of-view, but the project group hopes this handbook will give food for thought to other sectors as well. The challenges of cross-border data exchange are similar although case examples vary.

References

1. Nordic Council of Ministers. (2021). Our Vision 2030. Available: <https://www.norden.org/en/our-vision-2030>. Cited 7.7.2023.
2. Finnish Ministry of Finance. (2021). World's smoothest cross-border mobility and daily life through digitalization. Available: <https://vm.fi/en/world-s-smoothest-cross-border-mobility-and-daily-life-through-digitalisation>. Cited 7.7.2023.
3. World's Smoothest Cross-Border Mobility and Daily Life Through Digitalisation. (2023). Project website for workshop materials. Available: <https://wiki.dvv.fi/pages/viewpage.action?pagelId=117377490>. Cited 18.7.2023.
4. Nordic Council of Ministers. (2021). Baseline study of cross-border data exchange in the Nordic and Baltic countries. Available: <https://www.norden.org/en/publication/baseline-study-cross-border-data-exchange-nordic-and-baltic-countries>. Cited 7.7.2023.

2. The ballpark and the key players

Today, our society operates heavily on data and information, and the knowledge, operations, and services derived from them. Public organisations have a tremendous amount of data of and related to their citizens. The overall goal of cross-border data exchange within and between the Nordic and Baltic countries is to **ease the everyday lives** of Nordic-Baltic citizens.

Not only are citizens targets of data exchange, but citizens also play a central role in cross-border data exchange by allowing, or denying, their data to be shared to different stakeholders. The MyData principle^[5] empowers individuals as actors in relation to their personal data, its privacy, processing, and sharing. Citizens need to recognise where their personal data is being used and for what purposes.

National authorities provide the actual conditions for data exchange where international cooperation ensures working towards mutual goals with common standards and frameworks. The fourth key players in this context are the professionals of different fields of expertise who need to understand the possibilities and restrictions regarding cross-border data exchange as well as know the standards and systems they can utilise and benefit from in their respective development activities.



Figure 2. Key players in cross-border data exchange

5. <http://urn.fi/URN:ISBN:978-952-243-455-5>

A smooth digital service infrastructure enabling cross-border data exchange in the Nordic-Baltic region supports the shared visions of an open labour market area and the Nordic-Baltic countries being the most integrated region by 2030. The common digital service infrastructure also supports the formation of a **common Nordic voice** in relation to relevant stakeholders, such as the European Union. The cooperation framework supported by initiatives such as the Interoperable Europe Act for public administrations across the EU helps to agree on and build **secure digital solutions for cross-border data exchange**. Within the European, Nordic, and Baltic cooperation networks, the countries share resources and ideas, such as open-source software, guidelines, checklists, frameworks, and IT tools. Utilising existing solutions **reduces administrative burdens**, including legal, organisational, semantic, and technical obstacles. As a result, it will **save time and costs** for companies and citizens, businesses, and for the public sector itself.

To be able to provide seamless public services with cross-border data, **the interoperability of different national solutions** will need to be addressed. Essentially, interoperability is about **achieving common goals together**, despite organisational or geographical distance between actors. Public sector interoperability represents the ability of administrations to cooperate and **make public services function across borders, sectors, and organisational boundaries**. It will save time, costs and efforts when simplifying the interactions with administration by using the data already collected by another administrative body whether in the same or another country. The key to success is the professionals in charge of the development, making sure cross-border collaboration aspects are a default setting in all development decisions.

”

Emphasising personal contacts and soft infrastructure is extremely important in developing the cross-border data exchange.

– Ville Sirviö, CEO of Nordic Institute for Interoperability Solutions



2.1 Standards and frameworks

The European Commission strongly promotes data-driven development, the 'once only' principle, and making Europe fit for the digital age. The Commission aims at strengthening Europe's digital sovereignty and setting standards that have a clear focus on data, technology, and infrastructure. Not only is the EU's digital strategy seen as empowerment for people and businesses, but also helping the EU to achieve its target of a climate-neutral Europe by 2050.

European regulation is implemented nationally. National authorities coordinate the implementation nationally and they involve needed national sectoral agencies into piloting and later implementing the legislation. Recognise the parties involved in your country! Contact persons can in most cases be found from national agencies' webpages.

In this chapter are highlighted some central strategies, regulations, standards, and frameworks which the reader should at least be aware of. On a larger scale this proves the importance of digitalisation and the political will to achieve these goals at the national, Nordic-Baltic, and European level. In addition to these cross-domain frameworks, different domains such as health services, education and judicial have established domain-specific standards and frameworks.

The European Data Strategy^[6] has set a goal of **making the EU a role model for a society empowered by data**. The European Data Strategy focuses on putting people first and defending and promoting European values and rights in the digital world.

The Data Act^[7] supports the European Data Strategy by harnessing the potential of industrial and commercial data, setting up rules regarding the use of data generated especially by Internet of Things (IoT) devices. It also aims to ensure consistency between data access rights. The Data Act clarifies who can create value from data and under which conditions.

The Data Governance Act (DGA)^[8] focuses on public sector data sharing, data availability, and the reuse of data. The act aims to facilitate the reuse of public sector data, ensure trustworthy data sharing within European data spaces, and facilitate data to be used across sectors and borders. The DGA creates processes and structures to facilitate data sharing.

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6. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en
 7. https://ec.europa.eu/commission/presscorner/detail/en/IP_23_3491
 8. <https://digital-strategy.ec.europa.eu/en/policies/data-governance-act>

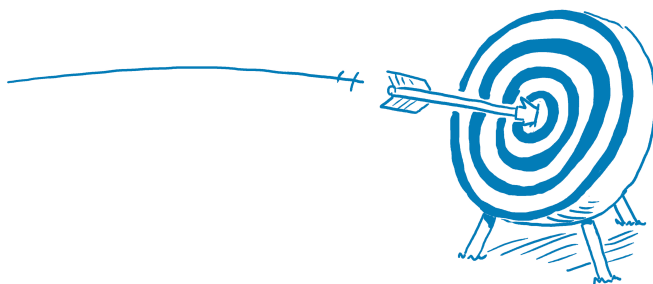
The Digital Services Act (DSA)^[9] provides a common set of rules for providers of digital services. It covers intermediary services, hosting services, and online platforms, for example, online marketplaces, social networks, content-sharing platforms, app stores, and online travel and accommodation platforms and aims at ensuring a safe and accountable online environment.

The Digital Markets Act (DMA)^[10] establishes a set of obligations ensuring fair and open digital markets. The DMA aims at preventing large online platforms from abusing their market power.

For the public sector, the EU additionally provides both regulation and guidance to promote and facilitate cross-border interoperability and data sharing:

The Public Sector Information (PSI) Directive, or Open Data Directive^[11] as it is known nowadays, invites administration to ensure public sector information is allowed to be released in open formats and re-used, when possible. The Directive is based on the general principle that public and publicly funded data should be reusable for commercial and non-commercial purposes. The goal is to ensure fair competition and easy access to public information and to enhance cross-border innovation based on data. The new regulation has been in force since July 2021.

The Interoperable Europe Act^[12], yet at a proposal stage, will establish a governance structure to enable public administrations from all levels and sectors to co-create and coordinate the exchange of information across network and information systems. The Interoperable Europe Act provides elements for the soft infrastructure: software, guidelines, checklists, frameworks, and IT tools such as interoperability platforms, data models and simply, not needing to fill in the same attributes or details on different platforms again and again. The proposal was published in November 2022.

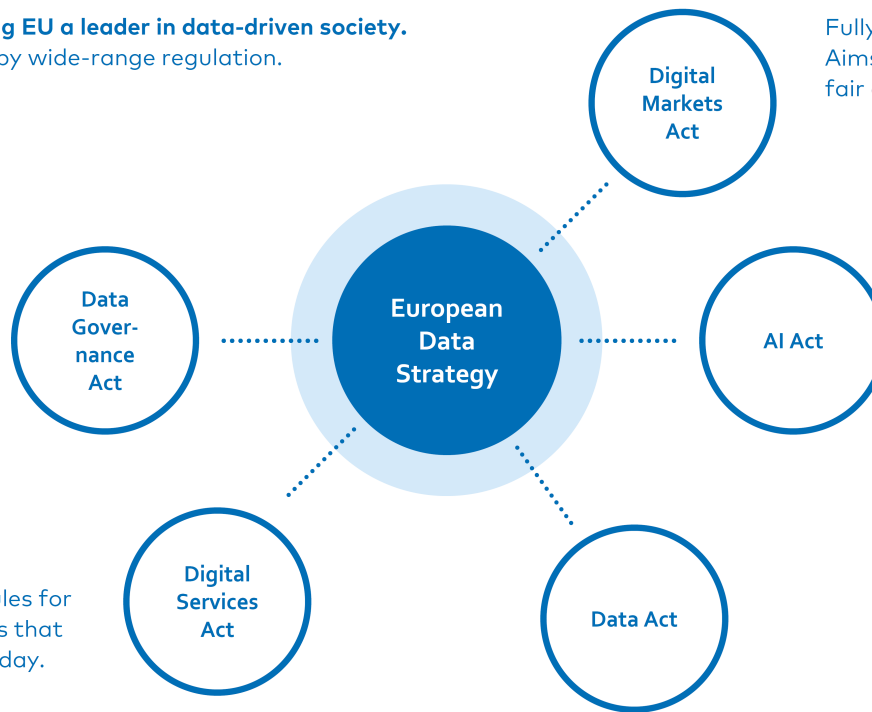


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9. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/digital-services-act-ensuring-safe-and-accountable-online-environment_en
 10. https://digital-markets-act.ec.europa.eu/index_en
 11. <https://eur-lex.europa.eu/EN/legal-content/summary/open-data-and-the-reuse-of-public-sector-information.html>
 12. https://commission.europa.eu/publications/interoperable-europe-act-proposal_en

European Data Strategy aims at making EU a leader in data-driven society.
Strategy implementation is supported by wide-range regulation.

Published in June 2022. Aims to increase the reliability of data intermediaries for data sharing within EU. Binding regulation on all EU member states.

In force since November 2022. Provides set of proportionate rules for safe online intermediary services that millions of Europeans use every day.



Fully applicable in EU since May 2023. Aims at making online market more fair and contestable.

The Artificial Intelligence Act also known as the EU AI Act regulates the use and development of artificial intelligence within the European Union. The Act is not yet finished, the aim is to reach an agreement by the end of 2023. It aims to ensure that AI systems are safe and respect fundamental rights and values within the EU. The Regulation has a risk-based approach, where the obligations for providers and users are subject to the level of risk the use of artificial intelligence bears.

The use of artificial intelligence will be regulated by the Artificial Intelligence Act. Regulation is in formulation process, goal is to reach an agreement by end of 2023.

Proposed in Feb 2022. Aims to make more data available for use, and set up rules on who can use and access certain data. Industrial and commercial view.

Figure 3. European Data Strategy and some key Acts supporting its implementation

Case examples already implementing these above-mentioned regulations include a Finnish interoperability platform^[13] that provides tools for defining interoperable data content, and a Finnish open data repository^[14] that provides a free platform for all Finnish open data.

To facilitate and support cross-border development work, the **European Interoperability Framework (EIF)**^[15] is a commonly agreed approach to the delivery of European public services in an interoperable manner. The EIF lays out the basic conditions for achieving interoperability, thus providing a common core for national interoperability frameworks (NIFs) and domain interoperability frameworks (DIFs). As Member States have different administrative and political systems, compliance with the EIF guarantees that national and domain interoperability is coordinated and developed in a compatible way while also providing flexibility to address specific requirements coming from national or domain-specific requirements.

The European Interoperability Framework (EIF) analyses interoperability in four layers: legal, organisational, semantic, and technical interoperability.

- *Legal interoperability* confronts the different legal frameworks, policies, and strategies that may affect cross-border data exchange and collaboration.
- *Organisational interoperability* tackles the processes, structures, and responsibilities of public organisations that could impact mutually beneficial cross-border collaboration.
- *Semantic interoperability* ensures the format and meaning of exchanged data is preserved throughout the exchange process amongst all parties.
- *Technical interoperability* promotes the sharing and use of common infrastructures, services, and applications to make the digital cross-border data exchange possible.

FINNISH INTEROPERABILITY PLATFORM

The FI-Platform provides tools for defining interoperable data content. The platform consists of the terminologies, code sets and data models needed for data flows and in other areas of information management.

<https://dvv.fi/en/interoperability-platform>

FINNISH OPEN DATA REPOSITORY

gathers all Finnish open data on one free platform. An open license grants permission to use the data freely for any purposes – for administration, businesses, associations, or citizens. All data on opendata.fi portal is also harvested by European Data Portal.

<https://www.opendata.fi/en>

13. <https://dvv.fi/en/interoperability-platform>

14. <https://www.opendata.fi/en>

15. https://ec.europa.eu/isa2/eif_en/

4 LAYERS



Figure 4. The New European Interoperability Framework. Source: https://ec.europa.eu/isa2/eif_en/ Cited: 18.7.2023.

EIF provides 47 recommendations, which are organised around three main pillars:

1. **12 principles** that guide policymakers in what to consider in the pursuit of interoperability
2. **Interoperability layers** which present different aspects of interoperability that should be addressed in the design of European public services
3. A **conceptual model** which aims at designing and delivering integrated public services.

The purpose of the EIF model is to **inspire European public administrations in their efforts to design and deliver seamless European public services** to other public administrations, citizens, and businesses to be *digital-by-default* (i.e., providing services and data preferably via digital channels), *cross-border-by-default* (i.e., accessible for all citizens in the EU) and *open-by-default* (i.e., enabling reuse, participation, and transparency). The Nordic-Baltic goal aims to achieve the exact same direction, with concrete Nordic-Baltic projects, experiments, and actual cross-border digital collaboration cases.

The European Blockchain Services Infrastructure (EBSI)^[16] aims to leverage the benefits of blockchain technology for public good. The goal is to boost cross-border services with the EBSI. The EBSI is operated by the European Commission and the European Blockchain Partnership, and it consists of a peer-to-peer network of interconnected nodes running on a blockchain-based service infrastructure. The EBSI is iterative by design meaning that the focus is on a small number of specific use cases, which are then expanded over time. The EBSI will also be enriched by other use cases. The initial set of EBSI use cases are notarisation, diplomas, a European digital identity, and trusted data sharing. The EBSI will later be extended to private organisations.



Figure 5. What is the EBSI?

Picture credit: <https://ec.europa.eu/digital-building-blocks/wikis/display/EBSI/>

16. <https://ec.europa.eu/digital-building-blocks/wikis/display/EBSI/Home>

The European **Electronic Identification and Trust Services (eIDAS)** Regulation^[17] enables and encourages the use of electronic identification means and trust services within the EU. eIDAS supports Europe's Digital Agenda and stimulates innovation and digital growth in Europe by pushing forward higher levels of information security, interoperability, and transparency.

The EU Cybersecurity Strategy^[18] was published already in 2013 and a new strategy was published in 2020 jointly by the European Commission and the High Representative of the European Union for Foreign Affairs and Security Policy. It aims at building resilience to cyber threats, as well as the operational capacity to prevent, deter and respond to cyber-attacks, and to advance global cyberspace through increased cooperation.

In June 2023, the European Parliament representatives reached a political agreement on the core elements of a new framework for a **European Digital Identity (eID)**^[19]. The revised regulation ensures harmonised European digital identity means based on a European digital identity wallet (EUDI Wallet).

Wallets normally contain a variety of personal data concerning the wallet's owner such as payment cards, identity cards, driving licences and various professional certificates. The EUDI Wallet application will contain the same authenticated personal data and certificates in an electronic form, and European citizens will be able to use the wallet application to access and share the needed data when using different kinds of services around Europe. EU Member states are expected to ensure there is at least one wallet application available to their citizens, but it will not be mandatory for citizens to use it.

During the project, some perspectives, services, and developments regularly came up as the cross-border data exchange and services were discussed. The most frequently arising matter was identity matching and acting on behalf of another person. The need to be able to identify an individual in different systems in different member states would improve the service for the individual, unburden the processes for the administration, and increase the quality of the service processes. In addition, practices involving acting on behalf of another person (e.g. on behalf of your child) vary significantly in member states as the development is planned and executed nationally. Additionally, in the future it will be important to develop interoperability for services and applications where it is possible to act on behalf of another person.

17. <https://digital-strategy.ec.europa.eu/en/policies/eidas-regulation>

18. <https://digital-strategy.ec.europa.eu/en/policies/cybersecurity-strategy>

19. <https://www.consilium.europa.eu/en/press/press-releases/2023/06/29/council-and-parliament-strike-a-deal-on-a-european-digital-identity-eid/>

The Single Digital Gateway (SDG)^[20] is an initiative and regulation aiming to support the need of European citizens and enterprises for greater mobility. The regulation obligates the authorities to provide basic information of each country's services digitally for all European citizens through the **Your Europe** portal^[21]. The goal is to provide one hub where European citizens can easily find all relevant information and digital services concerning any of the EU Member States. The regulation also obligates the authorities to implement the once-only principle concerning information another European authority already holds, thus encouraging authorities yet again to engage in cross-border collaboration and interoperability.

Technical preparations of the **European Digital Identity Wallet (EUDI Wallet)**^[22] include an **eIDAS Expert Group** which is developing the exchange of good practices and initiatives supporting electronic identification and trust services^[23], in addition, the group is developing the EUDI Wallet Toolbox^[24]. Its task is to create a technical architecture and reference framework (ARF) for the Wallet, select a set of standards and technical specifications, and define common guidelines for national wallet development work. Toolbox process results are shared openly in Github.^[25]

The European Commission has also provided funding through different funding elements (*currently the Digital Europe project*)^[26] for the development of standard-based open and reusable digital solutions that enable implementation of the eIDAS. These **Building Blocks**^[27] offer basic capabilities for European projects to facilitate digital cross-border public services. The currently available Building Blocks are: eID, eSignature, eDelivery, eInvoicing, and Once-Only Technical System (OOTS).

eID offers services capable of electronically identifying European users. **eSignature** helps create and verify paperless signatures, where **eInvoicing** helps send and receive invoices with automated processes, in line with EU standards. **eDelivery** provides tools for exchanging electronic data and documents securely.

