Study on the Feasibility of Improving Information Exchange under the Prüm Decisions

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ABSTRACT

English

Ten years after its adoption the Member States and the Commission seized the opportunity to start the discussions on a number of important points that could be improved in a next generation Prüm legal framework. This report assesses each of these opportunities for improving the Prüm framework and presents its impacts.

The report also distils a Single Composite Option, a combination of minimal improvement solutions, with the aim to tackle the most urgent challenges. That option covers a review of the technical standards, improving the current data exchange, including facial images, driving licences and biographic data as new data categories, and enhancing the efficiency of the "hit" follow-up procedure.

The report also proposes a new IT architecture for Prüm via a central router and interoperability with current and future EU information systems in the area of home affairs and security. Integrating Europol as a new stakeholder in the Prüm landscape is also suggested as a part of the next-generation Prüm framework.

Français

Dix ans après leurs adoptions, les Etats Membres signataires des Décisions de Prüm et la Commission Européenne peuvent saisir l'opportunité de discuter un nombre de points importants pouvant être améliorés dans le cadre juridique de Prüm de prochaine génération. Ce rapport évalue chaque opportunités d'amélioration pour réformer le cadre Prüm, mettant en exergue l'impact liés à l'implémentation des améliorations.

Le rapport distille une Option Composite Unique, une combinaison des améliorations suggérées, qui a pour vocation de s'attaquer aux défis les plus pressants. Cette option couvre une révision, entre autre, des standards techniques, de l'amélioration de l'échange actuel de données, y incluant de nouveaux catégories de données comme les images faciales, les permis de conduire ou les données biographiques, ou l'amélioration de l'efficacité de la procédure de suivi.

Le rapport suggère également une nouvelle architecture du système informatique pour Prüm via un router central et la connexion avec les composants des solutions d'interopérabilité de l'UE dans le domaine des affaires intérieures et de la sécurité. La participation de nouveaux acteurs, tel que Europol, est également suggéré comme amélioration pour Prüm nouvelle génération.

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EXECUTIVE SUMMARY

The evolution of the Prüm Decisions

Prüm has promoted cooperation between EU law enforcement authorities by facilitating the exchange of DNA, fingerprints and vehicle registration data (VRD) between participating countries, and by setting out rules for operational police cooperation.

Under discussion from 2005, the Prüm Convention became European law in 2008 through the Prüm Decisions: Council Decisions 2008/615/JHA and 2008/616/JHA. Prüm has been a major help since then in investigating serious cross-border crime across the European Union.

The growing number of participating Member States has contributed to a significant increase in the number of automated data exchanges of all data types. Having launched with only seven participating Member States, the Prüm Network has 26 operational Member States for DNA and, and 24 for fingerprint and 25 for VRD exchanges.

In 2019, the Prüm Network had over 9.2 million DNA profiles available for comparison throughout all Member States' databases, with more than 2.2 million DNA searches made in that year. There were almost 400 000 fingerprint searches and 10 000 verified hits and more than 16 million VRD searches in 2019.[1]

This is a major achievement for the European Union and its Member States' law enforcement authorities. Nevertheless, stakeholders have raised some shortcomings hampering the effective and efficient use of the Prüm framework.

Although the number of connections set up has increased considerably, many still need to be implemented to achieve full network coverage.

The existing automated data exchanges are well established and functional, but suffer from some technical inefficiencies, ranging from outdated and non-harmonised exchange standards to restrictive quota that impede the Prüm framework.

In addition, Prüm does not accommodate currently the follow-up procedure used by Member States after a biometric match has been confirmed. This leads to differences in the quality of information exchanged, communication channels used and lead times to provide the relevant information.

In addition, advances in the technology landscape in recent years have rendered possible the inclusion of new data categories for automated data exchange.

The introduction of a central router architecture could bring many benefits such as scalability, resilience, cost-efficiency, the collection of statistics and central system monitoring.

Furthermore, current and future European information systems in the area of Justice and Home Affairs are being made interoperable. By introducing a new architecture for Prüm, building a connection between Prüm and interoperability solutions becomes possible.

Vision for the future

[1] Statistics and reports on automated data exchange for 2019.

From interviews and a questionnaire, this study identified 40 initial improvement opportunities. Following a first workshop with officials of Members States and EU bodies, such as the General Secretariat of the Council of the European Union, eu-LISA and Europol, the most relevant ones, prioritised by these experts, were grouped in fifteen improvement topics.

A round of 36 expert consultations and two additional workshops supported technical analysis of each improvement topic.

An Advanced Technical Report was drawn up covering operational and end-user implications, technical and security issues, and legal and data protection analysis for every improvement topic.

The Single Composite Option presented in this report, includes all relevant improvement topics for the Next Generation Prüm[2] considered in this analysis.

A part of the analysis was to look at the possibility of **harmonising the legal scope** of the Prüm Decisions across Member States regarding the use of the Prüm framework for searching of missing persons and unidentified dead bodies. The Prüm Decisions state that the solution is used for prevention and investigation of criminal offences. Differences in national law as to whether using the Prüm framework for searching missing persons and unidentified dead bodies means there are differences in how Prüm is implemented in different Member States. The study suggests including the possibility to use Prüm for missing persons and unidentified dead bodies, and thus creating a level playing field.

The study also analysed the current technical standards used for the exchange of DNA and dactyloscopic data, as well as for the implementation of facial image data exchange. The current data types exchanged under Prüm use different standards, data structures and technologies that require implementation of and ongoing support for multiple technologies and protocols. In addition, these standards do not all easily support interoperability with other systems or stakeholders outside Prüm and, therefore, the study analysed the possibility of adopting an updated and interoperable common exchange standard.

With all this in mind, this study focused on identifying, analysing and proposing several opportunities for Prüm in five improvement areas:

1. **Improving the automated data exchange;**
2. **Streamlining and improving the efficiency of the follow-up procedure;**
3. **Introducing new data categories;**
4. **Introducing new IT architecture;**
5. **Exploring the possibility of linking Prüm to other information systems and the interoperability solutions.**

All the opportunities proposed are designed to remedy at minimal level the shortcomings identified by the study or to include new solutions resulting from changes in the technological landscape and maximise the performance of the Prüm network.

Improving the automated data exchange

[2] From the initial list of 15 improvement topics, the inclusion of ballistics was not yet recommended since ongoing projects need to be completed before they can be fully considered.

The exchange standards used for the automated data exchange are considered to be outdated and not portable with other European systems. The study recommends the use of ANSI/NIST-ITL 1:2011 (2015 revision or later) as the single message exchange format for fingerprint, DNA and facial image data.

