exchange

Overview of the implementation of the Prüm Decisions

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EXCHANGE
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Executive Summary

The purpose of this report is to provide an overview of the process of design and implementation of the "Prüm Decisions" (EU Council, 2008a, 2008b) that followed the Prüm Treaty of 2005. This report draws from data publicly available at the European Council (EC) website (http://www.consilium.europa.eu/), namely DAPIX (Ad Hoc Group on Information Exchange) documents and statistical data.

Introduction – The Prüm Treaty is framed by the increasing importance of forensic DNA databases for criminal investigation and the ascendance of DNA profiling as a stabilised and reliable means of individual identification. The evolution of the scientific and technological infrastructures and means for the exchange of DNA data are concurrent with political agendas recognizing the expansion of threats brought about by cross-border crime and terrorism.

Part 1 – Development and Implementation – A first part of this report analyses the official documentation issued by the European Council and the steps taken towards implementation until early 2016, namely how the different Member States (MS) performed the division of the tasks and provided support to others, and what sort of challenges were faced during implementation.

Part 2 – Visualising implementation – On a second part, the more recent developments in the implementation of Prüm are summarised, and the available statistics are examined in further detail. In this section, it is possible to have some insights into the general scenario and trends emerging from the DNA data exchange. These include the disparities of Prüm operational Member States in terms of DNA database size and proportion of population included, the volume of exchanged profiles and obtained matches, as well as the performance of the DNA data exchange in terms of the type and direction of the matches, and an assessment of the relevance of Prüm compared to the operation of the national DNA databases of Member States.

Introduction

The process of implementation of Prüm in the European Union (EU) has widened the scope of an increasingly important tool for criminal investigation and criminal justice systems. Over the last two decades, the accelerated development in processing and storage capacity of IT systems were conjugated with the stabilisation of forensic genetics techniques like PCR and STR to allow a rapid expansion of DNA profiling and databasing for criminal investigation purposes (Williams and Wienroth, 2014a).

Starting with the NDNAD in 1995, followed by the Netherlands and Austria in 1997, national DNA databases have been implemented in most Member States (MS) of the EU. These databases are mostly dedicated to the storage of DNA profiles of convicted offenders and DNA profiles of unidentified stains collected for criminal investigation purposes, although most can also serve purposes of civil identification, for example, in cases of missing persons or mass disasters (Williams and Wienroth, 2014b).

In spite of their common set of designed purposes, in the EU, national DNA databases can vary significantly in terms of their governing legislation and overall criminal justice system and police practices, which affects aspects like the proportion of the population included, size and rate of growth of the database, rules of access to DNA data, or the type of searches that are admitted (Santos et al., 2013).

Traditional formal agencies of control like the police and courts of justice began relying on forensic genetics to assist in the detection and identification of offenders, but also the discourses of political actors justified these devices of “genetic surveillance” with the notion that they contribute to social order through crime prevention and deterrence (McCartney, 2004).

The expansion of information networks and the fluidity of national borders has also reconfigured the scope of transnational policing, as well as the faces of threats, with growing political concerns towards the mobility of “risky populations” (Heinemann et al., 2012). The development of the necessary technology was conjugated with the redefinition of risks and threats to bring about a new panorama in transnational policing. This new scenario would bring about the creation of systems for the exchange of information. Hence, in contrast with the mostly military measures adopted by the United States of America (USA), the historical experiences of some European countries with terrorism would be reflected in systemic developments of several legal and technical-scientific instruments created in the EU framework (Monar, 2008). One of those instruments would became known as the Prüm Treaty.

The history of Prüm dates back to 2003, when an initiative proposed by German Ministry of the Interior Otto Schily (Luif, 2007), reflected concerns to EU security in the

aftermath of the 11 September 2001 attacks in the USA. The information that these attacks were perpetrated by individuals originating from the so-called *Al-Qaeda Hamburg Cell* in Germany may have contributed to unleash the transnational realization that there is a great potential for domestic radicalization and recruitment (Monar, 2008: 214).

Following debates on what model of cooperation should be adopted, in 27 May 2005, the so-called Prüm Convention or Prüm Treaty was signed in the German town of Prüm between seven EU Members States (Austria, Belgium, France, Germany, Luxembourg, the Netherlands, and Spain), in a process where Austria and Germany were the leading actors, and where France and Spain were last minute signatories (Balzacq et al., 2006: 16). According to Walsch (2008), Germany's initial proposal was to create centralized databases in Luxembourg, but the other partners decided to employ national contact points for the exchanges.

The title and preamble of the Treaty are quite clear regarding its drive and purposes, namely its relation to the Schengen where "*in an area with free movement of persons it is important for Member States of the European Union to step up their cooperation, in order to combat terrorism, cross-border crime and illegal migration more effectively*" (Prum Convention, 2005).

Hence, the provisions of the Treaty intended the creation of a system to intensify cross-border cooperation to face the abovementioned threats through the automated exchange of information between Member States, namely of DNA profile data, fingerprints, and vehicle registration data. It also envisioned the adoption of the Treaty's dispositions into EU legislation, which became formally adopted into the EU's legal framework in 23 June 2008 through Decisions 2008/615/JHA and 2008/616/JHA (EU Council, 2008a, 2008b).