20. https://single-market-economy.ec.europa.eu/single-market/single-digital-gateway_en

21. https://europa.eu/youreurope/index_en.htm

22. <https://digital-strategy.ec.europa.eu/en/policies/eudi-wallet-implementation>

23. <https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&groupID=3032>

24. <https://digital-strategy.ec.europa.eu/en/policies/eudi-wallet-toolbox>

25. <https://github.com/eu-digital-identity-wallet>

26. See chapter 2.3 *Potential funding mechanisms*

27. <https://ec.europa.eu/digital-building-blocks/wikis/display/DIGITAL/Digital+Homepage>

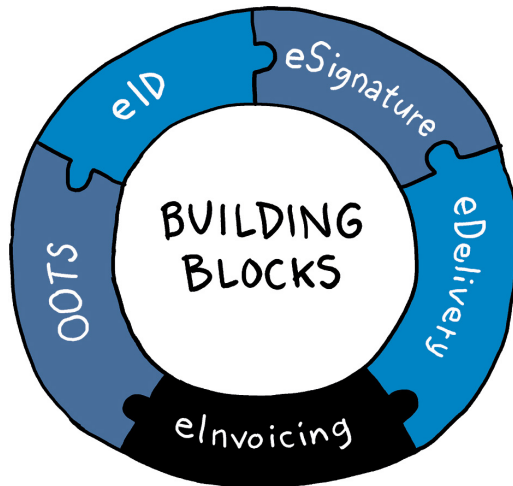


Figure 6. Building Blocks for Digital Europe

The **Once-Only Technical System (OOTS)**^[28] connects EU public authorities for exchanging data and documents. The goal is to minimise the need to provide information to authorities if another authority already holds that information in an electronic format. The aim is to reduce the administrative burden on citizens, businesses, and the administration itself.

The goal of creating a Digital Europe requires a massive amount of collaboration both nationally and on a European level. There are several European working groups, communities, and projects focusing on building an interoperable Europe. For example, the European Commission's **SEMIC Support Centre**^[29] provides pragmatic support, training, and piloting to help build an interoperable Europe.

For example, **DC4EU**^[30] is a Digital Europe funded project supporting the public and private sector in educational and social security domains in deploying cross-European interoperable digital infrastructure services. The Nordic Council of Ministers funded **Nordic-Baltic eID Project (NOBID)**^[31] has inspired a large-scale European pilot for the payment use case in the EU Digital Wallet. One should note that the NOBID consortium funded by the European Commission is distinct from the Nordic-Baltic eID Project. This **NOBID consortium** includes Norway, Denmark, DSGV, Italy, Latvia and Iceland. Its focus is on the cross-border payments use case.^[32]

The possibility to access digital services across borders in the Nordic-Baltic region is one of the main goals of the digitalization cooperation under the **Nordic Council of Ministers**. Cross-border service provisioning is a key enabler for cross-border mobility. The respective authorities responsible for means of electronic identity

28. <https://ec.europa.eu/digital-building-blocks/wikis/display/OOTS/OOTSHUB+Home>

29. <https://joinup.ec.europa.eu/collection/semic-support-centre>

30. <https://www.dc4eu.eu/>

31. <https://www.digdir.no/digdir/nordic-baltic-eid-project-nobid/1342>

32. <https://www.nobidconsortium.com/>

(eID) in the countries in the region, are working to achieve this under the Nordic-Baltic eID Project (NOBID).

A vital step to achieve this smoothly and safely is to identity matching. For service providers in the region to cater to users with a foreign eID from the region, they need to be able to recognize the user. This is especially important if the user has been in the country the service is provided in before and already has a form of identity registered. The duty of the identity matching solution is then to match the identity of the user provided by his or her home eID with the new or existing identity records of the same person in the country the person is seeking a service in.

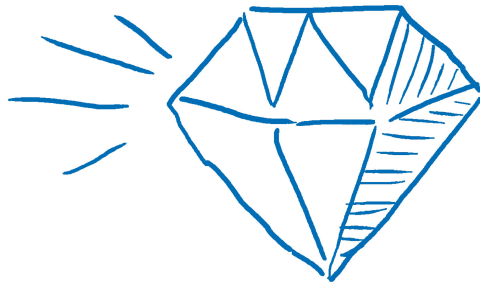
An identity matching solution must be developed nationally in each country but coordinated and synchronized under the Nordic-Baltic cooperation on digitalization. There are many ways an identity matching solution could look, and many parts of the user journey the matching may take place.



OOTS eases citizens' and businesses' cross-border administrative duties. As an example, individuals can make declarations and requests to administrative bodies of receiving state prior to their physical moving to that Member State. The key objective of OOTS is to further mobility within the Union. In this context, scope of SDG regulation will expand, and it will be the central source of information exchange.

– Mervi Kylmänen-Paakki, Senior Specialist,
Finnish Development and Administrative Services Centre

At the time of writing, the NOBID project is working on establishing best practice recommendations for the region and is also working on a roadmap on how identity matching could be achieved throughout the Nordic and Baltic countries. Recently, the Nordic and Baltic ministers responsible for digitalization have adopted a Ministerial Declaration that demonstrates a clear commitment to work towards an identity matching solution for the region.



The Ministerial Declaration provides important political leverage to the work conducted on an expert level. The declaration also stresses some of the key advantages the Nordic and Baltic region has, such as the maturity and similarity of the digital infrastructures, eID means and identity management processes, as well as the high level of trust and willingness among the countries in the region. These elements put the Nordic-Baltic countries in the best position to achieve identity matching across borders.

The CBDS Programme^[33] is a strategic initiative from the Nordic Council of Ministers and it promotes cross-border digital services in the Nordic-Baltic region.

A comprehensive list of digitalisation stakeholders in Europe, i.e. a list of EU Member States' eIDAS implementation responsible organisations, and points of single contact can be found via the eID User Community.^[34]

In addition, in 2017 the Nordic and Baltic countries already formed a ministry level collaboration forum for digitalisation called **MR-DIGITAL**, which has the goal of enhancing overall digitalisation, as well as cross-border collaboration and integration in the Nordic and Baltic countries.^[35]

33. <https://www.digdir.no/internasjonalt-arbeid/cross-border-digital-services-cbds-programme/3058>

34. <https://ec.europa.eu/digital-building-blocks/wikis/display/EIDCOMMUNITY/eIDAS+Points+of+single+contact>

35. <https://www.norden.org/en/information/nordic-baltic-co-operation-digitalisation>

2.2 Potential funding mechanisms

When the need for interoperable services and the relevant parties are recognised, where can one find funding for development activities?

Funding is available through several channels with varying timetables and prerequisites. Information on funding can be found from the funders' work programmes and websites. It is also good to keep an eye on policy papers as they may establish new funding programmes. Additionally, discussions with sectoral experts may reveal new or unharnessed funding possibilities.

Next, some potential funding mechanisms studied during the projects are highlighted.



The European Commission's **Digital Europe Programme**^[36] (2021–2027) is a common European funding mechanism for developing services and standards that are interoperable on a European level. The funding is focused on bringing digital technology to businesses, citizens, and public administrations. It aims to accelerate the digital transformation of public administrations across Europe and help upskill them. It further aims to facilitate interoperability as a core enabler of Europe's digital autonomy and foster the uptake of interoperable cross-border and cross-sector public services in alignment with regulatory requirements.

36. <https://digital-strategy.ec.europa.eu/en/activities/digital-programme>

The DIGITAL Europe programme provides funding in five key areas: supercomputing, artificial intelligence, cybersecurity, advanced digital skills, and ensuring a wide use of digital technologies across the economy and society. The programme has several calls for funding. The calls will be published online, and the application is done through **Commission's Funding & tender opportunities portal**.^[37]

Earlier, the **Connecting Europe Facility programme** (CEF Digital) (2014–2020) supported the adoption and reuse of digital building blocks in public and private projects and services on a continental scale. Now, the CEF Digital 2021–2027 programme aims to support and catalyse investments of common interest in the digital connectivity infrastructure.^[38]

The Nordic Council of Minister's **CBDS Programme** also has an open funding mechanism to support the realisation of cross-border mobility in the Nordic-Baltic region by launching cross-sectoral projects. These projects are formed through specific calls for tenders.^[39]

Other potential funding mechanisms include the **Recovery and Resilience Facility** (2021–2026), **European Regional Development Fund** (2021–2027), **Interreg: Central Baltic Programme** (2021–2027), **Interreg: Baltic Sea Region** (2021–2027), and **Interreg Europe** (2021–2027).

Potential funding can also be found sector-specifically, for example for the **educational sector** there is the **Erasmus+** Key action 2 & 3 (2021–2027) programme, while for the **healthcare sector** potential funding mechanisms include the **Horizon Europe** Pillar 2, Cluster 1 Health (2021–2027) and **EU4Health Programme** (2021–2027), and for **legal interoperability** there are funding programmes such as the **Justice Programme** (2021–2027) and **Internal Security fund ISF** (2021–2027).

37. <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/digital>

38. <https://www.welcomeurope.com/en/programs/connecting-europe-facility/>

39. <https://www.digdir.no/internasjonal-arbeid/cross-border-digital-services-cbds-programme/3058>

Funding programs	Funding type	Eligible organizations	Eligible countries	Own organization funding required
Nordic Council of Ministers: Cross Border Digital Services (CBDS) Programme	Tender	Public authorities	Nordic-Baltic region	No, since it's a tender
Digital Europe Programme, 2021-2027	Grant and tender	All legal entities	EU Member States and third countries associated to the Programme	No (although exceptions because of different funding types)
Connecting Europe Facility (CEF): Digital, 2021-2027	Grant and tender	All legal entities	EU Member States and third countries associated to the Programme	No
Recovery and Resilience Facility (through national programmes), 2021-2026	Depends on the public authority granting the funding as well as individual calls – eligibility criteria vary significantly			
Horizon Europe: Pillar 2, Cluster 1: Health, 2021-2027	Grant	All legal entities	EU Member States and third countries associated to the Programme	No
Erasmus+: Key action 2 & 3, 2021-2027	Grant	"Any public or private body active in the fields of education, training, youth and sport"	EU Member States and third countries associated to the Programme	No
EU4Health Programme, 2021-2027	Grant and tender	All legal entities	EU Member States and third countries associated to the Programme	No
Justice Programme, 2021-2027	Grant	All legal entities	EU Member States (excluding Denmark) and third countries associated to the Programme	No
Internal Security Fund (ISF), 2021-2027	Funds are granted through Member states' own programmes as well as through the European Commission. Thus, eligibility criteria varies.			
European Regional Development Fund, 2021-2027	Grant	"Organizations that can benefit from regional funding include public bodies, some private sector organizations (especially small businesses), universities, associations, NGOs and voluntary organizations."	Funding is applied for locally at a Member state.	No
Interreg: Central Baltic Programme, 2021-2027	Grant	Public sector organizations on local, regional, and national levels.	The participating regions in the Central Baltic Programme 2021-2027 are situated in Estonia, Finland including Åland, Latvia and Sweden.	Yes, 20%
Interreg: Baltic Sea Region, 2021-2027	Grant	"Public and private organizations"	Denmark, Estonia, Finland, Germany (parts of), Latvia, Lithuania, Poland, Sweden, Norway	Yes, 20%
Interreg Europe, 2021-2027	Grant	"Public authorities and organizations relevant for regional development policies"	EU Member States as well as Norway and Switzerland	Yes, 20%

Figure 7. List of potential funders for interoperable digital services development, Lauri Keskinen.

Source: [https://wiki.dvv.fi/pages/viewpage.action?](https://wiki.dvv.fi/pages/viewpage.action?pageId=117377490&preview=/117377490/213629520/Overview%20on%20potential%20funding_CBDS%20Data%20exchange_DVV.pdf)

[pageId=117377490&preview=/117377490/213629520/Overview%20on%20potential%20funding_CBDS%20Data%20exchange_DVV.pdf](https://wiki.dvv.fi/pages/viewpage.action?pageId=117377490&preview=/117377490/213629520/Overview%20on%20potential%20funding_CBDS%20Data%20exchange_DVV.pdf).

2.3 Artificial Intelligence (AI) in public cross-border services

As the use of artificial intelligence (AI) continues to advance and artificial intelligence evolves, this phenomenon will have an effect on the Nordic and Baltic societies. AI is expected to play an increasingly prominent role in the use and provision of services and decision-making, respectively. Currently, AI is not a major theme in cross-border data exchange processes. Nevertheless, it is a topic to follow on a regular basis, as it may prove to become a specific point of interest to authority organisations and civil servants working with cross-border data exchange. The availability of digital public services is expected to develop and become more easily accessible to users across borders. Nevertheless, before AI can be utilised in any cross-border applications, the quality and completeness of the data, as well as its interface and semantics must be well defined. Cross-border data exchange aims to answer the needs of citizens, and to provide services which they require in their daily activities taking place across borders.

The development of AI is expected to have at least some impact on the way services are provided and used. The efficiency and accuracy of AI-driven, automated, or semi-automated decision making is expected to reduce errors and the time of the processes involved. Citizens could benefit from AI-driven services or decisions that are efficient, personalised, and responsive to their needs. Regardless of the processes of the public administration counterpart, the citizen may also choose to utilise an AI-based external service in formulating or generating their requests for services. Automated decisions could scale to handle large volumes of transactions, promoting consistent and equitable outcomes. AI's ability to analyse complex data patterns could help to uncover insights that inform better decisions and policies.

On the other hand, AI systems can inherit biases from the data used in their training, leading to unfair outcomes, thus affecting the citizens' trust and rights. Due to the nature of AI, the complexity of algorithms may also lead to unintended consequences. The lack of transparency in processes utilising AI can erode trust and it may prove difficult to explicitly follow how data belonging to a specific individual is being used within the process.

From the point of view of public administration, artificial intelligence technologies are tools and instruments. Artificial intelligence, or any other technology, does not call into question existing regulations, principles of good governance or civil servant ethics. Regardless of whether the authority organisation uses artificial intelligence or not, the authority is responsible for the systems it uses and their proper utilisation. Official activity must be impartial, objective, and appropriate, whether it is implemented with artificial intelligence or not. Artificial intelligence is not an independent actor comparable to a human, but a complex and learning support technology.

Within the Nordic and Baltic countries, the current national regulations set boundary conditions for the use of algorithms in the production of services and decision-making.^[40]

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3. Findings of work package 1: Studying in another Nordic or Baltic country

Work package 1 (WP1), in the project *Achieving the World's Smoothest Cross-Border Mobility and Daily Life through Digitalisation* funded by the Nordic Council of Ministers, focused on questions of data exchange related to studying in upper secondary level education and higher education in another Nordic or Baltic country.

3.1 Supporting student mobility and digital services for studying abroad

The European Commission and the European data strategy^[41] (see data strategy on page 11 for more information) aim at making the EU a leader in the data-driven world. The goal is to allow data to freely flow between member states for the benefit of business, research, public administration, and citizens. For citizens, studying abroad is a significant area where the need for smooth cross-border digital solutions is obvious.

In the Nordic-Baltic countries the mobility of students is good but the data concerning these mobilities still moves from one country to another partly manually and requires someone to document the required information again in another IT system. **Most digital services are still planned and implemented today within one country**, and cross-border digital services are an exception, although it could potentially have a significant role in improving work efficiency, productivity, and even sensibility in the public sector. Trusted cross-border digital services could significantly reduce the administrative burden of both students and educational institutions.

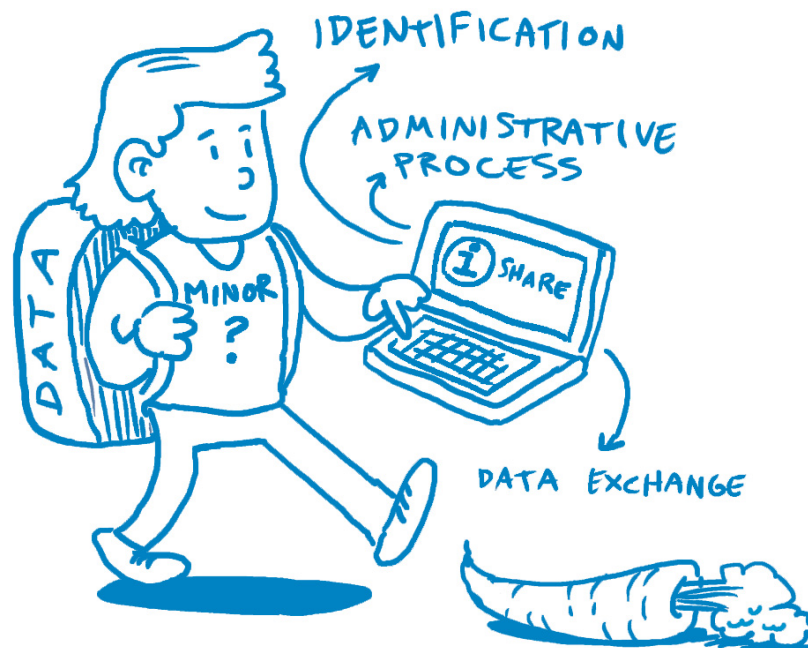
As digitalisation advances everywhere, it is also the **expectation of the citizens that digital services are available**, and that they would significantly simplify the old analogical processes. Citizens interested in studying abroad in neighbouring countries or in another EU Member State expect **smooth and flexible digital services** before, during, and after their studies (period abroad). It is also good to recognise, that increased student mobility also lowers the threshold later of

41. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy_en

working in another country, which potentially increases the mobility of labour as well.

The need for cross-border digital services has been recognised on a European level and there are several ongoing projects to support student mobility and the digital services for citizens studying abroad. EMREX, European Digital Credentials, Single Digital Gateway (SDG) and its Once Only Technical System (OOTS) European Digital Identity Wallet (EUDIW) and one of its large-scale pilots Digital Credentials for Europe (DC4EU) (see more on pages 14, 15 and 16), and Erasmus Without Paper are examples of international actions that have been or will be implemented to develop digital services supporting student mobility. We will discuss these shortly in this chapter.

The range of benefits from improved interoperability and public sector cooperation is extensive: there is an obvious **reduction in cost, time, energy, and unnecessary administrative burden for citizens, businesses, and the public sector itself.**



3.2 European standards and frameworks of educational data

The creation of interoperable European, or even Nordic-Baltic digital services requires common standards, frameworks, and regulations. While one standard would always be the best option, different standards can coexist^[42].

The level of digital maturity varies between countries, and interoperable solutions are presently deficient. Currently, possibly the most substantial challenge is accepting the incompleteness as part of any interoperable digital services development project. European Commission is seriously working on regulation and standards in several fields, and funding for development projects building common building blocks and other reusable materials, products, and services can be obtained from several sources (see chapter 2.1 Standards and frameworks).^[43] But with that said, the field is still not stable, also leaving the door open for participating in setting up the foundations

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We believe we have reason to state that while one standard would always be the best option different standards can coexist. There is always different scope for the different initiatives going on, and with that also at least partly different needs for data formats.