The study found no opportunity for revolutionary changes in the **exchange of dactyloscopic data**, but identified incremental improvements to help improve the efficiency and operational capability of existing standards. The recommendations for inclusion are:

1. **Standard Image Quality Analyses** – a standard quality framework (NFIQ[3], NFIQ2) is included in the Prüm technical specifications and adopted for analysis of ten-print images.
2. **Image Quality Metric** – the Prüm Interface Control Document (ICD) should require Member States to communicate quality scores of all ten-print images when exchanged.
3. **Usage Reporting** – Member States should systematically record a standard set of usage statistics.

Through discussions with Member States, the following additional recommendations for presented for optional inclusion:

1. **Vendor Feature Set Support** – The Prüm ICD could be updated to support the optional transmission of feature set data. This could allow for tighter integration and faster processing times between Member States having the same AFIS technology platforms, algorithms and versions.
2. **Candidate Lists (Reporting Match Scores)** – Member States optionally report the match score of all candidates to requesting Member States to understand relative confidence and possible merging of multiple results. This would only be useful where common technology is used and some Member States may prefer to adopt a re-matching process to rank all combined results.

The key challenge identified in the **exchange of DNA data** is the matching thresholds used in determining matches. The study identified the following recommendations for DNA-specific improvement opportunities:

1. **Configurable Minimum Loci** – the Prüm ICD should define that Member States can adopt configurable number of matching loci with other Member States based on bilateral agreements (with the minimum level remaining at six). The Prüm ICD should define a new field in all requests that allows the transmission of the threshold.
2. **Usage Reporting** – systematic recording and reporting of usage data should be implemented either by Member States or centrally if a central router is adopted. This will allow Member States to understand and report statistics on their search usage, requests received, errors, downtime and various other system metrics.
3. **Further Support for ESS** – The Prüm ICD should be updated to extend the loci definitions which are used by Member States in determining DNA matches. This will support Member States establishing bi-lateral agreements to increase the matching thresholds used. The final set of loci is subject to agreement by the working group.

Four different recommendations to enhance the **exchange of Vehicle Registration Data** have been retained, as listed below:

[3] NFIQ – NIST Fingerprint Image Quality, NIST – National Institute of Standards and Technology

1. Make the **country field optional:** When searching for a vehicle, police officers cannot always provide the country of a vehicle. The study recommends the option of being able to search for a vehicle without necessarily needing to provide the country of the vehicle.
2. Make the **search log for all international searches available.** Providing police officers with a log of past searches on vehicles, including the reason for the search, could help law enforcement officers by providing insights on the potential criminal behaviour.
3. Make it possible to **search for all vehicles registered under a single person or entity.** This will ease the access to information of multiple vehicles as law enforcement officers can currently only search using the chassis number and license plate of a single vehicle.
4. Make **vehicle colour and mileage** available. Providing additional information to law enforcement officers will help them to make sure they are controlling the correct vehicle.

Streamlining and improving the efficiency of the follow-up procedure

Three areas for improvement were identified. The recommendations are:

1. **Provide a minimum data set of personal and case related information in a short time frame**. This information should be provided within an agreed time period, depending on the urgency of the request. This would mitigate the issue of the lengthy lead times sometimes experienced now.
2. **Use one communication channel**, **SIENA**, by default. At present, the use of mainly two different communication channels, Europol's SIENA and Interpol's I-24/7, imposes additional administrative and coordination burden on law enforcement officers.
3. Implement **UMF as a Prüm data exchange standard**. Implementing UMF would have an impact in improving data quality and reducing data loss. This would mitigate Prüm's structural inefficiencies by structuring the data exchanged between Member States.

Introducing new data categories

Given the maturity of the technology and its capability within the context of forensic law enforcement, the study recommends that **the exchange of facial images** be adopted in Next Generation Prüm and that the ICD be updated to define the standards and formats needed. The data exchange process would be very similar to that used in existing fingerprint exchanges. However, Member States would use ANSI/NIST-ITL 1-2011 (2015 or later) as the data exchange standard.

The study recommends the following:

1. Prüm should define guidelines of quality standards for the capture of mugshot (known individual) reference data by law enforcement authorities. However, Member States should not restrict the automated data exchange of facial images based on quality solely;
2. Optionally, Member States can define a type of transaction to filter searches between mug shots (known) reference data and wild (unknown, surveillance trace etc.) data;
3. In order to balance bandwidth consideration against performance, the study recommends candidate list sizes of 50. However, where quality and database size is a concern, 100 may be preferable. The Prüm ICD should define a request parameter allowing Member States to define a maximum size; and
4. Non-matched personal data (facial images) should be removed within an agreed timeframe, for example 24-48 hours.

In addition, law enforcement officers have raised the need to access the driving license database to ensure the validity of an identity document/ person's identity based on the **driving license** data.

Member States have shown interest in the possibility to include the automated exchange of **biographic data**. Five Member States launched the pilot project of EPRIS-ADEP to assess the technical feasibility of such solution. The hit/no-hit approach, the material scope (i.e. stepping up of cross-border cooperation, particularly in combatting terrorism and cross-border crime) and the potential benefits for the law enforcement community in relation to improving the exchange of police records makes the solution a potential candidate to be integrated in Next Generation Prüm.

The inclusion of **ballistic data** was discussed, but discounted, when the Prüm Decisions were originally drafted. Today, the ballistic proprietary data formats are not yet interoperable between vendor's systems. However, members of the EMPACT project are currently investigating the use of a common standard, XP3, for the exchange of ballistic information. It is recommended that a decision on further action regarding the inclusion of ballistic intelligence under Prüm await the outcome of that project.

The study team also analysed the possibility to exchange firearms data using a Prüm-like approach, but has not been recommended, as other solutions are already in place.

Introducing a new IT architecture

Current mesh architecture of bilateral connections between Member States leads to uneven implementation of the Prüm framework and many connections have yet to be established. A switch from the current mesh topology to a **star topology** is recommended to ease the scalability of the connections to Prüm. Amongst other, a central router will allow for the collection of statistics, facilitate the maintenance and the monitoring of performance.

Furthermore, it is recommended that a web service based exchange protocol is implemented replacing the current SMTP technology. This would provide easier implementation of new exchanges and offer significant improvements in reliability, monitoring and report. The web service protocol and recommended data exchange formats are both XML based allowing easy integration.

Exploring the possibility of linking Prüm to the interoperability solutions

A possible connection between the Prüm network and the interoperability solutions has been envisaged, allowing competent authorities to search multiple information systems simultaneously. Given that law enforcement officers would be authorised to query the interoperability solutions to prevent or investigate a crime, a connection is recommended to be set up between the Prüm central router and the European Search Portal of the interoperability solutions.

Two articles (Article 20 and Article 22)[4] from the Interoperability regulations are deemed particularly relevant. Article 22 foresees that a two-step approach will be implemented that requires no ex-ante authorisation, indicating which source system (EES, ETIAS, VIS or EURODAC) contains the information. In case of a hit, the investigate officers must request full access to the particular records in a second step involving authorisation by a judicial authority.

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1578995996634&uri=CELEX%3A32019R0817

Using the provisions of Article 22 for purposes of a Prüm forensic search (in particular latent-fingerprints) would be highly impractical given these particular safeguards.

Article 20 of the Interoperability Regulations allows a police-officer (following adoption of national legislation) to perform an identification, using the fingerprints/facial-image of a person that is physically present to capture these biometric samples. It can thus not be used for investigations where biometric data (in particular latent-fingerprints) were captured in absence of the person.

The Article 20 only drives the reason for connecting Prüm to the Interoperability solutions.

Integrating new stakeholders

Finally, it appears worthwhile to **integrate Europol** in the Prüm landscape in order to render the data provided by the Third Countries accessible through an automated search.

All the recommended options form the proposal for the Single Composite Option, which is accompanied by a cost analysis of the improvement topics.

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1. INTRODUCTION

1.1 Background

The purpose of this study was to provide stakeholders with an analysis for the purpose of the future Next Generation Prüm by assessing potential improvement topics and compiling them into a Single Composite Option.

The Prüm Decisions enable EU Member States to exchange information for crime prevention and investigation, enhancing cross-border cooperation, particularly in combating terrorism and cross-border crime. This took an effect on law enforcement cooperation between Member States and facilitating the cross-national exchange of information through the access to national databases of DNA profiles, automated fingerprint identification systems (AFIS) and vehicle registration data (VRD).

Ten years after the adoption of the Prüm Decisions, it was deemed time to start looking, based on the lessons learnt during the implementation, for improvement options and to evaluate the feasibility of these options. The problem statement of this study has been to **assess and recommend the possible solutions for improvements for the Next Generation Prüm.**

The ever-changing technological and technical landscape, affecting security, biometrics, processes and systems, along with increasing data footprints and strong interconnectivity trends, are powerful enablers, creating an opportunity to make improvements to the current Prüm network that will have a real impact.

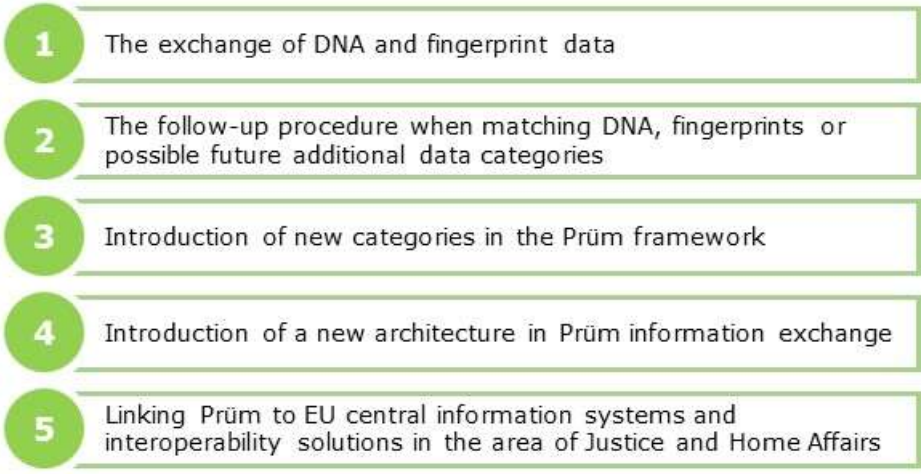
At the same time, there is a need to tackle the issues arising from differences in legal systems and technologies across the Member States and the absence of EU governance of the follow-up procedure, standards and data formats.

The study team carried out quantitative and qualitative analysis of these opportunities and constraints, triangulating them across several sources, including desk research into previous studies, surveys, interviews with subject matter experts, and expert workshops.

In response to questionnaires and interviews, Member States shared information on their achievements and challenges, needs, concerns and possible solutions. This was a clear demonstration of the willingness to improve Prüm and take it to the next level.

This work enabled the study team to identify a number of improvement opportunities in five main areas:

Figure 1 - Prüm improvement areas



The potential for improvement in each area was assessed against the following criteria:

- Operational and end-user implications;
- Technical and security;
- Legal and data protection; and
- Financial implications.

1.2 Structure of this report

The Final Report on Deloitte's Study on the Feasibility of Improving Information Exchange under the Prüm Decisions covers three major phases:

- the baseline scenario,
- improvements for the future, and
- a roadmap and related cost analysis.

Chapter 2 focuses on the current state of play of Prüm. It explores both how the exchange of data under the Prüm framework is working, and the challenges and constraints faced by stakeholders.

Chapter 3 provides an overview of the Single Composite Option or "Next Generation Prüm". This is a combination of a number of improvement opportunities. These cover the main changes regarded as crucial in any enhancement of the Prüm framework.

This Chapter also discusses improvement opportunities that could be incorporated in Prüm at a later stage. These elements have not been integrated into the Single Composite Option as ongoing projects still needed to be finalised before that can happen.

The chapter also presents the overarching conclusions of the Final Report.

Chapter 4 quantifies the costs of the different opportunities and contains an implementation roadmap.

For a detailed assessment of the improvements topics per improvement area, please consult the ***Advanced Technical Report***.

1.3 Caveats and limitations of this study

The following limitations applied throughout the study:

a) **Dispersed sources of information**: The Prüm network is decentralised, so the necessary information was not in DG HOME's possession and had, therefore, to be requested from the Member States. This limited the access to documentation (e.g. IT security specifications) and the understanding of the national contexts and challenges.

   Data on the cost of implementing the current Prüm framework and on possible future opportunities (e.g. new data categories) were required for our cost benefit analysis. This CBA is based on a range of inputs including:

   1) Known costs of previous Prüm data exchange implementation to Member States
   2) Costs from survey addressing adopting new data items such as facial images
   3) Costs from survey addressing the cost and complexity of technical changes, such as the adoption of ANSI/NIST-ITL 1-2011.

   Different Member States responded to each of these surveys and the lack of consolidated data points from all nations represents a challenge for the CBA.

b) **Benchmark unavailability**: Prüm has been a one-of-a-kind initiative in terms of automated data exchange and law enforcement cooperation. Little information is available for calculating the impact of new technical solutions and forecasting expected results. This makes it hard to find benchmark projects from which to draw inspiration for further improvements.