– Fridell et al. 2022. Interoperability of educational data demands standards

42. https://www.eunis.org/download/2022/EUNIS_2022_paper_13.pdf

43. See handbook Chapter 2.3 *Potential funders*

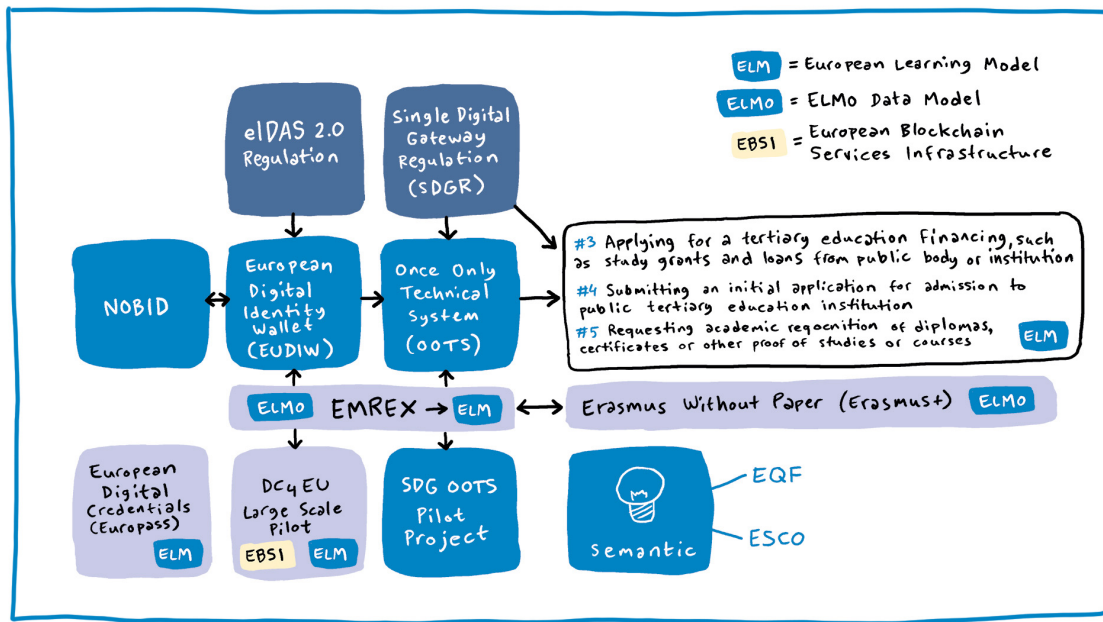


Figure 8. Connections between standards, data models, and current pilot projects in the context of cross-border data exchange of educational data (conception by Work package 1: Studying in another Nordic or Baltic country)

The European Learning Model (ELM)^[44] aims to establish a single semantic vocabulary for learning in Europe. It is part of the Europass Digital Credentials Infrastructure (EDCI) and the Qualifications Dataset Register (QDR)^[45]. The ELM consists of four levels: the European Information Model, European Learning Model, Application Profiles, and Extensions. By unifying technical vocabularies, it allows seamless cross-border data interchange.

The latest version ELM v3, launched in 2023, is targeted for all education and employment stakeholders in Europe. The ELM data model is built on open standards, the W3C Verifiable Credentials Data Model, and aligned with other models, including being fully compatible with ELMO and the EBSI Diploma Use Case. It is also linked to existing frameworks and classifications, for example EQF and ESCO.

44. <https://europa.eu/europass/en/news/upcoming-launch-european-learning-model-v3>

45. QDR: <https://github.com/european-commission-empl/European-Learning-Model>

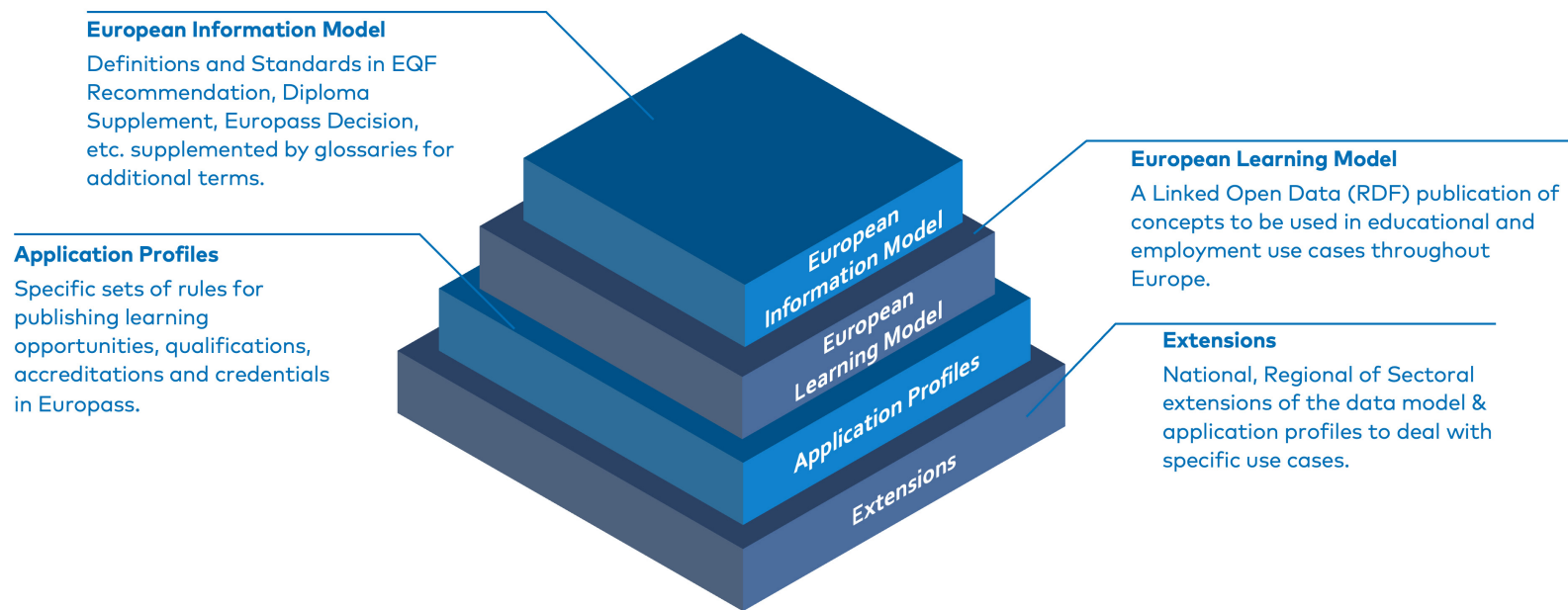


Figure 9. Four levels of ELM.

Picture adapted from <https://europa.eu/europass/en/news/upcoming-launch-european-learning-model-v3>. Cited 26.7.2023.

ELMO XML is a data format for the exchange of mainly educational credential information. It is based on the *CEN standard EN 15981–2011 EuroLMAI*. EuroLMAI is a data model describing assessments, primarily diplomas, diploma supplements, and transcripts of records for higher education. Elmo XML is an open-source data format, and the latest official version is available at EMREX GitHub repository.^[46]

EMREX^[47] is a technical solution for securely transferring verified educational credentials electronically between students, educational institutions, admission offices, and businesses (e.g., future employers). The development of EMREX started in 2015 as a cross-European policy experiment, funded by the European Commission through the Erasmus+ programme. In 2018, the former project participants together with new parties formed the EMREX User Group to maintain, develop, and support the EMREX solution. Information exchange through EMREX is based on the Elmo XML format.

The initial goal of EMREX was to make student mobility processes easier. The student was placed in the driver's seat of their own digitised educational credentials, allowing the student to decide which information to share digitally with whom. This MyData principle has given also new possibilities to utilise EMREX. For example, Norwegian employers use EMREX to receive applicants' educational credentials into their recruitment systems. In Finland, EMREX has been used as an educational credential transmitting tool between education providers within Finland.^[48] By enhancing the availability of data and increasing business opportunities for various actors across Europe, EMREX supports the European data strategy and economy.



All development that will be done has to concentrate on systems and standards. They must be clear, set on common standards, and further interoperability. Constant introduction of new instruments might be less beneficial than developing interoperability of existing systems.

– Guido Bacharach, EMREX Germany

46. <https://github.com/emrex-eu/elmo-schemas>

47. <https://emrex.eu/>

48. See chapter 3.4 *Experiences from real-life environments*

The Erasmus Without Paper (EWP)^[49] initiative focuses on enhancing the management of student exchanges by providing higher education institutions with a digital and secure, GDPR-compliant infrastructure for administrative workflows. The EWP also contains a registry^[50] which is an automated discovery service of APIs related to Higher Education in Europe. The EWP infrastructure utilises the ELMO XML data standard, and education institutes can connect to the EWP through an API interface.

Both EMREX and EWP are platforms for the electronic exchange of data for higher education institutions. Both may be used to transfer transcripts of records, diploma supplements, and course catalogues in different user scenarios: EWP supports education institutes' administrative staff and administrative processes, while EMREX provides a set of electronic services to students.^[51]

DC4EU^[52] as one of the pilot consortiums will test the use of the EUDI Wallet in education and social security fields. Use cases for the educational field include enabling the use of non-foundational identities (e.g. a European Student Identifier) in the wallet, individual bringing educational credentials to the wallet from trusted issuers and sharing their educational credentials from the wallet to a third party across borders in different scenarios. For student mobility especially use cases such as accessing government services, signing contracts, and educational credentials and proof of possession of educational certifications are of particular interest.

The aim of the **Single Digital Gateway (SDG)**^[53] **Regulation**^[54] is to safeguard the European goal of a genuine single market where the free movement of goods, services, capital, and people is fully ensured and all unnecessary online barriers between people in different EU countries are dismantled.

Once Only Technical System (OOTS)^[55] is a technical framework for data sharing. OOTS will enable the sharing of information between public administrations between EU countries. The goal is to reduce the administrative burden on citizens, businesses, and administration, and make it easier for citizens to study, move, work, retire, or do business across the EU. OOTS will connect public authorities across the European Union, using the **eID** (see eID on page 14 for more information).^[56] building block to authenticate users from different countries and the **eDelivery**^[57] building block for automated cross-border exchange of data, following the Single Digital Gateway Regulation. The initial goal was to make OOTS operational in all

49. <https://erasmus-plus.ec.europa.eu/european-student-card-initiative/ewp>

50. [EWP Registry Service \(erasmuswithoutpaper.eu\)](https://www.erasmuswithoutpaper.eu/)

51. https://wiki.uni-foundation.eu/download/attachments/1149171/EUNIS_2017_paper_3%20%281%29.pdf?version=1&modificationDate=1598870027676&api=v2

52. <https://www.dc4eu.eu/>

53. https://single-market-economy.ec.europa.eu/single-market/single-digital-gateway_en

54. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1724&from=EN>

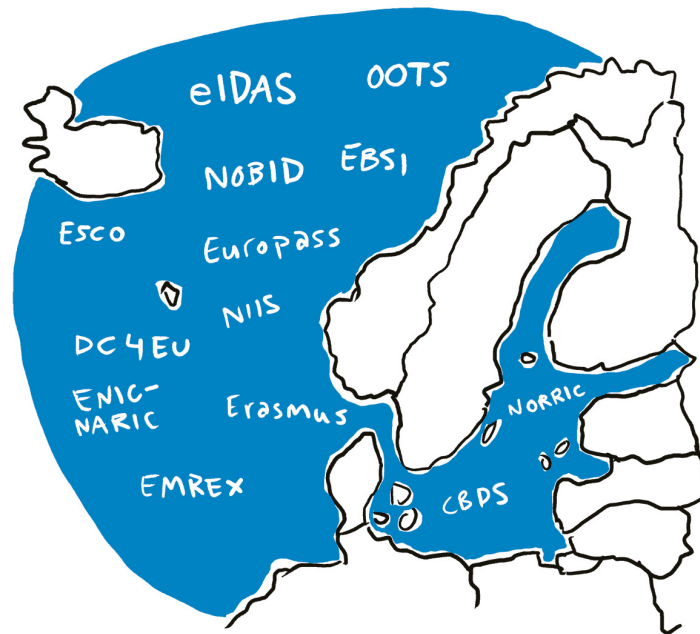
55. <https://ec.europa.eu/digital-building-blocks/wikis/display/DIGITAL/Once+Only+Technical+System>

56. <https://ec.europa.eu/digital-building-blocks/wikis/display/DIGITAL/eID>

57. <https://ec.europa.eu/digital-building-blocks/wikis/display/DIGITAL/eDelivery>

EU Member States by the end of 2023 but at the moment (summer 2023) this seems rather optimistic and the cutover of OOTS has been postponed until December 2024. The SDGR regulatory procedures in Annex II concern three life events/procedures concerning educational data that should be accessible across the EU by using OOTS.

The SDGR regulatory procedures in Annex II focus on three life events/procedures concerning educational data that should be accessible across the EU by using OOTS.



Title of the procedure in Annex II	Expected output
#3 Applying for tertiary education study financing, such as study grants and loans from a public body or institution	Decision on the application for financing or acknowledgement of receipt
#4 Submitting an initial application for admission to public tertiary education institution	Confirmation of the receipt of application
#5 Requesting academic recognition of diplomas, certificates or other proof of studies or courses	Decision on the request for recognition

As a concrete step towards OOTS, for example, the Nordic Council of Ministers has launched the **SDG OOTS Proof-of-Concept (PoC) pilot project**^[58] for 2021–2023 to evaluate and test the SDG Once Only Principle (OOP) architecture and prepare recommendations and good practices for the exchange of information between the Nordic and Baltic countries. The PoC project is piloting the architecture in six different use cases, including identity matching and an evidence request service that can be customised for the participating countries.

ESCO^[59] is the European multilingual classification of skills, competences, and occupations. ESCO provides a European multilingual classification and a dictionary that describes, identifies, and classifies professional occupations and skills relevant for the EU labour market, education, and training. The goal is to support job mobility across Europe by offering a common language of occupations and skills. ESCO is available for free via an online portal. The first full version of ESCO was published in 2017, the latest version is now also retrievable through the ESCO API interface or by downloading it. In the Europass Profile, end-users can select an ESCO occupation or use free text to fill the field "occupation or position held" for specific work experience. End-users can also select a language from the list of ESCO skills^[60].

The Europass Digital Credentials Infrastructure (EDCI) is being developed by the European Commission. The idea is that organisations will be able to implement the issuance of digital credentials for free. This supports the shift from paper-based certificates to digitally signed credentials. The EDCI data model, ELM, is aligned with the ELMO XML standard.

The European Qualifications Framework (EQF)^[61], which is also part of the Europass digital toolset, is an 8-level, learning outcomes-based framework developed by the EU to work as a translation tool to make national and different institutions' qualifications easier to compare. Where the education systems in member states vary, the **EQF levels describe the skills, knowledge, and competences acquired** on each described level. A local education system is then described in the framework making the education systems easier to compare and recognise which level of education compares to another in another country. All EU Member States and 11 other countries, including Iceland and Norway, have committed to implementing the EQF and link it to their national qualifications' frameworks to make the comparison of qualifications possible.

58. <https://www.norden.org/en/project/single-digital-gateway-once-only-proof-concept-pilot-project>

59. <https://esco.ec.europa.eu/en>

60. <https://esco.ec.europa.eu/en/about-esco/escopedia/escopedia/europass>

61. <https://europa.eu/europass/en/europass-tools/european-qualifications-framework>

”

I can see that digital credentials are here to stay; we see the value for all in these. Also, keep the student in mind, more than anything else when developing cross-border data exchange within the study sector.

– Padmasheela Kiiskilä, Doctoral Researcher in Tampere University

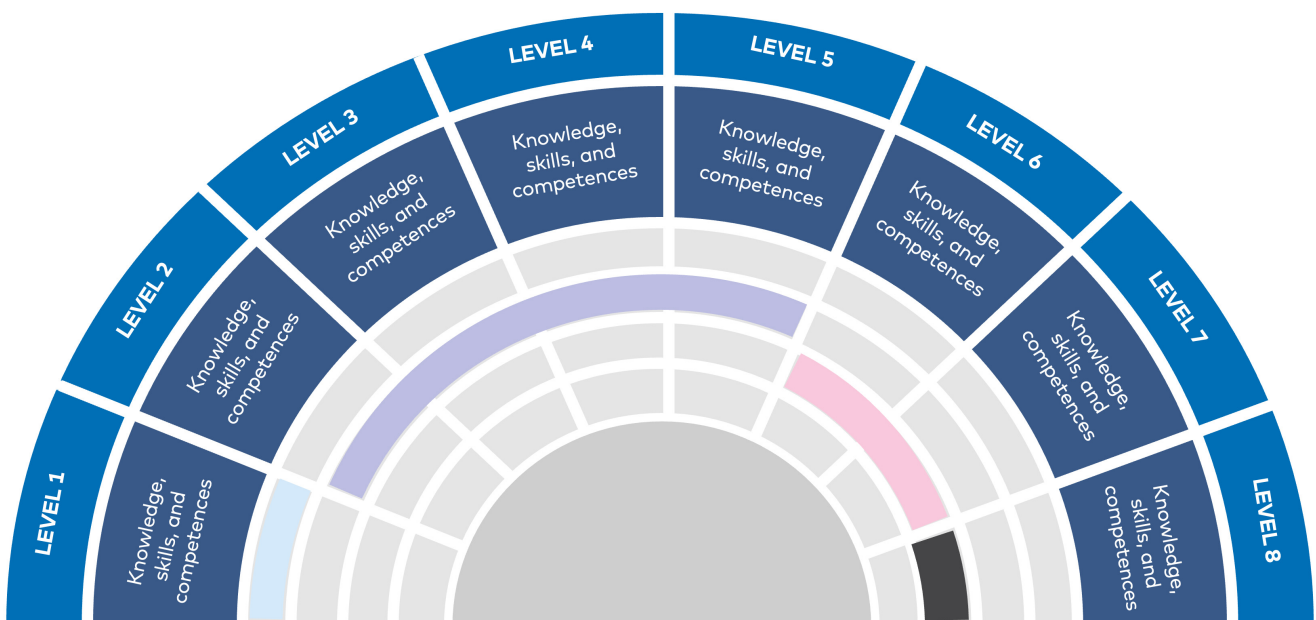


Figure 10. EQF framework in nutshell

3.3 Networks and stakeholders

Cooperation with other relevant projects, stakeholders and networks is an essential success factor in projects related to cross-border data exchange. Numerous projects and plans to improve digital services for students are ongoing or previously implemented at the national, Nordic, and Baltic countries, and EU level. The challenge is, who should you turn to when you have development ideas, requests for cooperation or further questions? When developing cross-border digital services we recommend engaging and following stakeholders on these different levels.