The proposed Single Composite Option is not the only possible solution to tackle the inefficiencies and shortcoming of the existing Prüm framework. This is a vision of the study team based on their expertise and information available to them.

2. BASELINE

This chapter provides an overview of the current functioning of the exchange of data under the Prüm framework. It also includes, as part of this baseline assessment, an overview of the three main challenges and constraints currently affecting the Prüm framework identified through the quantitative and qualitative examination performed by the study team. They are process efficiency, scope and regulatory challenges. These constrains provide the basis for the improvement opportunities, subsequently presented in the Single Composite Option chapter.

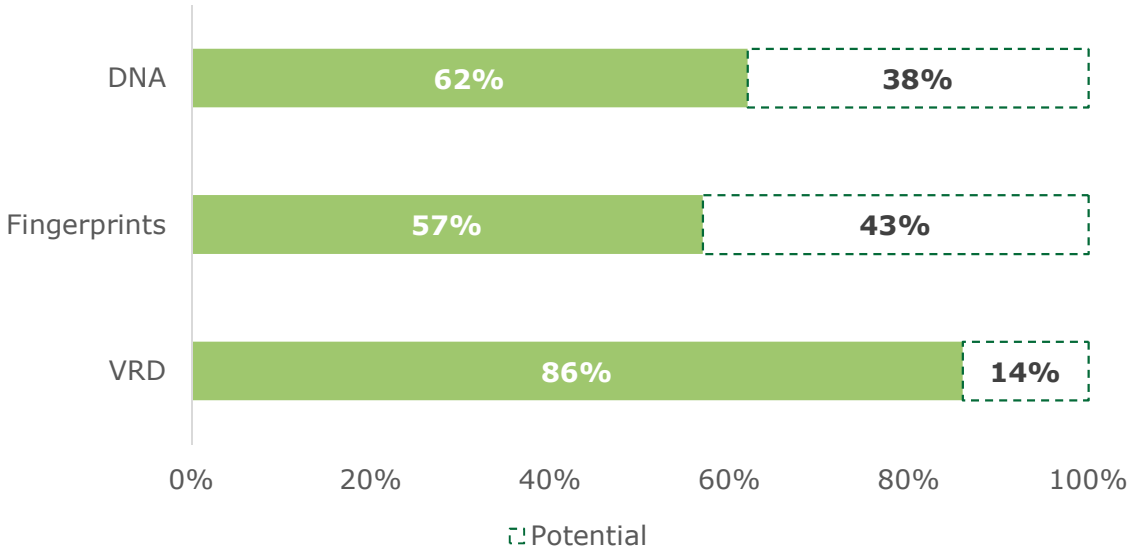
Member States exchange biometric and personal data through a hit/no-hit principle. Every Member States own and manage biometric databases. The databases can be queried by forensic experts from other Member States to verify that an unknown biometric sample is stored by their counterparts. The query returns a set of possible candidates that need to be manually verified by the forensic expert. If the forensic expert confirms that the unknown sample matches one of the possible candidates, he will request additional personal information related to the possible candidate for identification.

2.1 Prüm framework implementation: where does it stand?

In December 2019, Member States had implemented more than half of all possible operational DNA and fingerprint data exchanges between them. For biometric data, the network coverage reached approximately 60% of all possible connections – as some countries are not yet exchanging data and connections still need to be set up.

However, the coverage of operational data exchanges of vehicle registration data (VRD) is 86%. This stands out in comparison to biometric data and is mostly due to the different technical solution for connections offered by EUCARIS than is the case for DNA and fingerprint exchanges. .

Figure 2 - Coverage of operational data exchanges per data category (2019)



Source: Implementation of the provisions on information exchange of the "Prüm Decisions", 2019[5]

There are 26 Member States that are operational and exchanging information on DNA and fingerprints.

In 2019, more than 2.2 million DNA requests were sent out, and resulted in more than 100 000 matches. Almost 400 thousand fingerprints were sent out, for more than 10 000 hits.

There were 26 Member States operational and able to exchange **VRD** information under EUCARIS in 2019 (up from 11 in 2012). In 2019, in this data category, Member States recorded 16 million requests in total. These results and police officials confirmed that the Prüm Framework is a very useful tool to prevent and investigate cross-border crimes and terrorism.

Nevertheless, the **Prüm Framework faces challenges that have limited its ability to reach its full potential and effectiveness.** These mainly relate to discrepancies between Member States in terms of implementation, national legal frameworks and the level of process automation.

In 2018, i.e. a decade after the adoption of the Prüm framework (2008), the Council Working Party on Information Exchange and Data Protection (DAPIX) identified the following challenges[6]:

Table 1 - DAPIX challenges framework

Process efficiency	1.	Delays in the information exchange process are a point of concern
	2.	Mandatory legal processes in national legislation reduce the speed of current follow-up processes

[5] https://data.consilium.europa.eu/doc/document/ST-5081-2017-REV-4/en/pdf

[6] Based on the DAPIX report on developing Prüm (October 2018).

Prüm scope	3.	The scope of Prüm online access is limited to DNA, dactyloscopic and vehicle registration data
Legal challenges	4.	Current legal structure, established by the Prüm Decisions, makes adaptation to new technical/forensic standards challenging
	5.	The Law Enforcement Directive (EU) 2016/680 compels adjustments to the Decisions, as new privacy and security issues emerge

2.2 Prüm challenges and constraints

2.2.1 Process efficiency

Current standards for data exchange are outdated and do not use a universal format. Furthermore, the exchange of VRD only covers part of the data that it is possible to collect in a vehicle's life cycle.

Additionally, Prüm lacks a mechanism for consistent reporting or any prescribed levels of image quality and measures. There is no consistent statistics about many aspects of the use of the current system available.

In the follow-up procedure, the Prüm Decisions only cover the first step in the data exchange. They do not cover the follow-up communication process. This is "governed by the national law, including the legal assistance rules, of the requested Member State."[7] As a result, delays are a point of concern, with legal and administrative processes at national level reducing the speed of information exchange. The lead-time required to respond to a follow-up request can be too long for effective and efficient investigation or prevention of crimes. In extreme cases, Member States have reported waiting for several months in some occasions before receiving case-related information, which hampers the criminal investigations and prosecutions. Moreover,

The following improvement topics originated in these challenges:

- Improve fingerprint matching;
- Improving DNA matching;
- Improving VRD searches;
- Enforcing a quick answer in the follow-up procedure;
- Using a single communication channel;
- Implementing a UMF XML-based data format;
- Implementing a central router architecture and a web-based data exchange system.