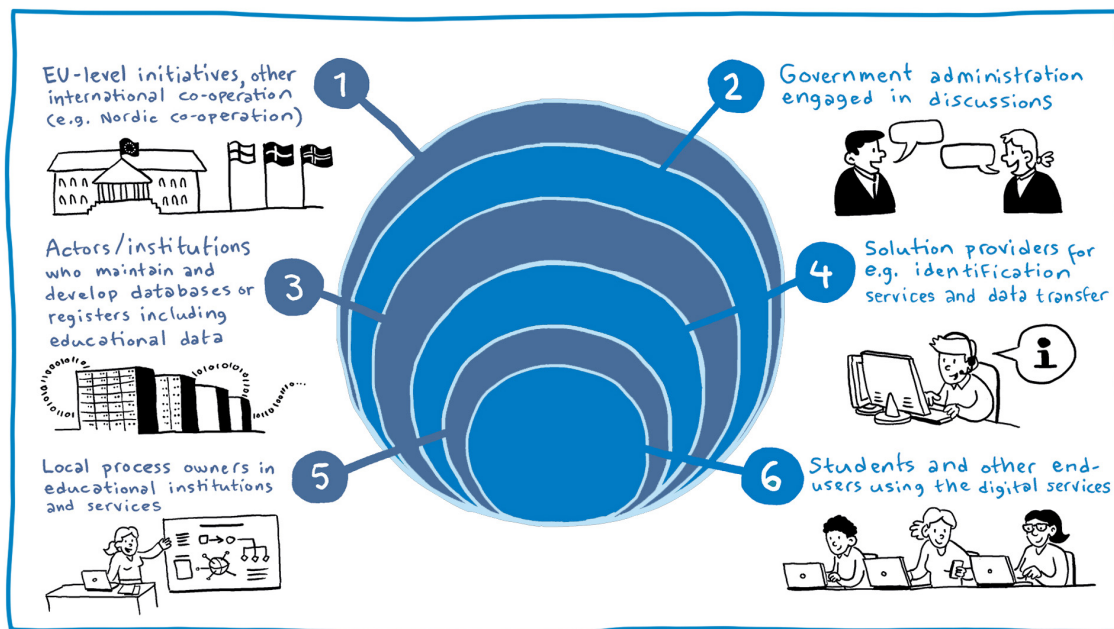


Figure 11. Levels of stakeholder engagement in cross-border data exchange projects

To begin with, it is essential to find the right people from each country in scope who possess deep knowledge of the practices, processes, key responsible parties in the country as well as the country-specific challenges, strengths, concerns, and other viewpoints to the project execution and outcomes.^[62]

1. **Monitor EU-level initiatives, other international cooperation (e.g. Nordic Cooperation).** To identify possible interdependencies and get an overall picture of the context in question, we recommend that you familiarise yourself with this policy-level view.
2. **Keep government administration engaged in discussions,** as the ministries are responsible for policy level decision-making including resources and national steering also in the field of education and digitalisation.
3. **Cooperate with actors/institutions who maintain and develop databases including educational data across borders.** This level includes governmental agencies responsible for education and digitalisation under the ministerial level, for example. In many countries, there are also joint and centralised IT/data service providers for higher education institutions. For example, CSC in Finland, Sikt in Norway and **established** in 2023, VPC (Higher Education and Science Information Technology Shared Service Center) created by four universities in Latvia.

62. <https://pub.norden.org/temanord2021-547/#88554>

4. **Work with solution providers.** For example, in the development of digital services, identification and data transfer solutions play a role in the processes and use cases. To find relevant stakeholders and to establish close relationships with these actors, is important and sometimes a critical factor for a project's success.
5. **Coordinate well with local process owners in educational institutions and services.** The benefits of the smooth cross-border data exchange of educational credentials are realised mostly in this level in the local processes.
6. **Engage students and other end-users in the digital service development.** At its best, engagement begins from the very start of development work: users should be included in the planning of the new functionality or system and the related processes. When properly implemented, engagement is also an excellent method to allocate scarce resources based on needs.



Example of a network and stakeholder map

In Figure 12, there is an example of a network and stakeholder map that was constructed in WP1 Studying in another Nordic-Baltic country by using a Miro board. It is one way to make visible the central actors, standards, and initiatives in the field of cross-border data exchange of educational data. The actors are divided and color-coded into three different categories: European, Nordic-Baltic, and national level. In this case, the national perspective is Finnish. There are also lines that mark the connections between the different actors and post-it notes contain a hyperlink to each actor's webpage.

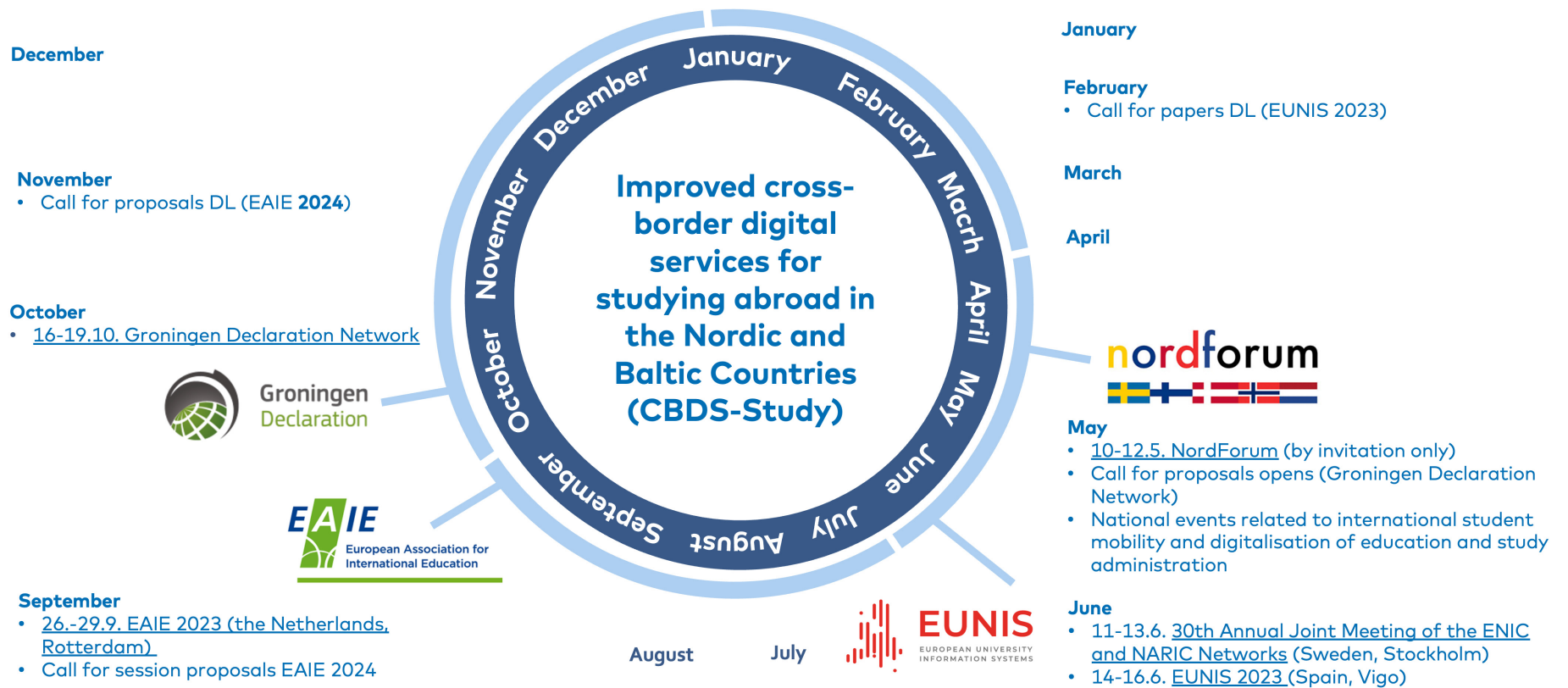


Figure 13. An example of a networks and events annual clock

3.4 Case examples of the exchange of educational credentials and interoperability in practice

In this chapter, we would like to introduce three case examples of interoperability in exchanging educational credentials. Two examples are related to EMREX – a technical solution for transferring verified educational credentials electronically mentioned earlier in chapter 3.2. The third case describes the use of an EBSI blockchain in practice.

Case EMREX & Finnish Metropolia University of Applied Sciences

Metropolia University of Applied Sciences in Finland has, amongst the first Finnish higher education institutions, introduced an electronic service based on EMREX.^[67] The service can be used to recognise studies completed elsewhere, as part of a degree that will be completed in Metropolia.

For the student, the new service makes the educational credential transfer process much easier. Earlier, the educational credential transfer process has heavily relied on paper documents and their manual processing and verification. This leads to human error and requests for supplementary and additional information occur quite often. EXREX enables the cross-border exchange of educational credential information in a machine-readable format and reduces the administrative burden for the process. It also substantially increases the reliability of the data as it is hard to destroy or change it in any way during the transfer process.^[68]

The solution can be used between higher education institutions between different countries as well as within one country.



67. <https://www.metropolia.fi/en/about-us/news-and-events/credit-transfers-for-studies-completed-abroad-made-easier-at-metropolia>
68. <https://dvv.fi/en/-/digital-leap-in-the-transfer-of-study-credits-data-on-studies-completed-elsewhere-can-now-be-transferred-electronically-across-borders>

Case EBSI – MicroBlock in Tampere University and DLNode in Kaunas University of Technology

The University of Tampere has engaged itself in a two-year EBSI blockchain research project, led by the European Commission, which is being co-developed between different type of institutions around Europe. By connecting to the EBSI-blockchain infrastructure, European higher education institutions enable the sharing of cross-border education credentials, both European Student Identifiers and Micro-Credentials.

The project is running simultaneously with a project that is taking place in Kaunas University of Technology in Lithuania. The objective of the EBSI blockchain research project is to standardise the use of EDCL-based digital credentials and their data, such as developed competences. The standardisation focuses on the exchange and recognition of the credentials. It also ensures the simplicity and reliability of the cross-border issuance and verification of digital credentials. It also allows flexible study pathways for learners. In practice, student should be entitled to request an individual Academic ID and Micro-Credential from their home institution. Second, a student could apply for a course in another institution by sharing their individual Academic ID and Micro-Credential. Subsequently, after the Academic ID and Micro-Credential has been verified by the institution offering the desired course, the student is able to enrol on that course, and entry to that course can be granted. Consequently, the receiving institution may receive and share the Micro-Credential, allowing it to share it with the home university and transfer data, such as the progress, grades or other necessary information related to the study abroad.^[70]

3.5 Key take-aways

In chapter 3, we have introduced some European standards and frameworks of educational data and ways to engage with different stakeholders and networks. In addition, case examples related to the exchange of educational credentials and interoperability in practice have been presented.

A 'cross-border by default' principle, to which the Nordic and Baltic countries' are committed to in all development of digital services was mentioned in the introduction of the handbook. Full interoperability in the study context could be described, for example, as a world in which the digital application for cross-border education would be easy, simple, and efficient both for the student and for the education institute. The student could seek education opportunities via information systems and portals hosted by the recipient country and digitally share information on his or her study background in the form of a transcript of records. The educational credentials would also include descriptive information about the

70. <https://ec.europa.eu/digital-building-blocks/wikis/display/EBSI/Micro-credentials>

contents of the completed studies and the information could be utilised in the student selection process.

As a key take-away, we would like to summarise the requirements for cross-border data exchange of educational credentials by describing the components that enable the smooth data exchange. The picture below tackles technical and semantic interoperability and it sets aside the soft infrastructure, practices at the educational institution level and legal issues. As long as the regulation and its interpretation along with local processes of the educational institutions vary significantly, the full potential of interoperability will not be achieved.

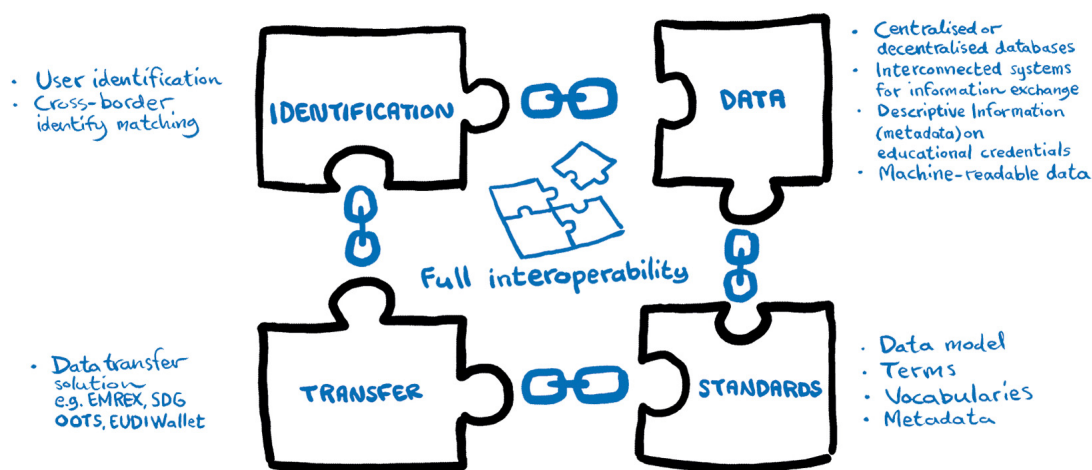


Figure 15. Requirements for cross-border data exchange of educational credentials. Components that enable the smooth data exchange.

In addition, these three aspects cannot be overemphasised when developing interoperable cross-border data exchange of educational credentials:

To understand the big picture of standards and frameworks is essential.

Active collaboration with stakeholders and relevant networks is the key to success.

Already functioning interoperable solutions and practices should be taken into account.

1. The big picture of standards and frameworks

It is highly recommended to get an overview of the connections between standards, data models and other related projects when starting or implementing a project in the field of cross-border exchange of educational data. Desktop research and documentation at the early stage will save time and prevent possible overlapping and double work and could help to point important collaboration instances.

2. Active collaboration with stakeholders and relevant networks

It is fundamental to find the right people, organisations, and networks from each country in scope. They possess the knowledge of the local practices and processes as well as the country-specific challenges and strengths. Events organised by the projects themselves and participation in more established forums, such as conferences and network meetings in the field have proven to be effective in promoting dialogue between actors. It is also crucial to find out who has the mandate to make the necessary decisions when needed.

3. Already functioning interoperable solutions and practices

It is also useful to keep in mind the already functioning solutions that are aiming at interoperable ecosystems in the EU and beyond.^[71] For example, the EMREX solution has been in production use since 2017 and it is actively collaborating with the ongoing European level initiatives such as DC4EU and SDG OOTS by building bridges between the different solutions.^[72] In addition, countries already have good local and cross-border practices in utilising and transferring educational data. Identifying and sharing practices between and within countries encourages cooperation and, at best, offers shortcuts to the development of digital services.



71. <https://www.eunis.org/eunis2023/wp-content/uploads/sites/22/2023/05/080-Digital-IDEU-public-services-54-Strack.pdf>

72. <https://www.eunis.org/eunis2023/wp-content/uploads/sites/22/2023/05/051-EU-Student-Mobility-16-Fridell.pdf>

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4. Findings of work package 2: Use of health services in another Nordic or Baltic country

Work package 2 (WP2), in the project *Achieving the World's Smoothest Cross-Border Mobility and Daily Life through Digitalisation* funded by the Nordic Council of Ministers, focused on questions related to the use of health services in another Nordic or Baltic country. The project started by conducting a baseline study.^[73]

This work package presents an overview of the current capabilities of the Nordic and Baltic countries when it comes to the exchange of healthcare data, different structures, ongoing development actions in the field, and plans concerning ePrescriptions and patient summaries. Moreover, there are many technical and semantic interoperability challenges related to current exchange practices of ePrescriptions and patient summaries. In general, the countries are using different systems and databases for different purposes, such as ePrescriptions, vaccinations, health records and social welfare. Moreover, the content of the patient summary data sets significantly varies between the countries, but standardised fields or a minimum data set are usually found. In some countries, the compilation of a patient summary is manual, whereas other countries compile it more automatically from different documents or source systems.

It is also important to stress that not only are citizens targets of data exchange, but they also play a central role in cross-border data exchange by allowing, or denying, their data to be shared with different stakeholders. MyData principle^[74] empowers individuals as actors of their personal data, its privacy, processing, and sharing.

Finally, the professionals at the actual implementation level testing and developing the services is essential. Additionally, the amount and quality of data depends heavily on the healthcare providers and how they update the fields. This affects the quality of the data in the systems.

73. <https://www.norden.org/en/publication/baseline-study-cross-border-data-exchange-nordic-and-baltic-countries>

74. <http://urn.fi/URN:ISBN:978-952-243-455-5>



4.1 The importance of cross-border exchange of health data

Continuity of care

People may need to request medical care when travelling, working, studying, or living abroad. In addition, patients in the EU have the right to utilise the closest healthcare provider regardless of the place of residence. A patient's health information recorded in the country of affiliation, such as the medical background and related history, should be available upon request to all healthcare professionals in Europe, when a need for that information arises. Currently, the EU allows the exchange of patient summaries and ePrescriptions. The goal is to also have medical images, laboratory results and reports, and hospital discharge reports available for exchange across the EU.^[75] Treatment without any background information of the patient may result in unnecessary risks and financial costs. Improved cross-border data exchange helps the professionals to connect to the stream of information generated along the patient's continuity of care.^[76] In addition, enhanced cross-border health data exchange would improve the overall accessibility of cross-border mobility for all, including those with disabilities and chronic diseases who currently face barriers due to lack of data exchange. It is worth noting that a great amount of emphasis has been placed on the development of a common European Digital Identity, which is directly linked to social security institutions and their functioning

75. https://health.ec.europa.eu/ehealth-digital-health-and-care/eu-cooperation/ehealth-network_en

76. https://health.ec.europa.eu/system/files/2022-06/ehn_guidelines_eprescriptions_en.pdf

within the Union. In this context, EESSI (Electronic Exchange of Social Security Information) is a system for the exchange of information between the social security institutions in the EU countries.^[77] EESSI may be tied to the EUDI Wallet (see EUDI Wallet on page 14 for more information) and consequently, European Union citizens will benefit from digitalised versions of entitlement documents, which would make it easier for the social security institutions and healthcare providers to proceed with verifications.^[78]



Figure 16. Hot spot areas of daily life crossing the country borders in Nordic-Baltic countries

77. [System for electronic exchange of information EESSI | About Kela | Kela](#)
 78. [Towards a more digital social security coordination: Commission proposes steps to make it easier for Europeans to live, work and travel abroad - Employment, Social Affairs & Inclusion - European Commission \(europa.eu\)](#)

In the baseline study, certain border regions in the Nordic and Baltic countries were identified as areas of close cross-border cooperation, where daily life revolves around working, living, and consuming services on both sides of the border. Cross-border data exchange is particularly vital in border regions where the nearest healthcare facilities may be located on the other side of the border. Consequently, there is often an increased amount of collaboration between the countries' clinical groups and hospitals.

The cross-border sharing of patient data digitally would significantly improve the availability of data. From the professionals' point of view, the improved availability of data correlates with patient safety. It is noteworthy that the needs and requirements for health data exchange depend on the nature of cross-border mobility in the region in question.

Based on the cost-benefit analysis of healthcare data exchange,^[79] the COVID-19 pandemic had a wide-spread effect on cross-border mobility and especially commuting, since different countries allowed access on different, often very restricted grounds, and even the definition of an essential worker was often interpreted differently by different countries. Even during the periods when cross-border commuting was allowed, restrictions and required procedures upon entry (such as quarantine periods and COVID-19 testing) caused frustration among the commuters.

In addition to cross-border commuting, several other reasons for mobility were further highlighted by the COVID-19 pandemic, including family ties and property ownership. Countries closing their borders and only allowing access on very restricted grounds that often differed between the countries caused further frustration in these areas, for the tightly integrated way they were built and strongly relied on the possibility to cross the border whenever needed.

Cross-border healthcare data exchange has its core objective in **continuity of care**. It includes both planned and unplanned care. Planned care refers to aspects such as intentionally traveling to another country to access specialised healthcare services where unplanned care is more of an emergency or sudden a need for healthcare during a stay in another country. For both planned and unplanned care, the capability to reliably transfer health data on personal medication, allergies, and other vital information to another country enhances the safety and continuity of care for the patient. In addition, the smooth exchange of health data can reduce the number of unnecessary double-testing and procedures, and therefore also contribute to lowered healthcare costs.