2.2.2 Prüm scope

The application of the material scope under the Prüm framework is not uniform across Member States. In some cases, the differences between national legislative frameworks prevent law enforcement authorities from using Prüm for the same purposes.

Additionally, Prüm was originally designed for technologies mature enough for the automated data exchange. Back then, the technology was ought to be insufficiently mature to exchange ballistic data. The technical evolution in the past years has led the

[7] Council Decision 2008/615/JHA

study team to assess the suitability of the automated exchange of several new data categories.

Member States' law enforcement authorities possess national databases related to criminal investigations, i.e. the police records. Locating, which Member State may have relevant information and obtaining this information on police records from other Member States is generally time-consuming and based on manual exchanges via traditional police cooperation channels. The exchange of biographical (alphanumerical) information between Member States under Prüm would reduce the overall efforts in this field, similarly as Prüm reduces the effort for the exchange of vehicle registration and biometric data.

Law enforcement authorities have requested the access to the driving licenses' databases of other Member States to corroborate the trustworthiness of the identity documentation/driving licence and through that the identity of a person.

At present, Member States can use I-24/7[8], SIENA[9], SIRENE[10], liaison officers' networks or police customs cooperation centres as communication channels for the follow-up procedure after a hit has been confirmed. However, no harmonised approach is followed, decreasing the efficiency of the follow-up procedure.

Moreover, current outdated standards do not easily support interoperability with other stakeholders outside Prüm. In May 2019, the European Parliament and the Council adopted regulations (2019/817 & 2019/818) establishing a framework for interoperability between EU information systems for borders and visas and for police and judicial cooperation, asylum and migration.[11] Several major European information systems will be able to exchange data and share information, but the "Prüm system" was not included as it is still based on a fully decentralised concept.

Finally, potential stakeholders that could exchange information over the Prüm network have been identified.

The following improvement topics originated from discussions held with stakeholders, or from the afore-mentioned challenges:

- Enlarging the material scope of the Prüm framework;
- Using a single communication channel;
- Including facial images in Prüm;
- Integrating the driving licence data set in Prüm;
- Exchanging firearms and ballistic-related data;
- Integrating the exchange of biographic data (police records)in Prüm Decisions;
- Integrating the Prüm network with the interoperability solutions of Justice and Home Affairs;
- Integrating new stakeholders in the Prüm landscape.

2.2.3 Legal considerations

The information presented above indicates that there is room for improving the current Prüm Decisions framework. This will require changes to legislation, while taking into

[8] Interpol I 24/7 communication channel

[9] Europol SIENA information exchange tool

[10] National SIRENE bureaus in each Member State serve as contact points for the SIS II, the Schengen information system for alerts on persons and objects

[11] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0817

account the recent EU developments in data protection and the existing EU legal framework on law enforcement access to and exchange of information..

To assess the legal implications of amending the Prüm Decisions, two major pieces of European legislation have to be taken into account. These are the General Data Protection Regulation ('GDPR')[12] and the Law Enforcement Directive (Directive (EU) 2016/680) ('LED')[13]. Only LED is relevant in this context as competent law enforcement authorities under Prüm framework process and transfer natural person's sensitive personal data (e.g. biometric data) for the prevention, investigation, detection or prosecution of criminal offences.

The overall data protection and legal assessment indicates that all solutions can be implemented as long as the above mentioned legal frameworks are respected. In particular, two legal principles, data minimization and proportionality require in certain cases the need for additional safeguards such as stricter rules for data access, four eyes principle or automated destruction of data.

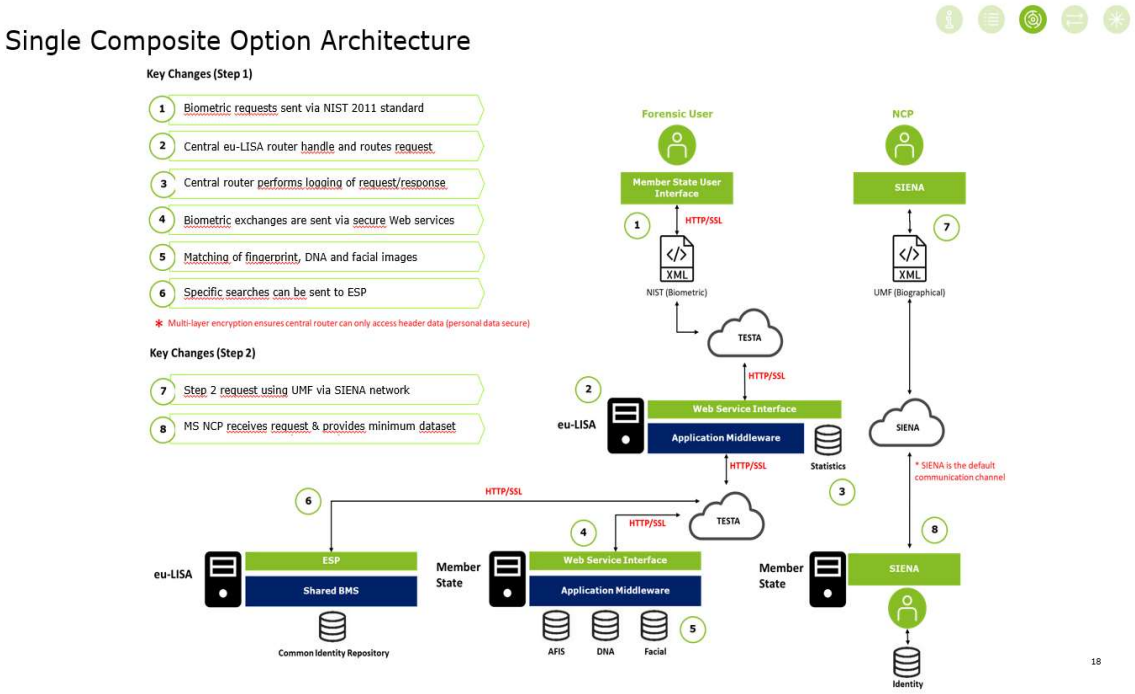
The changes in the new Prüm framework will require assessing the data protection aspects in the Impact Assessment and if necessary, in DPIA to ensure that all recommended safeguards will suffice.

[12] Op.cit.
[13] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016L0680

3. SINGLE COMPOSITE OPTION

In Chapter 3, the study details each of 15 opportunity topics discussed below under the five opportunity areas' framework[14]. Each topic went through an operational, legal, financial and technical evaluation to underpin the recommendation of improvement measures presented in the Single Composite Option or "Next Generation Prüm". The ***Advanced Technical Report*** contains the full assessment.

The image here below provides an overview of most changes making up the Single Composite Option.