79. <https://wiki.dvv.fi/pages/viewpage.action?pageId=117377490&preview=/117377490/235526906>

According to Laitinen, Virkki and Porkka (2022),^[80] international health data harmonisation is essential to ensure the effective and functional sharing of Finnish healthcare data. Data harmonisation has a direct impact on the quality, reproducibility, and reliability of research that uses healthcare data. Additionally, data harmonisation is important for interoperability. Effective data interoperability leads to improved efficiency of methods and processes, and improved time from research project design, through trend identification to policy implementation (Knosp 2020).^[81]

Understanding the diverse needs of citizens for cross-border data-exchange

The results and conclusions of the cost-benefit analysis of cross-border healthcare data exchange in areas of close cross-border cooperation in the Nordic and Baltic countries offer a wider understanding of the phenomenon—how common it is in numbers, what the needs of the people are who cross borders as a part of their daily life, and how important cross-border data exchange is as a prerequisite for mobility for all.

From an equality point of view, it is essential to ensure the different user groups are accounted for and that they can access the kind of health data that is necessary for them. **Gender equality** is generated where ordinary decisions are made, resources allocated, and norms created.^[82] In the case of developing cross-border health data exchange, the development of an electronic maternity card at the national level is an essential aspect that would create a basis to enable and promote the mobility of women and families. National development should be carried out in close cooperation with other countries to ensure interoperability.



The main objective is to ensure continuity of care – including both planned and unplanned care. As an example, where a sudden need for medical care occurs whilst traveling abroad, the transfer of relevant data should follow the patient when the care continues again at the place of habitual residence.

– Juha Mykkänen, chief specialist, Finnish institute for health and welfare

80. <https://www.duodecimlehti.fi/xmedia/duo/duo17059.pdf> (in Finnish)

81. https://playbook.cd2h.org/en/latest/chapters/chapter_6.html

82. <http://horden.diva-portal.org/smash/get/diva2:1283606/FULLTEXT01.pdf>

Acting on behalf of another person is one example of national development that would require some more European collaboration as currently the authorisation works differently in different member states. This causes potential challenges for example when a parent would need to act on behalf of their child in case of an emergency while in another EU country. Currently, the original authorisation in the child's home country might not be visible to the authorities in another EU country and the process may be delayed while the required evidence of authorisation can be arranged.

The Nordic Council of Ministers' programme for cooperation on disability issues between 2023 and 2027 has been endorsed. One of the focus areas is raising awareness of and breaking down barriers to freedom of movement across country borders. This is a priority area within Nordic co-operation. The EU is also making special efforts to break down barriers for people with disabilities. Activities in this focus area promote freedom of movement for people who are at risk of being hindered by different barriers due to various laws, rules, and administrative practices in the Nordic countries.^[83]

In addition, cross-border mobility of health data may contribute to better access to services at a lower cost, as the nearest pharmacy or hospital might be across the border.

Increased need for cross-border exchange of data

There is an increased need for cross-border exchange of healthcare data in the areas of close cross-border collaboration. These areas share many characteristics but as we identified in our analysis, there are several factors that affect the amount and nature of cross-border mobility, as well as collaboration between the countries. In the areas where distances are long and the population density is low, countries need to collaborate more closely and share resources to provide the necessary services, also in terms of healthcare. The extensive collaboration between the ambulance services of Finland, Sweden and Norway in the Torne Valley and the collaboration between Estonia and Latvia around the Valka-Valga region are great examples of such collaboration.^[84] In the more urban areas, such as the Öresund region or Helsinki and Tallinn, the need for sharing resources is not as significant. However, since there is a significant amount of cross-border commuting also in these areas and since the commuters are often entitled to utilise the healthcare system of their country of employment, it can be concluded that the cross-border exchange of healthcare information would provide significant improvements to the citizens of these areas as well.

83. <https://nordicwelfare.org/en/disability-issues/nordic-programme-for-co-operation-on-disability-issues-2023-2027/>

84. See chapter 4.4 Case examples of exchange of healthcare data

Therefore, despite regional differences, we found that there is an increased need for cross-border exchange of healthcare data and overall access to healthcare services across borders in most of the examined areas. Similar areas for close cross-border collaboration have been identified between many other European countries, which implies that there may be a more substantial need for cross-border exchange of healthcare data across the EU than expected. This is especially likely if previous estimations of needs have been based on use cases related to tourism.

Expected benefits

The benefits to be gained from the cross-border exchange of healthcare data are clear and supported by previous research. The benefits have been studied on several occasions over the years, and in accordance with the results of this study, it has been clear for some time that there is a strong need for exchanging healthcare information between the Nordic and Baltic countries. The most cited benefits include improved patient safety and quality of care, as well as patient access to care, especially in terms of unplanned urgent care. Additionally, improved cross-border exchange of healthcare data could result in cost savings due to a decrease in manual requests for information processes, as well as in the form of not needing to perform unnecessary double tests and scans.^[85]



85. Cost-benefit analysis of cross-border healthcare data exchange in the Nordic and Baltic countries, p. 30

4.2. Frameworks, initiatives, and standards

This chapter assesses the most relevant standards and frameworks in the field of cross-border data exchange in health services. It must be noted that the European Health Data Space (EHDS) and the European Digital Identity Wallet (EUDI Wallet) (see EUDI Wallet on page 14 for more information) are currently only **at a stage of legislative proposal**, and even after the negotiations and consultations on the new regulation, there may be room for different means of implementations in practice. In the following chapter, the Handbook will shortly introduce the essential frameworks and initiatives related to cross-border healthcare data exchange. These standards should be considered as the basis for work. (See chapter 2.1 Standards and frameworks for more information).

The **European Health Data Space (EHDS)**^[86] is a recent (May 2022) proposal for a regulation which would better address specific challenges to electronic health data access and sharing. The general objective of the EHDS is to ensure that natural persons in the EU have increased control over their electronic health data. The EHDS also promotes better exchange and access to different types of electronic health data, including electronic health records, genomics data, patient registries etc. Additionally, it would support not only healthcare delivery, that is, services and personnel involved in providing healthcare (primary use of electronic health data), but also health research, innovation, policymaking, regulatory purposes, and personalised medicine purposes (secondary use of electronic health data).

EU citizens' rights to access and control of their healthcare data, as well as free mobility of information are considered to be some of the key benefits of the EHDS. **Patient access to their own electronic health records (EHRs)** is becoming an essential part of healthcare systems. According to the Commission's 2030 Digital Compass, by 2030, all citizens could have access to their electronic medical records, also 80% of citizens could use an eID solution.^[87]

The **European Health Digital Service Infrastructure (eHDSI)**, also known currently as the **MyHealth@EU Infrastructure** is a central initiative for developing service infrastructure for cross-border health data exchange between the EU countries, and it is part of the EU4Health programme^[88] that runs until 2027. The cross-border services provided through eHDSI are currently referred to under the brand name **MyHealth@EU**^[89].

86. https://health.ec.europa.eu/ehealth-digital-health-and-care/european-health-data-space_en

87. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

88. https://health.ec.europa.eu/funding/eu4health-programme-2021-2027-vision-healthier-european-union_en

89. https://health.ec.europa.eu/ehealth-digital-health-and-care/electronic-cross-border-health-services_en



Contact points of each Member State create the foundation for information exchange in healthcare services. Each of these contact points must perform the minimum requirements for interoperability. On the other hand, each of these contact points are the implementing entity, who integrate the national healthcare services according to eHDSI standards and prepare it for exchange.

– Paavo Kauranne, the Social Insurance Institution of Finland

eHDSI enables the exchange of ePrescriptions and eDispensations as well as patient summaries electronically between the EU countries, through National Contact Points. Since the maturity of national solutions is variable across the EU, the focus of the MyHealth@EU has been on including only most necessary requirements. Additional desirable features that could improve the infrastructure have been identified and included in an EHDS proposal. The consistent and synchronised implementation of services across different countries has been challenging, but the implemented services are in operational use while still maintaining security and safety.

Finland and Estonia are currently the only two Nordic-Baltic countries successfully sharing ePrescription information using the eHDSI.

The European Digital Identity Wallet (EUDI Wallet)^[90] (see EUDI Wallet on page 14 for more information) is one of the enablers of European citizens to access, share, and control their electronic health data in a secure and convenient way. For instance, EU citizens can present their medical prescriptions using the EUDI Wallet. Additionally, it will promote the ability of individuals to manage their information and control how they use their information across the EU. A wallet prototype is planned to be tested in four large-scale projects in real-life scenarios spanning several sectors.

One of the EUDI Wallet pilot projects, **POTENTIAL**^[91] is piloting the use cases including *Identify to and access a digital public service* and *Claiming prescriptions*. **DC4EU**^[92] (see DC4EU on page 16 for more information) is piloting a use case on *A portable document A1 (PDA1) & European Health Insurance Card (EHIC)*.

90. <https://digital-strategy.ec.europa.eu/en/policies/eudi-wallet-implementation>

91. <https://www.digital-identity-wallet.eu/>

92. <https://www.dc4eu.eu/>



Interoperability is the most essential element. An illustration of this is the nationwide Finnish Kanta Services, which incorporates technical solutions to enable system interoperability, especially in Europe. Commonly accepted international standards should bear high priority both in operation and system design. In addition, it is feasible for all parties to aim for active participation, and to share one's own knowledge and insights.

– Vesa Jormanainen, Ministry of Social Affairs and Health, Finland

A patient summary is an identifiable dataset of essential and understandable health information that includes the most important clinical facts. The dataset is intended mainly for unplanned care; however, it can be used to provide planned medical care in the case of citizens mobility. The patient summary is a vital objective of the free movement of patients across the borders.

Standards are an important enabler of health data exchange. However, standards do not include all aspects of interoperability in the situation where they are implemented. Utilising standards in data exchange improves the interoperability of systems which support various work processes.

A patient summary is a standardised set of data that includes the most important health and care related facts required to ensure safe and secure healthcare. In international patient summary (IPS) standards, a patient summary is defined as an electronic health record extract containing essential healthcare information about the subject of care.^[93] The IPS dataset is a minimal set of basic clinically relevant, specialty-agnostic, and condition-independent data of a patient, that can be used by all clinicians for the unscheduled, cross-border patient care. The summary of the patient's clinical data provides the healthcare professional with the essential information they need to provide care in the case of an unexpected medical situation (e.g. an emergency or accident). (IPS, 2023.)

The IPS is building a bridge between the “home” health and care environment of the patient and any other place where the patient needs to visit a clinical professional, especially across borders. The construction of the IPS involves several **standards** and **specifications**.^[94]

International patient summary standards and specifications include guidelines and recommendations, CEN content standards, HL7 implementation guides, and SNOMED standard medical terminology, which supports semantic interoperability, and an IHE integration profile to guide implementation and enhance conformance.^[95] ePrescription exchange in eHDSI is based on the work of the European Patient Smart Open Services project (epSOS), which utilises the **HL7 CDA** standard.^[96] Health level 7, also known as HL7 defines clinical documents as historical, human-readable healthcare records that combine data and free text. Clinical Document Architecture, also known as CDA introduces the concept of incremental semantic interoperability.^[97] The CDA standard supports a combination of free text for human readability and adds structure and coding to the document to enable machine processing. The HL7 clinical document architecture standard is an internationally recognised standard which is implemented in many countries.

The European Electronic Health Record Exchange Format (EEHRxF) is a standardised framework designed to facilitate the secure exchange of electronic health records between different healthcare systems in Europe. It is designed to help improve the interoperability of health records in the EU Member States. It also supports the European strategy for data and creation of the European Health Data Space by scaling up the secondary use of this data in research, innovation, and regulatory activities. It establishes uniform data structures, coding systems, and protocols to ensure consistency in exchanging electronic health records. It provides an infrastructure for secure data exchange, for applications including the European Patient Summary and ePrescription.^[98] ^[99] In the EHDS proposal, the EEHRxF is described containing the necessary datasets for priority categories of health data, as well as the necessary coding systems and technical specifications. A previous eHealth Network recommendation of the EHRxF was published in 2019.

94. IPS: <https://international-patient-summary.net/>

95. Mykkänen. IPS – Standardit ja hankkeet. 18.5.2021. https://thl.fi/documents/920442/6748650/20210518_3_IPS-SoteTAOhry-Juha+Mykk%C3%A4nen.pdf/8a0fbc6c-f6d4-674a-ca2c-95b2131d8e40?t=1623991691391

96. [CDA ePrescribing Draft Standard for Trial use \(higa.ie\)](https://www.hl7.org/standards/product_brief.cfm?id=39289)

97. [HL7 Standards Product Brief - CDA® Release 2 | HL7 International](https://www.hl7.org/standards/product_brief.cfm?id=39289)

98. <https://digital-strategy.ec.europa.eu/en/policies/electronic-health-records>

99. <http://ehaction.eu/interoperability-guide/health-data-exchange/>



Currently, the main challenge is individual code systems varying between Member States, which prevent advanced interoperability. Mapping or harmonization of individual code systems to common European code systems is therefore a subject that needs closer attention. Moreover, it is important that Member States are encouraged to participate in eHDSI trial periods, where it is possible to get feedback from the professionals in another Member States that supports the development.

– Paavo Kauranne, Welfare and Product Owner, the Social Insurance Institution of Finland

4.3. Networks and stakeholders

The majority of the expert interviews stated that the development of the cross-border data exchange aims to achieve active cooperation between stakeholders. This chapter provides an insight into the key networks and stakeholders who could be utilised when working on this topic. Well-functioning information systems on the national and local level are the starting point, which function as a foundation for further development for international integration, harmonisation, and co-operation. Ultimately, these same administrative bodies and developers are often engaged in subsequent cross-border projects, or national and regional infrastructure is reused for international information exchange. The healthcare sector has a strong foundation through the European regulatory framework, which is further expanding through the regulatory proposal for European Health Data Space regulation. This proposal aims to develop cross-border healthcare data exchange.

The eHealth Network^[100] is the main collaboration body on eHealth at the European level. It gathers national eHealth authorities designated by the Member States, on a voluntary basis, to define a common vision and strategy for eHealth across Europe. It includes various communities and subgroups working on different topics, as well as secretariats run by the European Commission. When the European Health Data Space comes into effect, the eHealth Network will be replaced with the European Health Data Space board.

100 https://health.ec.europa.eu/ehealth-digital-health-and-care/eu-cooperation/ehealth-network_en

Currently **the subgroups of the eHealth Network** play a preparatory role, and they are focusing on producing evidence and recommendations to support the network's activities. The activities are financed through various EU-wide projects. For example, the X-eHealth project intends to produce a guideline on the exchange of electronic health records that ultimately needs to be approved by the eHealth Network.

The eHealth Network may be perceived as relatively complicated due to the multiplicity of actors involved. Both decision-making bodies as well as the preparatory subgroups are important functions of the network. Active participation in the network's functions is essential for ensuring coherent EU-level guidelines and regulations on health data exchange and use.

The eHealth Network (eHN) consists of members from the European Commission and from all EU Member States and Norway. Norway is an observer, and the Chair of eHealth Network may give observer status to national authorities responsible for eHealth of EEA/EFTA countries and of accession countries. The eHealth Network is voluntary to all Member States, and it provides a platform of Member States' authorities dealing with eHealth. The eHealth Network meets twice a year.

The eHealth Network's subgroups:

- **The eHealth Network Subgroup on Semantics (Semantic SG)** prepares recommendations on the use of certain standards against established criteria and based on the guidelines for accepting semantic resources as European semantic standards. It administers the Common European Network of Health Semantic Services. Additionally, the Subgroup on Semantics provides the strategic decisions regarding semantics to eHealth Network.
- **The eHealth Network Technical Interoperability Subgroup (Tech IOP SG)** aims to address technical interoperability.
- **The eHDSI Member States Expert Group (eHMSEG)** is a permanent subgroup^[101] of the eHealth Network and the group represents the participating Member States. It coordinates the implementation of the National Contact Points for eHealth (NCPeH) to ensure that they are fully interoperable. In addition, the group gives expert advice to the eHealth Network and to the eHealth Operational Management Board (eHOMB).^[102]
- **The eHealth Operational Management Board (eHOMB)** The eHealth Operational Management Board (eHOMB) is composed of representatives of internal services of the European Commission and the eHMSEG Chairs. It oversees the provision of services and takes tactical and operational decisions on the eHDSI.^[103]

101. Chapter 5.1 Analysis and evaluation: eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022SC0131

102. <https://ue.esante.gouv.fr/sites/default/files/2022-04/5%20-%20eHMSEG.pdf>

103. https://health.ec.europa.eu/ehealth-digital-health-and-care/electronic-cross-border-health-services_en#governance-and-financing



All aspects affecting the data exchange are made interoperable. Additionally, the awareness on matters relating to cross-border data exchange is important. Belief in EU-wide capability is one key aspect in this respect, and people holding authority in the decision-making organization must understand the benefits in the big picture. Only then the interoperability may be reached.

– Heidi Peltotalo, Finnish Institute for health and welfare

The EU4Health Programme (EU4H)^[104] has a vision for a healthier European Union. It aims to improve and foster health, protect people, ease access to medicinal products, medical devices, and crisis-relevant products, as well as to strengthen health systems across the Union. The programme has its primary focus on urgent health priorities, such as reinforcing the Union’s resilience for cross-border health threats, Europe’s Beating Cancer Plan and Pharmaceutical Strategy. In addition, for a functioning framework, sectors such as health system digitalisation and vaccinations are given further emphasis and development initiatives.

The X-eHealth project aims to build the foundations for advancing the integration of eHealth services into the already-existing European Cross-Border Patient Summary. It aims to do so by developing the basis for a workable, interoperable, secure, and cross-border Electronic Health Record Exchange Format (EEHRxF) and accelerate its implementation through the standardisation and harmonisation of health data.^[105]

DG-SANTE3 (Directorate-General for Health and Food Safety) develops and carries out the Commission’s policies on food safety and public health. Among others, DG SANTE aims to build a strong European Health Union to protect and improve public health, and to ensure Europe’s food is sustainable and safe.^[106]

104. https://health.ec.europa.eu/funding/eu4health-programme-2021-2027-vision-healthier-european-union_en

105. <https://www.x-ehealth.eu/scope-of-action>

106. https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/health-and-food-safety_en#responsibilities

The Nordic Committee of Senior Officials for Health and Social Affairs (ÄK-S) of the Nordic Council of Ministers (NCM) established **the Nordic Council of Ministers' eHealth Group** in 2011 to ensure knowledge transfer between the Nordic countries, and to help to strengthen the global leadership position of the region in the eHealth area.

The scope of the eHealth Group emphasises the current political priorities at national levels and in the EU framework. The eHealth Group is both a central forum for knowledge transfer between the Nordic countries as well as a platform for the joint formulation of strategic initiatives to enable communication of a common Nordic view.

The group has a rotating chairing country. Finland is the chair during 2023–2024, and the goals set for the period are

- Sharing of knowledge and best practices in e-health in Nordic countries, around issues like digital health structures in different Nordic countries, quality of data, interoperability at all levels of eHealth services, supporting the work of professionals through digitalisation
- Strengthening cooperation on relevant topics
- Influencing EU level development with a common Nordic voice
- Strengthening of the Nordic position in EU cooperation making it possible to stress Nordic priorities

There are two sub-groups operating under the Nordic e-Health Group: the eHealth Standardisation group and the Nordic Council of Ministers eHealth Research Network.

The main tasks of the **eHealth Standardisation group** are to serve as an arena for enhancing Nordic understanding, knowledge sharing, and to engage in collaboration on specific eHealth standardisation issues, and participation and positioning towards the ongoing international work on standardisation at the European and global level.

The Nordic Council of Ministers eHealth Research Network (NerN) works on eHealth indicators to advance the eHealth monitoring activities and systems in the Nordic countries. The work should also be shaped by the Nordic objectives and actions: the Nordic region being the most sustainable and integrated region in the world. The work should head towards systematic eHealth monitoring and appropriate collaboration with the OECD, EU and WHO. Primary objective: To develop and pilot an updated set of indicators that can be used to assess and compare the impact of national-level digital health programmes in the Nordic countries.

4.4 Case examples of exchange of healthcare data

This chapter provides an insight of case examples of exchange of healthcare data between Finland and Estonia, with a case example of extensive collaboration around the Valka-Valga region, a case example from the region between Finland and Sweden, and a case example from the Nordic Baltic Interoperability project case Alva.

Case: ePrescription in Finland and Estonia

Within the healthcare sector, Finland and Estonia are currently the only two Nordic-Baltic countries that are successfully sharing ePrescription information across borders through eHDSI. Finnish ePrescriptions have been used in Estonia already since 2019,^[107] and the Estonian ePrescription has been fully functional in Finland since 2020, without extra amendments from the doctor such as a medical prescription for purchasing medication abroad. Citizens can purchase the medication using the ePrescription by showing only a valid passport or official identity card in the pharmacy. This is especially useful for people working in a neighbouring country or having close family ties across a national border. Of course, this benefits travellers as well.

The successful adoption of cross-border ePrescription and eDispensation has been made possible by the pre-existing eHealth services and data infrastructures and continuous development in both countries. Cross-border health data exchange would be extremely difficult without a functioning nation-wide health service infrastructure. In addition, the EU Commission's financial assistance for Member States to set up cross-border health services is also granted with the pre-requisite that certain national services enabling cross-border health data exchange are already in place. The Finnish Kanta Services and Estonia's equivalent, eHealth Estonia, are examples of such system; they are sets of national digital health and social care record systems that provide citizens and healthcare professionals with secure access to patient information and health records. These systems share similar goals for their functions but are tailored to the specific needs and contexts of their respective countries, with differences in implementation, features, and operation. Recent research examining the implementation of the Kanta Services in Finland has described the central building blocks of such a large-scale nationwide development process^[108].

107. <https://e-estonia.com/first-eu-citizens-using-eprescriptions-in-other-eu-country/>

108. <https://helda.helsinki.fi/server/api/core/bitstreams/b70f9dfb-6162-4396-aa50-4f4499dedae1/content>

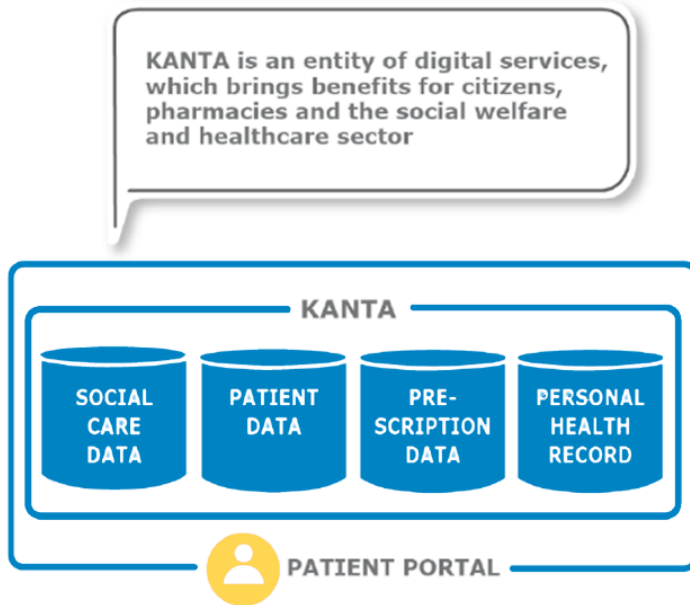


Figure 17. Finnish Kanta, core services

As a part of this work package, a seminar on the successes and challenges in the implementation of cross-border ePrescriptions between Finland and Estonia was organised. The following section presents the lessons learned from the workshop.

Lessons learned from Finland on the implementation of ePrescriptions^[109]

- An existing centralised health service infrastructure, such as the Kanta Services in Finland, has made the implementation of cross-border services easier, because a centralised service makes it possible to implement the solution only once.
- Ensuring interoperability between national codes and the common EU code lists is difficult.
- Testing periods are challenging and they require resources and time. Currently, the use of the ePrescription service is rather limited, yet it requires a lot of work to implement and maintain it.
- Progress is slow, and even minor changes take time and resources.
- The standardised development cycle enables controlled progress and the development of services. Also, the cooperation between representatives of other Member states mainly worked well, and assistance is available on request from the eHealth Network.
- Consistent mapping, measuring and documentation of the process has enabled successes in implementing services.

109. Nella Savolainen, Ministry of Social Affairs and Health, Lessons learned from Finland on the implementation of ePrescription/MyHealth@EU 29.6.2022

- Training and information materials for professionals are crucial to bridge the gap between national and cross-border practices.
- Information about cross-border ePrescriptions must be provided to citizens (see examples of the Kanta Services instructions for citizens).^[110]
- Cultural change is needed for health professionals to encourage adopting behaviors and mindsets that are consistent with cross-border requirements and processes, and for citizens to be more actively involved in the process.
- It is highly unlikely to achieve 100% compatibility of services; aim for the highest possible compatibility!
 - Technical implementation is not enough; understanding the processes and functioning of ePrescription and eDispensation in other countries is key. Constant communication, collaboration and agreements between countries are needed
 - Although challenging, testing of services should be done in cross-border context in addition to national context to identify user cases and potential pitfalls
 - It is important to constantly monitor the experiences of users and professionals

Challenges and successes at implementation level

Ms. Rutt Lindström & Ms. Katre Pruul
Estonia

Started cross-border ePrescription Jan 2017

There's differences in processes and products data

- Legislative changes
- Data protection
- Testing

Everything is there but it just won't WORK

Reimbursement?

Many activities took longer than planned

Double work in agreements

Maintenance
Difficult to organize

Quality & Monitoring
Which pack size unit?
Strengh per ml or dose?

Technically, everything must be substitutable

How much medicines?

Lots of talk about Viagra!

- Communication and collaboration is the key between countries
- ePrescription is the first step

Mr. Paavo Kauranne & Heidi Peltotalo
Finland

Now:
Finland exchanging eP/eD with:

- Croatia
- Estonia
- Poland
- Portugal
- Spain

Challenges:

- National differences
- One or more items per prescriptions
- Different rules for substitution
- Different code system

Successes & Failures

Every stakeholder needs to involve!

Update the available documentation for all the MSs

Material needs to be updated

we need training

Make use of eHDSI solutions

ASSUME NOTHING!
Same medicine - different data

Never 100% compatibility

Of course it's that way!!

Annika Ohlson
Sweden



- All pharmacies can dispense ePrescriptions
- 1250 hospitals and other points are capable of sharing electronic health data
- 90% of citizen has digital health ID

- Cross-border ePrescription plan to go live when the legal updates has entered into force
- Patient summary plan to start the work in autumn 2023. → Live 2026

Challenges: *could success factors*

- Technical
- Semantic
- Organisational
- Legal
- Cooperation
- Participation in European communities
- Care team responsible for cross-border services



Figure 18. Live illustrations from a workshop on challenges and success at implementation level

Customers and professional experiences on ePrescriptions

Related use cases and end-user benefits of cross-border ePrescription use have been studied over the past few years (e.g., Jõgi, 2021^[111], Kangosjärvi et al, 2023^[112], Jõgi et al, 2023^[113]).

When asking customers, most respondents in the study have been satisfied with the ePrescription, stating that being able to purchase prescription medicines across the border made short- and long-term traveling between the countries easier and more accessible.^[114] Many also reported that despite Finnish and Estonian languages not being mutually intelligible, they had received sufficient guidance regarding their medications in a language they could understand.

When asking pharmacists in both Estonia and Finland, most agreed that the cross-border ePrescription system improved access to medications. However, interfering factors, such as ambiguities or errors and technical problems in the system, can reduce access to medications. The respondents had received sufficient training and were informed of the guidelines; however, they felt that the content of the guidelines could be improved.^[115]

ePrescription in numbers

In Finland 2022 cross-border dispensations:

- 5000 foreign ePrescription dispensing events in Finland
- 9000 Finnish ePrescription dispensing events abroad

Figure 19. ePrescription in numbers, Paavo Kauranne, presentation in Tallinn 2023

Case: Twin cities of Valga (Estonia) and Valka (Latvia)

Another case example provides insight to the cross-border use of services. Valga and Valka are in the border area between Estonia and Latvia. The cities are working towards developing the two cities to become one for its inhabitants, regardless of their nationality.^[116] In terms of collaboration within the healthcare sector, the hospital catering to the inhabitants of both twin cities and residents within a 30 km radius is entirely owned and operated by Estonia. The healthcare services are

111. Jõgi, R. (2021). Cross-Border e-Prescriptions – the First Experience of the Pharmacists in Estonia and Finland
112. Kangosjärvi et al, 2023: https://dosis.fi/wp-content/uploads/2023/03/090-107_Dosis_123_Kangosjarvi.pdf
113. Jõgi et al, 2023: <https://pubmed.ncbi.nlm.nih.gov/37014689/>
114. Kangosjärvi et al, 2023: https://dosis.fi/wp-content/uploads/2023/03/090-07_Dosis_123_Kangosjarvi.pdf
115. Jõgi et al, 2023: <https://pubmed.ncbi.nlm.nih.gov/37014689/>
116. <https://visitvalgavalka.com/>

provided in both languages and both planned care as well as emergency medical treatment are offered to residents of both countries. Thus, due to the high degree of integration between Valga and Valka, their collaboration can be taken beyond information sharing and onto a more operative level.

Case: Torne Valley (Finland and Sweden)

This case example takes place in the border region between Finland and Sweden, centred around the twin cities of Tornio and Haparanda. The Torne Valley area has special characteristics by the everyday phenomenon of working and purchasing goods and services on both sides of the border.

Characteristics of healthcare services in the Torne Valley area:

- Crossing the border to access private healthcare services is common in the area, however utilising public healthcare services across the border for planned care is less common
- The area has a high degree of collaboration between emergency services of different countries to ensure both patient safety as well as timely and efficient delivery of the services

Especially in the Northern areas of lower popular density, such as the Torne Valley area, ensuring smooth daily life and on the other hand reasonable use of resources requires close cross-border collaboration. Usually, the distances between patients and care providers are long, and thus, the emergency services have an increased need to collaborate closely. The ability to share information between the responding units and hospitals in the two countries is crucial for improving patient safety in the field. Patient safety would be improved further if the patient's medical history, such as previous medical procedures, diagnoses, and allergies were available to the care provider multi-nationally. This is especially true in terms of unplanned, urgent care. Having adequate information on the patient's medical history would also make it easier to provide high quality of care, which would help to increase trust amongst patients and ultimately result in better service.

”

One of the best practices is to do a lot of testing with different countries. It helps identify challenges especially language related. Also, when implementing new services, you must know your users – find out whether there are people who would use the services and whether there are other countries using it.

– Katre Pruul, Rutt Lindström and Liisa Lvova, TEHIK

AMBULANCE MISSIONS IN THE TORNE VALLEY AREA

- From Sweden to Finland: 50-60 per year
- From Finland and Norway to Sweden: 100-150 per year

Figure 19. Case: Torne Valley. Ambulance missions in the Torne Valley area

The ePrescription service is not yet in use between Finland and Sweden, although access to ePrescriptions would significantly help to reduce the number of errors concerning medication purchased abroad and thus offer better overall medication safety. It would also improve the accessibility of healthcare, as well as better commitment to medical treatment when staying abroad, or residing in border areas. Developing cross-border healthcare data exchange would improve the overall cross-border mobility for all groups, including those with disabilities or chronic conditions that require regular monitoring or medication, for example in terms of being able to work or study across borders.^[117]

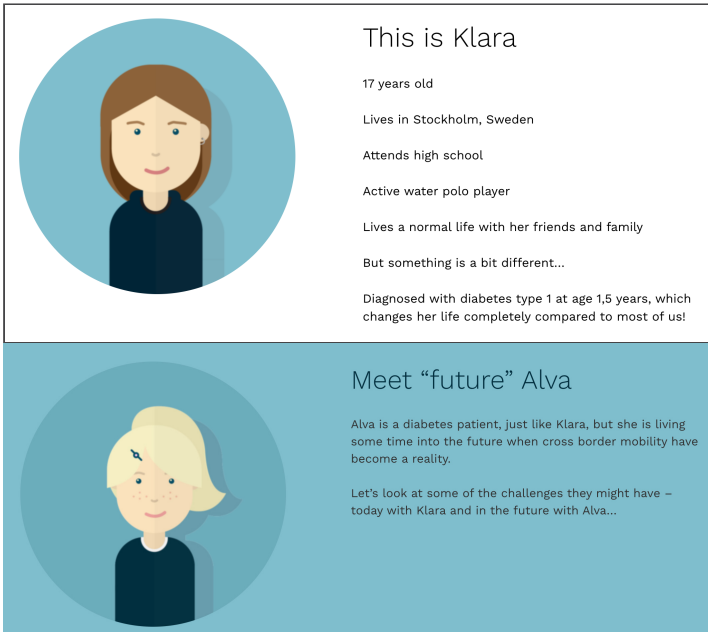
117. https://wiki.dvv.fi/pages/viewpage.action?pageId=117377490&preview=/117377490/235526906/Cost-benefit%20analysis%20of%20cross-border%20healthcare%20data%20exchange%20in%20the%20Nordic%20and%20Baltic%20countries_31052023.pdf

Case: Alva

To illustrate the possibilities and challenges that the sharing of health data in the Nordics presents, the Nordic Interoperability Project (NIP) created the Alva case. Alva is a Swedish diabetes patient in the near future, and we follow her journey through the Nordic region and see how shared health data is affecting her travels. [118]

Through these above-mentioned interoperability showcases it is possible to spark discussions and better understand the different needs of all citizens in different stages of life. It is essential to ask about and understand the different requirements of user groups to avoid creating realities that are discriminatory for some. Cross-border mobility is no exception and it represents a situation where all people must have equal power and opportunities to influence their lives and contribute to the development of society. Although matters of health data exchange are often discussed in largely technical terms, the solutions are developed ultimately to serve people equally and make their lives easier.

Cross-border mobility of health data enables more equal opportunities for all, but only if it is designed and implemented in a way that serves all its user groups without leaving anyone behind. Showcases such as Case Alva serve to remind that the goal of development work is to enable all patients to live and act in an open, seamless, cross-border healthcare ecosystem.



The screenshot displays two character profiles. The top profile, Klara, is a 17-year-old girl with brown hair, living in Stockholm, Sweden, attending high school, and being an active water polo player. She lives a normal life with friends and family but has been diagnosed with diabetes type 1 at age 1.5, which significantly changes her life. The bottom profile, Alva, is a blonde girl with a futuristic headpiece, representing a diabetes patient in the future when cross-border mobility is a reality. The text invites the viewer to look at the challenges they might face today with Klara and in the future with Alva.

This is Klara

- 17 years old
- Lives in Stockholm, Sweden
- Attends high school
- Active water polo player
- Lives a normal life with her friends and family
- But something is a bit different...
- Diagnosed with diabetes type 1 at age 1,5 years, which changes her life completely compared to most of us!

Meet “future” Alva

Alva is a diabetes patient, just like Klara, but she is living some time into the future when cross border mobility have become a reality.

Let's look at some of the challenges they might have – today with Klara and in the future with Alva...

Figure 20. Screenshots from the webpage of project Nordic Interoperability, Case Alva

118. <https://nordicinteroperability.com/case-alva/>

4.5 Key take-aways

1. Functioning and interoperable national and regional systems

Well-functioning national information systems are the starting point and foundations for further development for international integration, harmonisation, and co-operation. A policy-level commitment and investment in the process is vital to ensure successes in national and cross-border implementation. Ultimately, the same administrative bodies and developers are often engaged in subsequent cross-border projects.

Long-term development work is needed both on the national and on international level, and smooth cross-border health data exchange requires both national and international cooperation. There are many actors involved in health data exchange on a national level, but for international health data exchange especially the national authorities play a big role in driving the development forward. Regional cooperation in development is essential in ensuring interoperability.

2. Overcoming barriers to developing cross-border health data exchange

Multiple factors are slow down, prevent, or constrain data access and exchange of health data. These were identified in the baseline study **using the requirements on the European Interoperability Framework (EIF)**.^[119]

The key legal barriers slowing down, preventing, and constraining data access and exchange of ePrescriptions and patient summaries, are data privacy and information security-related challenges. Additionally, many countries do not have national legislation that supports cross-border health data exchange. Therefore, aligning national laws with cross-border services and identifying the need for amendments in the national legislation to ensure harmonisation on the national and EU levels creates the basis for smooth cross-border operability. Finally, political investments and prioritisation are needed to create or complement the national legislation concerning cross-border health data exchange.

119. See chapter 2. *The Ballpark and the key players*



It is worthwhile encouraging relevant authorities to actively participate in different types of EU-wide projects, such as joint actions. EU-projects should be utilized to support the development of relevant services and impact choices made at the EU level, as these projects are great avenues to launch initiatives and influence the outcomes. In addition, it is recommended that parties to these projects have strong willingness and capability to achieve the objectives, as this makes sure the outcomes are worth the effort and are of high quality.

– Konstantin Hyppönen, Policy Officer, DG Health and Food Safety (SANTE)

In addition, available human resources and financial issues for practical development work are significant organisational barriers. Information sharing between countries about different funding options and instruments available can be beneficial. Furthermore, establishing a national core team responsible for cross-border services can be beneficial for more effective coordination of and ensuring interoperability in national and cross-border services.^[120]

Semantic work is the core when it comes to smooth cross-border health data exchange. Sufficient alignment and translation of terminologies, code systems and mappings both nationally and internationally are needed to have enough detail in data sets that are commonly understood in different countries. The eHealth Digital Services Infrastructure (eHDSI) especially seems to be a key initiative for the cross-border exchange of ePrescriptions and patient summaries. Besides the semantics, patient-accessible electronic health records (PAEHR) and e-identification are also important themes that need to be considered in future development work.