Due to the variety of improvement opportunity, the following opportunities are not present in the visual:

- Enlarging the material scope of the Prüm framework; and
- Adding new capabilities to VRD exchanges

3.1 Improvements in the Prüm Decisions

Based on the improvement opportunities retained after the lightweight feasibility assessment and the outcomes of the qualitative impact analysis, the study team determined one comprehensive option for the future information exchange under the Prüm Decisions, matching each improvement topic to a pre-determined improvement area.

Table 2 - The Five Opportunity Areas framework

Improvement area	Improvement topics
	Enlarging the material scope of the Prüm framework

[14] Integration of ADEP-EPRIS and of ballistics data are long-term options discussed subsequently.

Improving the automated data exchange	Revising Prüm technical standards
	Improving fingerprint matching
	Improving DNA matching
	Changing VRD exchanges
Streamlining and improving the efficiency of the follow-up procedure	Enforcing a quick answer in the follow-up procedure
	Establishing a single communication channel
	Implementing UMF XML-based data format
Introducing new data categories	Including facial images within Prüm
	Integrating the data set relative to driving licenses in Prüm
	Exchange biographic information
Introducing new IT Architecture	Implementing a central router architecture
	Implementing a web-based data exchange system
Adding interoperability solutions	Integrating the Prüm network with the ESP
	Integrating new stakeholders in the Prüm landscape

3.1.1 Improving the existing automated data exchange

A range of improvements is put forward to make the automated data exchanges of data items more efficient and usable for Member States.

Since the possible cases that fall under the crime definition is not uniform across Member States, **enlarging the material scope of the Prüm framework** would benefit States whose legal framework does not cover using Prüm in certain situations (i.e. missing persons, or dead bodies). The scope of Prüm should be extended to allow the use of Prüm in non-criminal searches for missing persons and unidentified human bodies.

DNA and **fingerprint data items** exchanged across Prüm are implemented in different message formats. A single message format and encoding for all data items, including the recommended new facial image data type, could provide a common communication protocol across all exchanges – supporting an increase in adoption of Prüm and ensuring consistency of implementation across Member States. The study recommends ANSI/NIST-ITL 1:2011 (2015 revision or later) as the single message exchange format for fingerprint, DNA and facial image data.

The current standards for the exchange of **fingerprint images** and methods for recognition between Member States are widely considered successful and no major issues were identified. Nonetheless, a number of incremental improvements have been analysed and recommended to provide improved operational use and performance. These include communication of standard quality metrics and the capture of statistical usage data. In addition, optional recommendations have been included in relation to reporting of match scores and support for exchange of biometric template data.

Existing standards for the exchange of DNA data should be updated to allow Member States to adopt a configurable number of matching loci thresholds with other Member States. The existing rule of six matching loci from the European Standard Set (ESS) would remain the default minimum, but Member States could agree custom thresholds

with other Member States. To support this, the Prüm standard set would need updating to include additional loci from the ESS.

VRD exchanges should be enhanced by making available additional data on the vehicle's life cycle. Prüm users should be able to perform searches of all vehicles registered to a given name or entity, while also extending the VRD dataset and search capabilities, e.g. adding vehicle colour and mileage data in VRD query responses.

3.1.2 Streamlining and improving the efficiency of the follow-up procedure

The effectiveness and usefulness of Prüm is hampered by the fact that it does not cover the exchange of personal and case related data exchange after a match has been verified. In certain occasions, the lengthy waiting time for receiving the follow-up information has hampered the efficient crime prevention or investigation.

The study suggests introducing a step where the core information of the identity details would be shared in an agreed reasonable timeframe is fundamental within the Next Generation Prüm. There is currently no common agreement on the information to be provided during the follow-up procedure. Effort dedicated to gather the information or administrative burden, therefore, vary from one country to another. In order to fasten the exchange of follow-up information, it is recommended to **enforce a quick answer in the follow-up procedure** containing a common minimum data set of information.

The proposal for the minimum data set is the following:

- First name and surname (mandatory);
- Date of birth (mandatory) and place of birth (mandatory where available);
- Gender (where available);
- Nationality or Nationalities;
- Most recent offence in which the fingerprints/DNA-profile (and possibly facial images) were collected (mandatory);
- Contact details of the law enforcement authority responsible for the case (mandatory);
- Additional DNA, fingerprints and mugshots (optional).

The study team suggests **deciding on a single communication channel** for the follow-up step. The default communication channel for the follow-up (step 2) process is recommended to be Europol SIENA. SIENA is ought to be the most suitable option since it is an accredited secure channel for law enforcement information exchange managed by Europol, European Agency for Law Enforcement Cooperation which is already used by all Member States and can be integrated for into national systems, supporting efficiency gains. SIENA will need to be adjusted to the needs of the Prüm community, i.e. the priority and monitoring deadlines.

In order to ensure consistency and easy integration between Member States within this improvement area, the study team suggests that all communication of minimum datasets relating to matching of individuals should **use the XML based Universal Message Format (UMF).**

3.1.3 Introducing new data categories

The introduction of new data categories, prompted by the emergence of new technologies and investigation tools, may be important in enriching the current data exchange process and solving crimes that otherwise would have gone unsolved.

Accordingly, **facial image exchange** should be included in Prüm for the purposes of automated matching. The following should be included (for detail, see the Advanced Technical Report):

1. The file format used for data exchanges should be based on ANSI/NIST-ITL 1-2011 (2015 or later);
2. The primary workflow for the exchange of requests and responses should be based upon that currently used for fingerprint exchanges;
3. Prüm should define guidelines of quality standards (i.e. ICAO[15]) for the capture of mug shot (known individual) reference data by law enforcement authorities however, Member States should not restrict inclusion based on quality;
4. To balance bandwidth consideration vs performance, the study recommends candidate list sizes of 50. However, where quality and database size is a concern, 100 may be preferable. The Prüm ICD should define a request parameter allowing Member States to define a maximum size of the candidate list.

The New Generation Prüm should **integrate data sets relating to driving licenses** so that law enforcement authorities have access to driving licence information from other Member States via the EUCARIS application to corroborate or nullify the trustworthiness of other documentation for identity verification or permission to drive a vehicle.

Law enforcement authorities have pointed out that a solution to exchange biographic data could facilitate cross-border cooperation . Member States launched the European Police Records Index System initiative (EPRIS-ADEP pilot project) with the scope to minimise manual processes for identifying whether certain law-enforcement related biographic data is available in one or several Member States. Given the same application scope (i.e. crime prevention and investigation) for these exchanges and that it follows a similar two-step approach as Prüm, it is recommended that the **exchange of biographic data be integrated** in the Next Generation Prüm.