Benchmarking, knowledge sharing, and common prioritisation between countries are important aspects for further development. Common international standards are key to successful data exchange, and it applies to multiple aspects of health data exchange, including data privacy protection and security methods, encryption, identity management and identification, technologies, and semantic issues.

120. Annika Ohlson, Swedish eHealth Agency, Sweden – Cross-border services 22.8.2023

Concrete actions to improve knowledge sharing could be to gather statistics or knowledge on what kind of information is found in different countries. Measuring and documenting processes provide essential information to further develop national and cross-border services and are a key to success.^[121] Multiple European cooperation structures to aid knowledge sharing and interoperability are already in place,^[122] and utilising these structures is key to overcoming barriers in national development.



Communication, training and briefing materials provided to the professionals play a key role in describing the similarities between national workflows and the corresponding eHealth@EU workflows, paving the way to the smoother cross-border operations in daily practice.

– Paavo Kauranne, the Social Insurance Institution of Finland

3. Effective collaboration between Nordic and Baltic countries

Effective collaboration between the Nordic and Baltic countries is key when implementing cross-border health data services. Utilising the existing platforms and creating opportunities for dialogue are important for facilitating learning and enabling successes in cross-border health data exchange. Furthermore, fostering a common Nordic-Baltic voice is valuable in encouraging closer Nordic cooperation in EU-policies.

Some Nordic and Baltic cooperation structures have already been established to strengthen collaboration on digitalisation, but cross-border development would benefit from further strengthening the collaboration in the region. Development activities are potentially significantly more productive when putting our collaborative strengths together and building interoperable processes and systems.

121. Vesa Jormanainen, Ministry of Social Affairs and Health, Challenges, and successes at policy level: electronic prescription and Nationwide Kanta Services in Finland since 2010 22.8.2023

122. See chapter 2.2 *Networks and Stakeholders*

4. The role of professionals in the implementation of the operational services

In addition to policy-level commitment and investment to cross-border health data exchange, the role of professionals at the actual implementation level testing and developing the services is essential. Their feedback and experiences should be followed-up and used continuously in further development of the services.^[123]

Cultural change needs to be supported in the daily operations of professionals working with cross-border health data exchange. They need to be encouraged to adopt behaviours and mindsets that are consistent with new requirements and processes.

Comprehensive training and available up to date information and materials on cross-border health data practices are essential to ensure the capacity of health professionals to implement and provide cross-border services, and to bridge the gap between national and cross-border practices.

5. The role of citizens

In all planning and development of cross-border health services, it is central to recognise the citizens role as active actors in creating and using health data, not just targets of data use.

On the national level it is important to ensure the participation of citizens and patients and ensure that citizens' have access to more and higher-quality health information, e.g. by developing a health information portal, ensuring citizens' access to their own patient records, health information and log data. It further important to develop electronic services (booking of appointments, electronic discussions, electronic document transfer, online consultation) as well as enhance interactive electronic services.^[124]

In addition to health professionals, citizens must also have the relevant and up to date information on cross-border health services and how their data is handled and available to them, to be able to be actively involved in their care. Cross-border health data exchange adds another layer to health service and health data utilisation, and it is crucial for citizens to actively give or deny consent for cross-border health data sharing for the implemented services to function efficiently.

It is also important to monitor the attitudes and experiences of citizens regarding data sharing. For this reason, the project "Achieving the World's Smoothest Cross-Border Mobility and Daily Life through Digitalisation" supported the publication of the results of the NCM project titled, "A Nordic survey to monitor citizens' use and

123. Paavo Kauranne, Kela, Cross-border eP/eD with Finnish Kanta-services 22.8.2023

124. <https://julkaisut.valtioneuvosto.fi/handle/10024/74737>

experience with eHealth”^[125]. The project is led by the Nordic eHealth Research Network (NeRN), which is a subgroup of the NCM, consisting of researchers with expertise in the field of eHealth^[126]. The survey examines citizens’ access, use and attitudes towards digital healthcare systems in the Nordic countries. In the context of data sharing, citizens were asked if they were willing to share data in the case of personal treatment with either healthcare providers or for research purposes across the Nordic countries. The results showed that more than 50% of citizens were willing to share their health data. More knowledge regarding the citizen perspective on eHealth can be found in the TemaNord publication, “A Nordic survey to monitor citizens’ use and experience with eHealth”, which will be accessible in late 2023 or early 2024.

125. Eriksen J, Hjermitsev C, Vehko T, Harðardóttir G, Koch S, Faxvaag A, et al. (2023). A Nordic survey to monitor citizens’ use and experience with eHealth. Copenhagen: Nordic Council of Ministers.

126. <https://thl.fi/en/web/thlfi-en/research-and-development/research-and-projects/nordic-ehealth-research-network-nern>

National level requirements for cross-border health data exchange

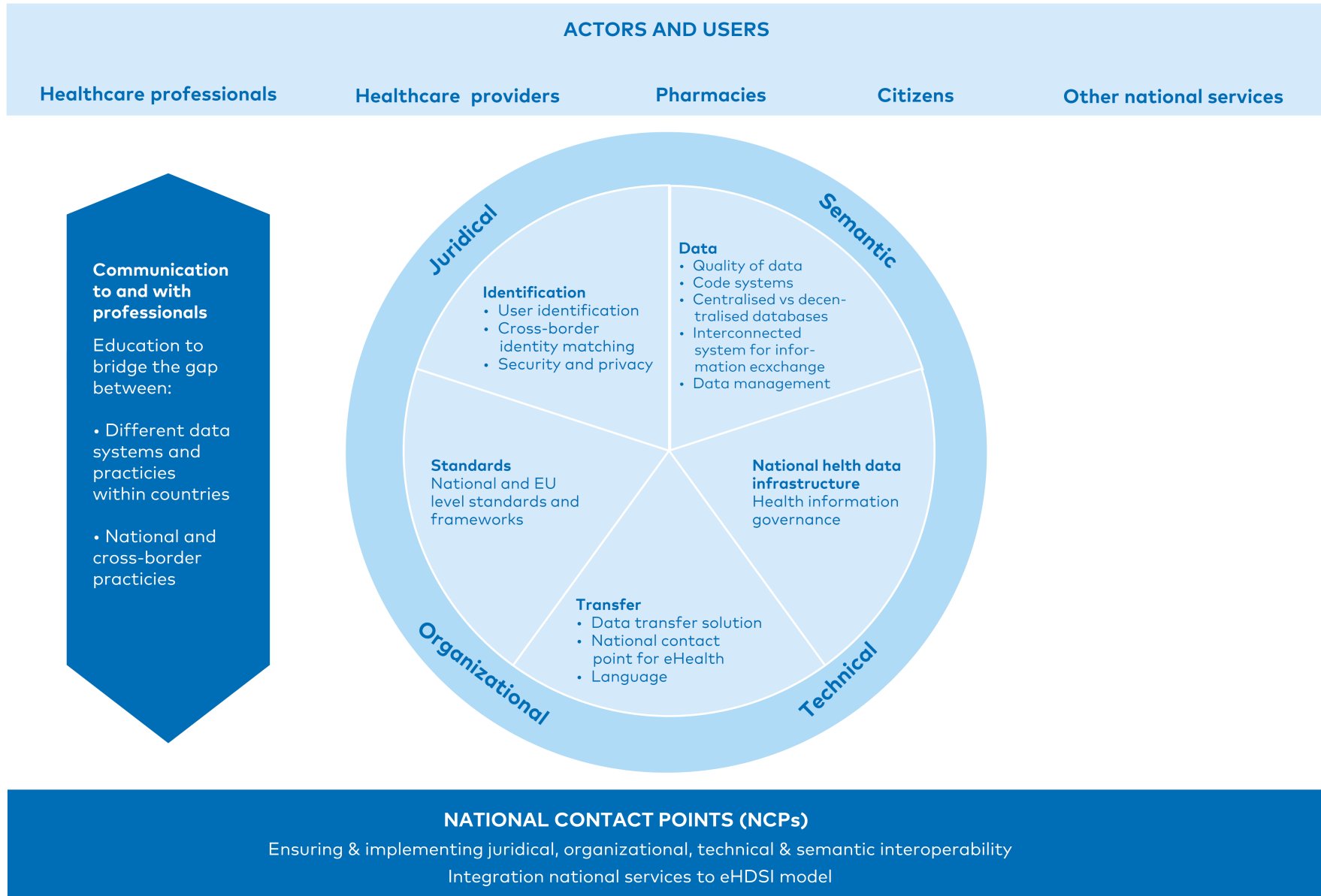


Figure 21. National level requirements for cross-border health data exchange

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5. Findings of work package 3: Versatile use of the Nordic and Baltic legal databases

Work package 3 (WP3), in the project *Achieving the World's Smoothest Cross-Border Mobility and Daily Life through Digitalisation* funded by the Nordic Council of Ministers, focused on questions related to versatile use of Nordic and Baltic legal databases.

5.1 Legal information in machine-readable format

When discussing cross-border data exchange and interoperability in the field of legal data, the concept is somewhat different than studying abroad (see chapter 3 for more information) or needing your health-related information abroad (see chapter 4 for more information). In Nordic and Baltic countries, national legislation is country-specific, although the EU harmonisation of legislation has had impact on the regulation at the national level. Citizens do not take their home country's regulations with them abroad but rather need to understand the local legislation in relation to the situation at hand. And should the person represent a private organisation or a public administrative body, the basic question remains the same: what the regulatory limitations are, and on the other hand, the regulatory possibilities in a specific country. Access to justice is closely connected to the access to legislation. Citizens of any Nordic or Baltic country have the right to access information on the legislative acts and their implementation in another Nordic or Baltic country. Thus, in a legal context the cross-border interoperability means sharing country-specific information on regulations and examples on how to interpret it.

Yet, just translating a regulation into another language is not a fully rational option. There are limitations to translating legislative documents; they cannot be translated word-for-word, nor can translation tools be used freely. The juridical force (legal validity) is connected only to the official legal languages of each country and the legislation will be assessed in court through those languages only, should there be cases of disagreements. Translated legal texts can though be used as an introduction to a country's main regulatory principles. Using translated regulatory texts, European citizens can get a better understanding of other member states' legal surroundings, whether for personal or business needs.



To be able to use the regulatory data more efficiently, the data has to be supported with context and background information – metadata, thesauri, and common formats. The adoption of metadata, thesauri, and common formats greatly facilitate the exchange and reuse of information. But to gain all the benefits from regulatory data with comprehensive metadata, providing access to that data online is not enough; providing the data in a machine-readable format enables development of advanced tools and services that will benefit both European citizens and organisations. It is the use of metadata and common data formats and publishing the data in a machine-readable format that enable interoperability and lead to both accurate interpretation of local legislation and concrete savings in time and money.

5.2 Standards and frameworks

To improve access to justice and legislative data in the Nordic and Baltic countries, there are several common standards and frameworks which can be used in the creation of legal information systems at the national level. These standards are fairly easy to implement and there are already a number of good practices and experiences in the utilisation of those standards. The following section introduces several standards and their key characteristics. In addition, the standards are introduced in Figure 21., where one can find which standards are used in each assessed country. (See chapter 2.1 Standards and frameworks for more information).

The **European Legislation Identifier (ELI)**^[127] is the European metadata standard for legal information. It is a system that enables making legislation available online in a standardised format, so that it can be accessed, exchanged, and reused across borders. ELI has been created to facilitate search, exchange, and interconnection of legal information and make it possible to look for legal information across legal systems.

127. ELI: <https://eur-lex.europa.eu/eli-register/about.html>

ELI includes *technical specifications on web identifiers* (Uniform Resource Identifiers, URIs) for legal information, *metadata specifications* for legal information, and a *specific language for exchanging legislation* in machine-readable formats. ELI is funded by the European Commission **ISA² programme**.^[128]

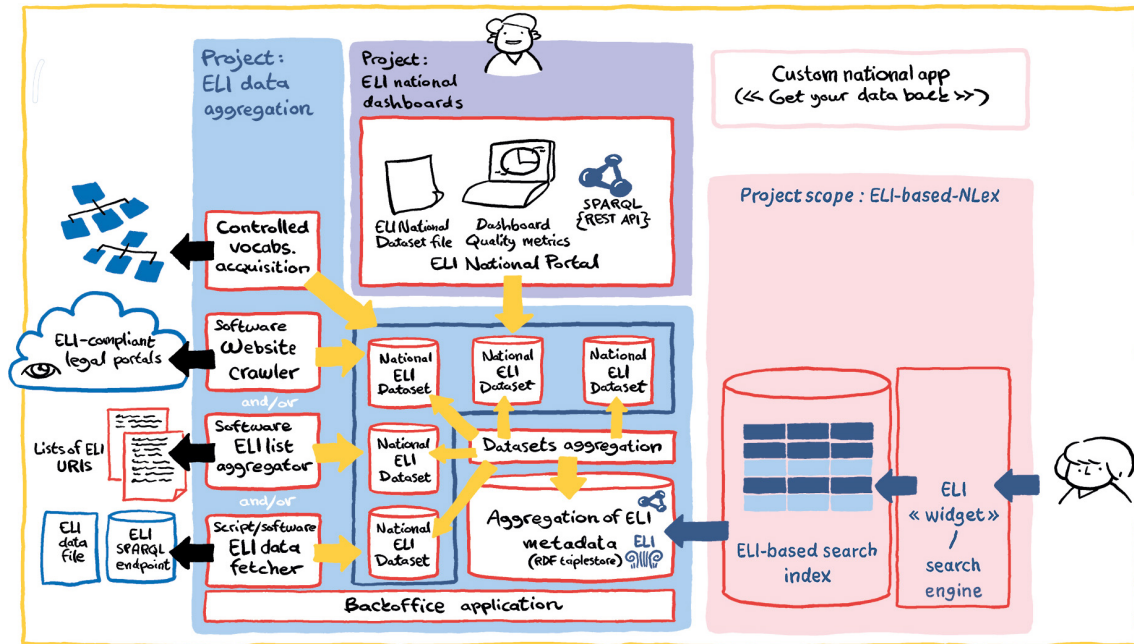


Figure 22. Future visions of ELI according the ELI Task Force

ELI metadata is a structured, standardised way to describe legal data. It provides means for identifying, classifying, linking, and finding legal information. It also connects legal information to other pieces of information and enables users to access and reuse it. Being able to search and access legal information through metadata makes it much easier to locate and use a specific piece of information than having to search just the actual contents of the resource. A common metadata standard is a key to interoperability between legal information systems. Publishers of legal information are free to use their own metadata schemas but are encouraged to implement the ELI metadata schema as well.

Akoma Ntoso^[129] is a structured technical XML standard for representing parliamentary, legislative and judiciary documents in a machine-readable format. It enables identification, classification, linking, and easy access to legal information through metadata. By adopting a common metadata standard, it promotes interoperability between legal information systems. Publishers are encouraged to

128. ISA²: https://ec.europa.eu/isa2/home_en/

129. Akoma Ntoso: <http://www.akomantoso.org/>

implement the Akoma Ntoso schema to enhance transparency and efficiency when accessing and reusing legal data. The primary goal of the Akoma Ntoso schema is to promote openness, accessibility, and interoperability in the legal domain on a global scale, while ELI, on the other hand, specifically targets the European Union's legal context. Amongst the assessed countries in the table below, Finland is the only country that uses the Akoma Ntoso standard. For this reason, this standard is omitted from the table. However, it should be noted that Akoma Ntoso is widely used by the European Union institutions.

Open Graph Protocol (OGP)^[130] enables any web page to become a rich object in a social graph. For instance, this is used on Facebook to allow any web page to have the same functionality as any other object on Facebook. Many different technologies and schemas exist and could be combined, there is not a single technology which provides enough information to richly represent any web page within the social graph. The Open Graph protocol builds on these existing technologies and provides developers with one tool for implementation. In OGP, basic metadata is based on RDFa which means that additional <meta> tags are put in the <head> of the web page. The four required properties for every page are: og:title (the title of the object), og:type (type of the object), og:image (an image URL representing the object within the graph and og:url (the canonical URL of the object as its permanent ID).

Thesauri are controlled and structured vocabularies with concepts represented by labels with hierarchical structure of broader and narrower terms. Thesauri play a central role in managing metadata and describing information resources, supporting the use of multiple languages. Using them ensures consistent indexing, allowing users to find relevant information accurately. By aligning metadata with the hierarchical structure of thesauri, data integration and exchange become smoother, enhancing seamless interoperability between different systems and databases.

130. Open Graph protocol <http://www.ogp.me>

	ELI meta- data	Dublin Core	Open Graph Protocol or Twitter metadata	Eurovoc	Keywords from national vocabulary	Endpoint for N-Lex search
Denmark (Rets- information)	x**	no	x	no	x	x
Estonia (Riigi Teataja)	x*	x	no	x	x	x
Finland (Finlex)	x**	x	no	no	x	x
Iceland (Stjornartidindi)	no	no		does not exist in Icelandic	x	IS is not included in N-Lex
Latvia (Likumi.lv)	no	no	x			x
Lithuania (e-Seimas)	x*	no	no		x	x
Norway (Lovdata)	x*	no		does not exist in Norwegian	x	NO is not included in N-Lex
Sweden (Lagrummet)	no	no	no	no	no	x

Figure 21. Table of applied standards within each assessed country

*Some ELI metadata properties

**ELI metadata in machine-readable RDF format

Remarks concerning the table: this table was compiled in the Pre-POC project and not all the data has been confirmed by the national contact point. There are differences in the use of metadata and thesauri in the Nordic and Baltic databases. The table does not include information from commercial databases. The data and languages of EEA countries Iceland and Norway are not included the Eurovoc thesaurus or in the N-Lex portal.

Eurovoc^[131] is a multilingual thesaurus created and used by the institutions of the European Union. It contains a comprehensive set of controlled terms and descriptors, organised hierarchically in a multilingual structure, currently available in 25 official EU languages. Eurovoc enables users to carry out documentary searches using a controlled vocabulary and with the benefit of semantic networks between concepts. It plays a crucial role in indexing and categorising EU documents, supporting cross-language access, and promoting interoperability. According to a pre-proof-of-concept (Pre-PoC) study done by Aija Valleala in 2022, EuroVoc thesauri seem to be the best choice for a common thesaurus in the Nordic and Baltic countries because it already has translations in most of the official languages of the region.

Dublin Core^[132], also known as the Dublin Core Metadata Element Set, is a set of fifteen core elements, or metadata items, for describing digital or physical resources. Dublin Core is maintained by **Dublin Core Metadata Initiative (DCMI)**. Dublin Core has been formally standardised internationally as ISO 15836, IETF RFC 5013, and as ANSI/NISO Z39.85.

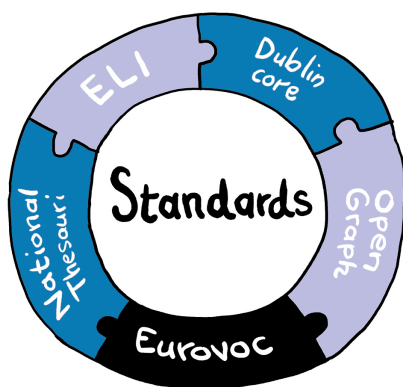


Figure 23. Standards: ELI, Dublin Core, Open Graph, EuroVoc, National Thesauri

131. Eurovoc: <https://op.europa.eu/s/y/Whr>

132. Dublin Core: <https://www.dublincore.org/specifications/dublin-core/dces/>

5.3 Networks and stakeholders

This chapter provides an insight into the key networks and stakeholders that could be utilised when working with this topic. The chapter aims to present different European and Nordic-Baltic stakeholders and their role in the changing regulatory regime.

The European Forum of Official Gazettes^[133] was launched in 2004. Its members are the organisations responsible for publishing the official journals of the EU Member States and the EU Publications Office. Since 2005, also legal gazettes outside the EU have been welcomed to participate in the Forum's work. The objective of the Forum is to exchange ideas and information on publication processes, technology, and best practices between countries.

The Nordic-Baltic Eight (NB8) is a regional co-operation format of Nordic and Baltic countries' prime ministers, speakers of parliaments, foreign ministers, branch ministers, secretaries of state and political directors of foreign ministries. The formal co-operation agreement has been in place since 1992. In the justice sector, the ministries of justice of the Nordic and Baltic countries have been cooperating for example on topics related to judicial cooperation and the exchange of data between the information systems.

The ELI Task Force (ELI TF)^[134] is a project established by the EU Publications Office and EU Member States with the objective to develop further the ELI standard and to update the specifications of the ELI standard. The work of the ELI Task Force has most recently resulted in the extension of the ELI standard to draft legislation (government bills, parliamentary documents, etc.).

The ELI (European Legislation Identifier) ontology for draft legislation (abbreviated *ELI-DL*) is an extension of the [core ELI ontology](#) which provides a formal data model to disseminate **structured data about legislative projects**. In particular, it enables the structured annotation of existing web pages (using RDFa or JSON-LD) in order to turn their information into machine-readable data.

133. Forum of Official Gazettes: <https://op.europa.eu/en/web/forum>

134. ELI Task Force: https://eur-lex.europa.eu/content/eli-register/governance_rules.pdf

The aim is to support the following use-cases:

- easier and earlier data exchange between legal information systems; typically to enable Member States to know that an EU procedure foresees an impact on existing legislation, and prepare its transposition earlier;
- legal monitoring of legislative projects to be alerted early on the legislation being drafted;
- cross-link the description of the legislative project across multiple websites (typically OJ, parliament and committees websites);
- increased transparency to the public;

ELI-DL enables the description of the 3 following main entities :

- *LegislativeProjects* (eli-dl:LegislativeProject), from the initial proposal to the final publication in an OJ;
- *LegalActivities* (eli-dl:LegalActivity) occurring during the legislative projects, such as reading before a chamber.
- *LegislativeProjectWorks* (eli-dl:LegislativeProjectWork).

ELI-DL is an extension of the [FRBRoo](#) and [CIDOC-CRM](#) ontologies.

e-Codex is the main European tool for establishing an interoperable, secure, and decentralised communication network between national IT-systems in cross-border civil and criminal proceedings. It allows its users to electronically send and receive documents, legal forms, evidence, or other information in a secure manner. Its users can be judicial authorities, legal practitioners, and citizens.^[135]

A new horizontal EU regulation on the digitalisation of judicial cooperation and access to justice will enter into force stepwise between 2023-2029, covering over 20 legal instruments in civil and criminal proceedings of a cross-border nature within the EU. It would supplement horizontally, rather than replace, existing rules on digital delivery of documents, digital hearings and other uses of information technology (IT) for cross-border judicial cooperation. In principle, Member States' competent judicial or other authorities would be under a duty to use digital channels of communication, whereas for individuals, the use of such channels would be optional.

Nobareg^[136] is a working group on regulatory issues related to digitalisation. It was established in 2022 to explore issues at the intersection between digitalisation and regulation in its realm, such as the Data Governance Act, Data Act and Artificial Intelligence Act (see page 11 for more information about the acts). Nobareg

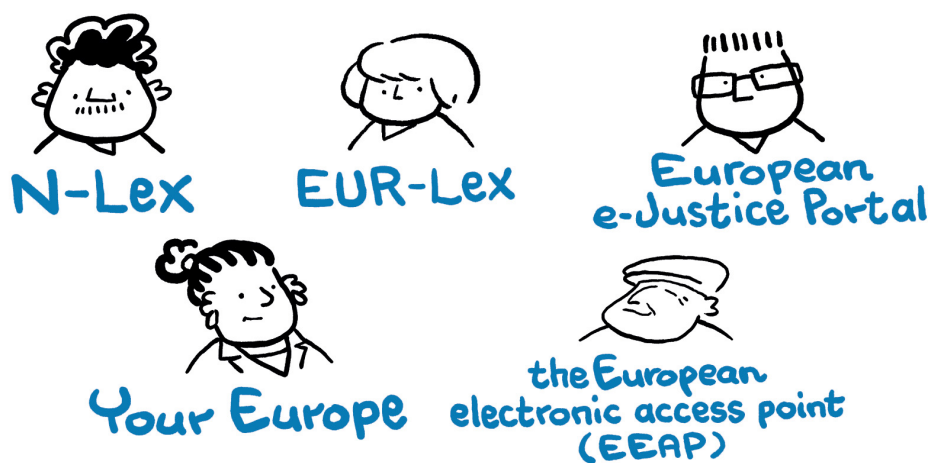
135. <https://www.consilium.europa.eu/en/press/press-releases/2021/12/08/digitalisation-of-justice-council-presidency-and-european-parliament-reach-provisional-agreement-on-e-codex/>

136. <https://www.digdir.no/datadeling/nordic-baltic-working-group-regulatory-issues-nobareg/4911>

coordinates the development of well-informed positions ensuring a value-based approach and prepares for new roles and responsibilities for the Nordic-Baltic public sector. Nobareg contributes to national digitalisation efforts through an exchange of experiences and common approaches to implementation of relevant EU legislation. In addition, Nobareg cooperates on issues such as making future legislation digitalisation ready, and the group identifies and discusses possible common values in the Nordic-Baltics within digitalisation and regulation. Nobareg is managed by the Norwegian Digitalisation agency.

5.4 Legislative info portals

There exist various different legislative info portals which serve both citizens, professionals and administrative bodies. For example, the European Union maintains several legislative portals: N-Lex, EUR-Lex, and European e-Justice, and in addition, the Your Europe portal that offers information on basic rights under EU law, provides access to network of national portals, as well as offering a free email or telephone contact for EU related assistance service and advice. These portals could benefit from access to legislative and judicial content as data. For instance, information portals often refer to sections of acts and decrees and display these to users.^[137]



137. <https://seco.cs.aalto.fi/publications/2018/oksanen-et-al-lvi-2018.pdf>

N-Lex^[138] is a legal search portal that gathers legislation from EU countries in a single website. It is a single-entry point to individual EU countries' national law databases. N-Lex also allows users to search several national legal databases simultaneously with a multi-country search feature. In addition, N-Lex provides a list of legislative websites of worldwide non-EU countries.

For whom: N-Lex is for legal experts who need to compare legislation in several EU countries. N-Lex itself contains no documents, but the data in the national databases is linked to N-Lex. N-Lex complements EUR-Lex by linking EU law to the national law of its member states.

EUR-Lex^[139] gives access to EU legislation, case-law and other legal documents coming mostly from the EU institutions. It is the EU's central official database for EU laws and legal documents. It is worth noting, that EUR-Lex provides access to legal documents in all EU official languages.

For whom: EUR-Lex is a portal for citizens, civil servants, and businesses, providing extensive information on EU legislation and EU processes.

The European e-Justice Portal^[140] provides information on justice systems and improves access to justice throughout the EU. The European e-Justice Portal is dedicated to facilitating access to justice and information about legal systems, while N-Lex and EUR-Lex primarily focus on providing access to legal texts.

For whom: the e-Justice portal is for citizens, civil servants, judges and private companies, providing both information on judicial processes in all EU member states and access to several databases (e.g. to find a lawyer).

Your Europe^[141] is a life event-based info portal on legislation and regulations from different EU countries. The portal provides practical advice and information concerning specific life events, such as travelling, work and retirement, taxation, education, and healthcare. Some of the topics link to national authorities' web pages. It is impossible to know from the front-end user interface how the links to national content are retrieved and maintained and whether any keywords are used.

For whom: The primary audience for Your Europe are EU citizens and businesses, while N-Lex, EUR-Lex and European e-Justice Portal serve legal professionals and other experts in particular.

In 2025-2026 a new service will be introduced in the e-Justice portal, **the European electronic access point (EEAP)**. It will be used for electronic communication between natural or legal persons and competent authorities in civil and commercial cases. The European Commission is responsible for the technical development and

138. <https://n-lex.europa.eu/n-lex/index>

139. <https://eur-lex.europa.eu/homepage.html>

140. <https://e-justice.europa.eu/home?action=home&plang=en>

141. https://europa.eu/youreurope/index_en.htm

maintenance of the access point. The EEAP allows natural and legal persons to file claims, launch requests, send and receive procedurally relevant information and communicate with the competent authorities in any EU member state.

NATIONAL INFO PORTALS

Suomi.fi is Finland's official info portal. It is aimed to help citizens and entrepreneurs in different situations. It has compiled a vast variety of public services the information, instructions, and services in one portal.

Borger.dk is Denmark's official guide to life in Denmark. It provides a single point of access to all public services whether they regard housing, working, family matters, taxes, transport, healthcare, education, or leisure.

Eesti.ee is Estonia's official info portal that contains information and advice concerning different life events and situations for both citizens and entrepreneurs.

For whom: For EU citizens and businesses, who have the need to start a judicial process in another country (monetary claims etc.).

By using the national citizens' info portals, it is possible to find relevant information for example on working, studying, and social security. National citizens' info portals are a good way of finding relevant information for legislation related to life events. As an existing solution, info portals require no additional development or resources from those countries which have national info portals. Citizens' info portals were studied in this work package's cost-benefit analysis in 2022^[142], and in the pre-proof-of-concept (Pre-PoC) study (Valleala, 2022)^[143].

In addition to national info portals, the states maintain databases where one can find laws, regulations, and court decisions. As an example, Finlex is currently undergoing a development (then: Semantic Finlex), where its contents are additionally in machine-readable format. The objective is to offer easily accessible and approachable legal information open to anyone, as well as harmonised and high-quality data for various applications. Subsequently, the users of Semantic Finlex are citizens and businesses or other actors which develop applications that require such data.^[144]

142. KPMG: Cost-benefit analysis of developing a shared interface between legal databases in the Nordic countries.

143. Valleala: Joint Nordic-Baltic Legal Search Interface – Pre-Proof-of-Concept Study.

144. <https://data.finlex.fi/fi/main>

FINLEX – FINNISH OPEN LEGAL DATABASE

Finlex.fi is an online database of Finnish legislative and other judicial information. Finlex is a public service of Finland's Ministry of Justice, and the database is available free of charge. Finlex has been available as public website since 1997. Technically the Finlex content is currently available for humans to read but not for machine-reading.

In 2024 Finlex will be renewed and published as **linked open data on semantic web** for intelligent web services. The goal is to ensure availability, accessibility, interoperability, and reusability of judicial data.

5.5 Proof-of-concept of the joint search interface for Nordic and Baltic legislative databases

Finland and Estonia are currently (2023) undertaking a proof-of-concept project to map out what kind of data requirements a common legislative interface between countries would have and what would be required of each country interested in participating in common legislative search interface and its development.

Establishing joint standards and principles for the development of legal databases in the Nordic and Baltic countries would significantly improve the availability and accessibility of information, as well as data interoperability in the future. The need for joint standards and principles is essential from the multitude of ongoing initiatives promoting cross-border data exchange on the EU-level, as well as the roadmaps published by existing search portals, such as N-Lex. The European Digital Strategy and EU Data Act (see Data Act on page 11 for more information), as well as SDG OOTS (see SDG OOTS on page 15 for more information) promote the sharing of information between public administration and citizens across the EU.

The benefits of utilising common standards include improvements in the quality, accessibility, and reliability of legislative data, in terms of both human and machine-readability. Utilising common standards should therefore be considered as a key goal in the future development of legal databases in all countries. The European Eli-standard is most prominent available standard for legal data. In the Nordic-Baltic countries only Finland, Norway, and Denmark have implemented ELI identifiers so far.

The proof-of-concept (PoC) taking place between Finland and Estonia in 2023 will provide valuable insight for establishing common standards and principles. In addition to providing information on the development requirements related to the standardisation of data sets, this PoC will also result in valuable hands-on experience other countries can utilise in their respective development efforts. The goal of the PoC phase is to identify the data requirements for a shared interface

between countries and create a demonstrator of an application for retrieving information from Finland and Estonia's legal databases. The PoC is aimed at testing the practical functionality of the search interface. The PoC complements text search with a faceted search. This allows user to search and filter documents based on metadata such as enforcement dates or keywords. The faceted search also shows all the available selections with their hit counts. Aalto University's Semantic Computing research group carried out the PoC from March 2023 to November 2023.

The PoC demonstrator is a development version that that does not include all the features proposed in the pre-PoC, but it should be familiarised with when planning the entire implementation. The demonstrator is intended to be used for collecting feedback from users at an early stage in order to identify needs and requirements and develop the product. It is natural that after this, some questions may remain open or new questions may arise.

The Finnish LawSampo service was used as the basis for the development of the demonstrator. The data of the LawSampo is retrieved from the Finnish Semantic Finlex. Semantic Finlex includes texts and metadata of legislation in RDF format applying the Eli-standard. LawSampo uses a simplified data model derived from Semantic Finlex. Estonian statutes are published in XML format, but not using the Eli standard. This means that it was necessary to convert the Estonian data to the RDF format. The conversion was done only in the extent that what was essential for the PoC application. Because the data from Finland and Estonia was not published using the same standard, it required some work to understand the Estonian data format, and to create an automatic script for conversion.

Language technologies were used to enhance the search functionalities. The PoC uses keywords based on the European Eurovoc vocabulary. These keywords are added to the documents using language models. PoC uses translations that are created using language models when an existing translation has not been available.

The PoC applications show how legislation of two countries can be compared using same faceted search interface. This requires that data from both countries is converted to the same data model. Additionally, to use the search functionalities optimally, the vocabularies need to be the same. If all European legislation would be published using shared standards it would be essentially trivial to scale up the PoC to all countries. However, when common standards are not implemented the conversion work would need to be redone separately for every case.

The PoC makes it possible to search legislation using a keyword "travel", for example, and the user will get statutes that are determined by the language model to relate to travelling in both Finnish and Estonian legislation. The user can also select a specific EU directive and get all the statutes relating to that directive from both Finland and Estonia. The PoC also includes simple tools to visualise the data.

5.6. Key take-aways

1. Functioning and interoperability of national systems with cross-border emphasis

Establishing joint principles for future development between the Nordic and Baltic countries is vital to achieve the European goal of interoperability. Well-functioning national information systems are the starting point which function as a basis for further development for interoperability, harmonisation, and enhanced co-operation.

Until now, the Nordic, and Baltic countries have been developing their national legal information systems independently and the cross-border interaction between the development projects has been scarce. The sharing of good practices and examples on the use of metadata standards could be useful especially during ongoing development projects on legislative data.



2. Continued and strong Nordic and Baltic collaboration could help address some of the barriers preventing cross-border data exchange

When it comes to comparing the identified costs and benefits, many of the barriers identified in earlier studies that are currently preventing cross-border data exchange could be better addressed if there was a stronger mandate for the countries to direct resources into the development. Depending on the level of maturity of national information systems, the development required of each country to reach the common standards and compatibility may demand much stronger prioritisation in terms of resource allocation.

Implementing the ELI standard has thus far been based on voluntary action, which may explain its slow adoption across countries, even if the benefits of cross-border data exchange may have been clear. This could imply that when there is a "critical mass" of Nordic and Baltic countries using ELI standard, some of the identified barriers currently preventing cross-border data exchange could be significantly reduced. This further underlines the need for strong Nordic and Baltic collaboration and coordination related to the cross-border exchange of legislative data. The NB8

formation of Ministries of Justice of Nordic and Baltic countries and the ELI Task Force could serve as a platform for intensified cooperation. The benefits of easier access to legislative information are clear, not only making cross-border mobility and daily life easier for citizens, but also for finding a common voice among the Nordic and Baltic countries to share knowledge and contribute to EU-level discussions as an integrated region.



The mobility of citizens has rapidly increased after the Covid-19 pandemic. Therefore, it is necessary to share good practices and intensify cooperation on providing cross-border access to legislation in Nordic and Baltic countries

– Aki Hietanen, Ministry of Justice (Finland)

Of the existing search portals for legislative information, N-Lex has stated that ELI-standard is the most prominent alternative for text-based search features in the future. In the Nordic-Baltic countries only Finland, Norway, and Denmark have implemented ELI identifier so far. The benefits of utilising the ELI-standard include improvements in the quality, accessibility, and reliability of legislative data, in terms of both human and machine-readability. Utilising common standards, such as the ELI-standard should, therefore, be considered as a key goal in the future development of legal databases in all countries.

3. Tackling the identified barriers when developing cross-border data access and data exchange

The factors that are slowing down, preventing, or constraining data access and exchange of legislative data have been identified **using the requirements of the European Interoperability Framework (EIF)** (see EIF on page 12 for more information).^[145] To establish semantic interoperability between the legal acts of Nordic and Baltic countries, smooth cross-border data exchange and easier access to data requires both national and international cooperation. In addition, resources and financial issues were identified as significant organisational barriers to cross-border development. The key legal barriers slowing down, preventing, and constraining data access to legislative data are data privacy and information security-related challenges.

145. See chapter 2. The Ballpark and the key players

To make progress, it is necessary to emphasise benchmarking, knowledge sharing, sharing of good practices and common prioritisation between countries as important aspects in further development. The existing ELI standard, the rich metadata in the Akoma Ntoso and Dublin Core standards and the versatile Eurovoc thesaurus connected to national ontologies and the national info portals can be seen as key elements for providing cross-border access to legislative data. The experiences and solutions of the proof-of-concept will be made available to all Nordic and Baltic countries, with the intention to lower the threshold to starting new cross-border piloting projects on legislative data.



Using similar metadata standards and data formats will open new possibilities for future co-operation

– Aija Valleala, Author of the Pre-Proof-of-Concept Study

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145. See chapter 2. The Ballpark and the key players.

About this publication

Handbook of cross-border data exchange within the Nordic and Baltic countries

Lessons learned in cross-border data exchange in the fields of studying and using healthservices in another Nordic and Baltic country, and in the use of Nordic and Baltic legal databases

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Nordic co-operation

Nordic co-operation is one of the world's most extensive forms of regional collaboration, involving Denmark, Finland, Iceland, Norway, Sweden, and the Faroe Islands, Greenland and Åland.

Nordic co-operation has firm traditions in politics, economics and culture and plays an important role in European and international forums. The Nordic community strives for a strong Nordic Region in a strong Europe.

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