3.1.4 Introducing new IT Architecture

When implementing the Prüm Decisions, Member States have established bilateral connections with other Member States, resulting in a mesh network. A Member State has to establish a connection with 31 other countries (the 27 other Member States, Iceland and Norway, and soon Switzerland and Liechtenstein) that is replicated through each data category.

As mentioned earlier:

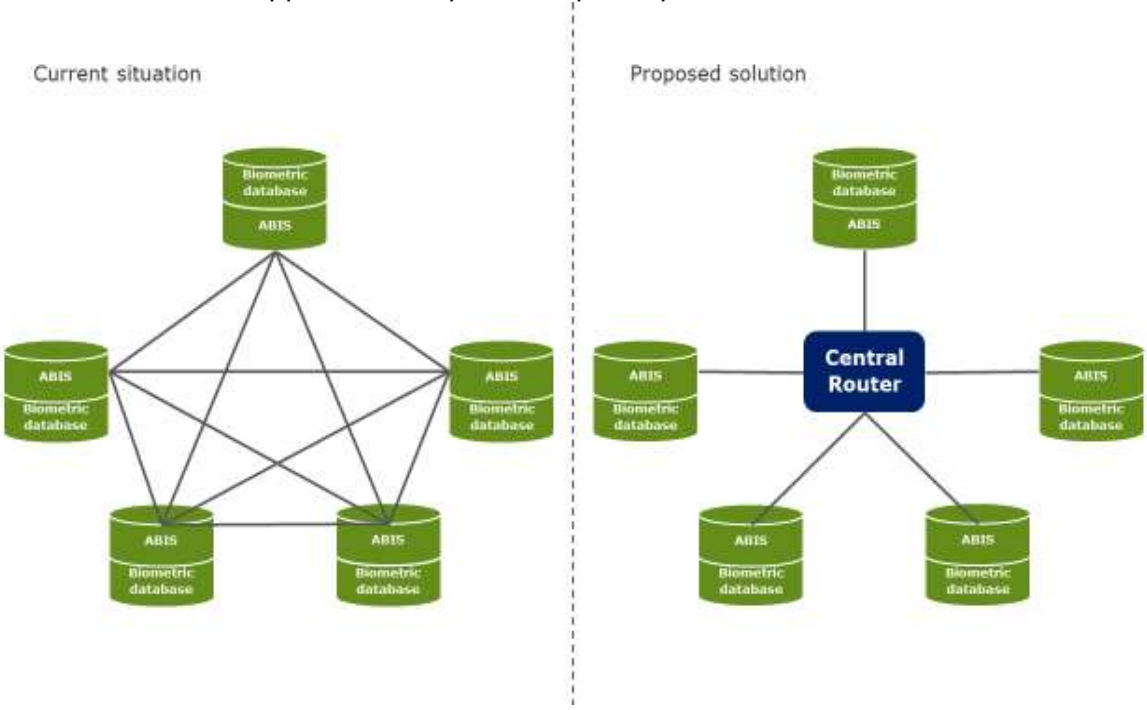
- The network has not reached full coverage;
- The network is not scalable; and
- Statistics have to be collected nationally which often leads to major discrepancies in numbers even between two Member States connected to each other via bilateral connection.

Therefore, the study recommends the **implementation of a central router** as a brokering mechanism. Member States will only have to set up and maintain a single connection.

The new IT Architecture would provide:

[15] International Civil Aviation Organisation

1. Easier adoption and less complex national level integration and maintenance support as Member States would only need to integrate with 1 single end-point (central router);
2. Centralised monitoring of the system performance and capturing of statistical usage data;
3. Optionally, easier integration with external systems such as the interoperability solutions;
4. Reduction in national level costs through less complex IT platforms; and
5. Centralised support and help desk capability



The study also recommends that the revised architecture be based on Web services for the communication of all biometric data types in replacement of the existing SMTP based architecture. Adopting Web services as the primary communication protocol will allow the following:

1. Easier integration of new connections and less infrastructure components required (email servers);
2. Better support for XML based messaging formats such as ANSI/NIST-ITL 1:2011 and UMF; and
3. Enhanced options for security such as dual layer encryption should this be desired to be implemented.

3.1.5 Adding interoperability solutions

On 22 May 2019, a framework for interoperability between EU information systems in the field of borders and visa (Regulation (EU) 2019/817) and in the field of police and judicial cooperation, asylum and migration (Regulation (EU) 2019/818) were published. The interoperability framework solves the problem that, to date, data are separately stored in various large-scale IT systems at the EU level, but the systems can principally not communicate with each other.

Of the six major EU central information systems[16] that are to be made interoperable by using central components, five store biometric information. The CIR will serve as common database for the five EU central information systems registering. Biometric data of 300 million non-EU citizens are expected to be stored.

Currently, the interoperability solution does not take into account the possible integration of the Prüm network. Even though the solutions are mainly designed for border and migration management, the regulations contain two specific articles relevant for the law enforcement community:

1. Article 20 defines 'Police identifications' where a police officer can, where fingerprints were collected in the presence of a person, perform an identification to retrieve the identity (names, date-of-birth, gender, travel-document-details) of that person.
2. Article 22 defines a 'two-step law enforcement access' to the (mainly biographical) data in the CIR.

The Advanced Technical Report suggests **connecting the proposed Prüm central router to the European Search Portal (ESP)**. However, only Article 20 is relevant in the context of Prüm.

By connecting the central router with the ESP, only one level of integration will be required, rather than one for each individual Member State. Member States will need to provide support (e.g. testing) to ensure that the connection is well established.

The study team also recommends **integrating new stakeholders in the Prüm landscape**, making the information provided by third countries to Europol accessible for the automated exchange of data via the Prüm network.

By implementing the Single Composite Option the following benefits would be reaped:

- An updated material scope of Prüm to allow searches for missing persons and unidentified human bodies for a level playing field.
- The Prüm network will be scalable, and all participating countries will be connected one to another.
- Member States will not need to set up an interface to the interoperability solutions to perform forensic searches.
- The data format used will be consistent, and interoperable with other national and EU systems.
- Member States will have access to broader data sets (i.e. facial images, driving licences and biographic data) that they struggle to obtain today.
- Member States will have access to biographic data provided by Third Countries to Europol.
- Lead times in providing answers to follow-up requests will be shortened.

3.2 Long-term optional element

As mentioned in chapter 2, the inclusion of data on ballistics in Prüm was considered as potential opportunity topics for the Single Composite Option.

The opportunity is deemed interesting for the improvement of the Prüm framework, but cannot be recommended today as information is still missing to take an informed choice. The proprietary data formats of the different ballistic vendor solutions are currently not

[16] VIS, SIS, Eurodac, EES, ECRIS-TCN and ETIAS

interoperable. A project under EMPACT-Firearms[17] is currently investigating the possibility of creating an interoperable format for such exchanges.

3.3 Final Conclusions

Processes standardisation and the maturity of the technology supporting the exchange of information are key in building the Next Generation Prüm framework. Improving the automated data exchange, while introducing new data categories, under a new IT architecture will lead to significant effectiveness and efficiency gains.

The benefits and efforts to implement vary a great matter depending on the opportunity. The recommended improvement opportunities are grouped by the magnitude of benefits they bring to Prüm stakeholders:

High benefits

1. Include facial images data exchange within Prüm
2. Include biographical data exchange within Prüm leveraging the EPRIS-ADEP technology
3. Implement a central router and web-based architecture
4. Revise Prüm technical standards
5. Enforce a quick answer in the follow-up procedure or include common core data by default
6. Integrating new stakeholders in the Prüm landscape

Medium benefits

7. Include driving licenses data under Prüm
8. Establish a single communication channel
9. Implement UMF
10. Integrate the Prüm network with the ESP

Low benefits

11. Enlarge the material scope of the Prüm framework
12. Improve DNA matching
13. Improve fingerprint matching
14. VRD related changes

In terms of regulatory adjustments, the implementation of changeslies primarily with the Member States. Initial work will, however, be needed in conjunction with the European Commission to define and document the adopted specification.

In terms of costs, this report estimates that EUR 125.462.520, 00 will be necessary for the implementation and recurring costs of the Single Composite Option over an implementation period of at least 4 years.

The Prüm Decisions enhanced by the proposed Single Composite Option will, along with other EU policy actions, ensure an even more stable and secure European Union.

[17] European Multidisciplinary Platform Against Criminal Threats

4. COST-BENEFIT ANALYSIS

To understand the magnitude of the investments required to implement the improvement opportunities recommended in the study, a cost analysis was performed. Due to the nature of the improvement opportunities retained as part of the Single Composite Option, it has been deemed appropriate to deviate from a standard cost-benefit analysis. The main reason for this methodological deviation is that the benefits cannot be quantified in monetary terms given the specific nature of security and law enforcement fields.

In some cases, it is anticipated that the Member States will already have the capacity to implement the improvements, and therefore limited costs can be attributed to the implementation of this change. Therefore, the costs of the following opportunities have not been quantified:

- **Enlarging the material scope of the Prüm Framework**: The associated costs are expected to be limited (except for the cost associated with making legislative amendments, change management and communication), since this only affects the cases in which Prüm can be used.
- **Enforcing a quick answer in the follow-up procedure:** The study recommends that Member States agree upon a timeframe to provide the minimum set of data. However, if Member States should re-organize its work processes to be able to provide the minimum data set within the time limits, e.g. automation of certain steps, the associated costs should be calculated at Member States level.
- **Establishing a single communication channel:** The proposed communication channel SIENA should be operational at every Member State. Given that Member States are already using SIENA, no extra costs are foreseen. Costs were calculated to cope with the requirements to operate the communication channel on a 24/7 basis.

The table below provides an overview of the costs likely to be incurred for the different opportunities in the Single Composite Option. For further information on how the numbers were calculated, kindly refer to the separate Cost Analysis document. The costs are the estimated one-off costs to implement the improvement opportunity

Table 3 - Single Composite option costs

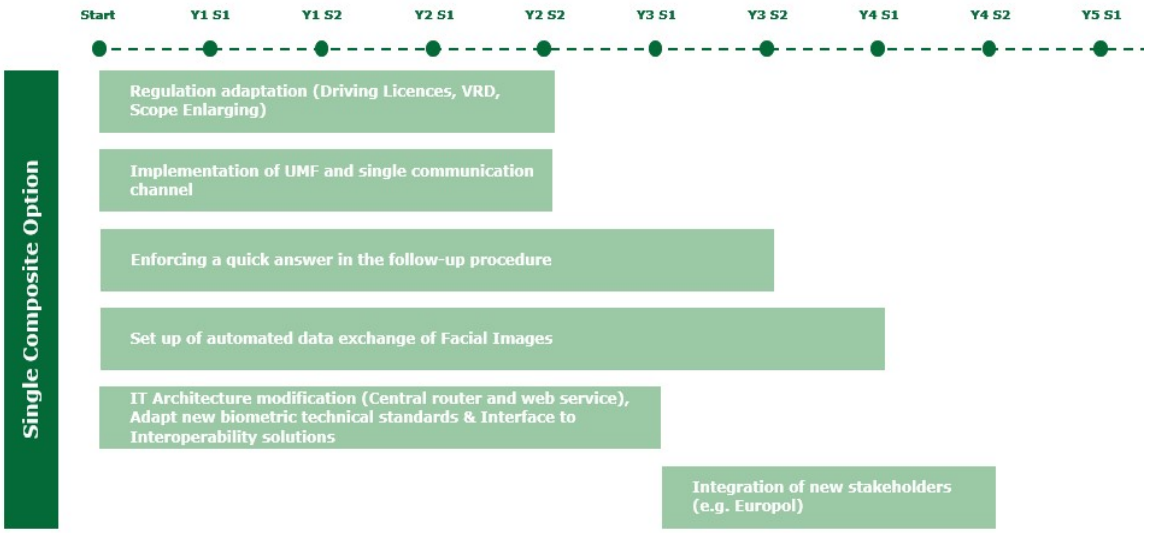
Opportunity	Costs at EU level	Costs per Member States
Prüm technical standards	160.620 €	458.223 €
Fingerprint matching	26.832 €	101.827 €
DNA matching	26.832 €	101.827 €
Changing VRD	458.223 €	483.680 €
Implement UMF	70.248 €	305.482 €
Facial images	0 €	2.273.655 €
Biographic data	1.666.267 €	1.527.412 €
Central router	2.144.035 €	610.965 €
Interoperability	333.253 €	203.655 €
New stakeholder	930.333 €	305.482 €
Total	5.816.644 €	5.913.985 €

4.1 Implementation roadmap

This study introduces the path towards a more efficient network, as it requires the discussion and subsequent integration of each of the 13 improvement topics presented. After adopting the new Prüm legal instrument, improvement opportunity

implementation time is estimated to take from two to four years for a full implementation, as forecasted in the following roadmap[18]:

Figure 3 - Next Generation Prüm Implementation Roadmap



[18] The start of the roadmap begins with the adoption of the Next Generation Prüm as a legal instrument.

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