The implication of the incorporation into EU law was that all Member States would be required to set up the necessary implementation requirements to establish connections to other Member States. The Decisions marked a deadline of one year for the operational exchange of Fingerprints (FP) and Vehicle Registration Data (VRD) and, exceptionally, three years for the implementation of DNA data exchange. Given the deadline for operational exchange of 26 August 2011, only 12 Member States met the operational requirements, although not all of them were exchanging DNA data. States that were exchanging data in August 2011 were: Bulgaria, Germany, Spain, France, Luxemburg, the Netherlands, Austria, Romania, Slovenia, Slovakia, and Finland. From the group of 12, Portugal was the only authorized country not to have started DNA data exchange. While the framework for the transnational exchange of information contemplates three types of data, this report focuses on the case of the exchange of DNA data.

Part I – Development and Implementation

How did the Prüm implementation process start?

On 25 April 2006, the Presidency of the Council of the European Union (CEU), asked COREPER (Committee of Permanent Representatives in the European Union) to set up an Ad Hoc Group on Information Exchange with a mandate to "*propose solutions for the exchange of DNA data on a hit/no-hit basis by a direct automated access from a national contact point of a Member State to the DNA database of other Member States*" (MS).

On 30 October 2007, by initiative of the **Federal Republic of Germany**, a Decision draft was composed with a view to implement what would be later the Decisions 2008/615/JHA and 2008/616/JHA.

Having been set a deadline of 3 years of the Decision taking effect (26 August 2011), and considering the varied state of implementation by different Member States, the Presidency advised Member States to contact operational MS to support them. **DE** and **AT** submitted applications for the funding of "mobile expert teams" to provide technical assistance to newly implementing MS and "*lighten the workload of the longest operation MS*" (11273/09, p.2).

What countries we operational from the start, and how did others join?

The first document regarding "Prüm implementation-State of play and way forward" states that, in November 2009, 10 Member States were operational in the exchange of DNA data: DE, ES, FR, LU, NL, AT, FI, SI, BG, and RO. These original Prüm Treaty signatories were given the task of helping other Member States achieving implementation. The support teams providing support to other countries were DE, AT, NL, LU, SK and FI. Evaluation teams were composed by NL, SK, AT and DE.

Table 1 – List of MS acting as support or evaluation teams to other MS (2009)

	Support Team	Evaluation Team
AT	CY, HU, MT, SK	IT, LT, HU, MT, SK
DE	IT, LV, PT	LV, PT
FI	EE	
LU	BE	
NL	BE, DK, EE, EL, SE	BE, EE, EL, SK, SE
SK	CZ, PL	CZ, PL,

In order to be able to exchange DNA data, Member States were required to comply with a number of formal requirements, as well as technical implementation and operational tests. The evaluation procedure that must be executed before a Member State can start exchanging data with others consists of:

- A questionnaire regarding the status and conformity of data protection (document ST 6661 2009 REV 1 ADD 1 REV 1 EN)
- A pilot run (exchanging data with another MS);
- An evaluation visit.

After complying with all requisites, the Council of the European Union issues a Decision authorizing the concerned Member State to start exchanging DNA data. Besides the original Prüm Treaty signatories that were dispensed from these formalities, all others were authorized in the following sequence:

2010 – Slovakia

2011 – Latvia, Lithuania, Portugal

2012 – Cyprus, Czech Republic, Estonia, Hungary

2013 – Malta, Poland, Sweden

2014 – Belgium

The 10 Member States dispensed from Council Decisions authorizing the exchange of data (listed as signatories of the *Prüm Treaty*) are: **Bulgaria, Germany, Spain, France, Luxemburg, the Netherlands, Austria, Romania, Slovenia, and Finland**.

Furthermore, article 25(3) of 2008/615/JHA states that countries that have already started the supply of personal data under the Prüm Treaty do not need the Council's acknowledgement that provisions regarding the processing of personal data are implemented in the national law of the involved countries. This is the case for **Germany, Spain, Luxemburg, and Austria**.

Given the deadline for operational exchange of 26 August 2011, only 12 Member States met the operational requirements, although not all of them were exchanging DNA data. States that were exchanging data in August 2011 were: Bulgaria, Germany, Spain, France, Luxemburg, the Netherlands, Austria, Romania, Slovenia, Slovakia, and Finland. From the group of 12, Portugal was the only authorized country not to have started DNA data exchange.

How many Member States are operational in the exchange of DNA data and what are their connections?

Since February 2010, the Presidency of the European Council started informing the Working Party on Information Exchange and Data Protection (**DAPIX**) with an overview (*State of Play*) of the implementation of the Prüm Decisions.

The early 2016 "Prüm implementation-State-of-play" document lists **22** countries as operational. On **19 January 2016**, the Netherlands is the Member State which is exchanging DNA data with most countries (21), followed by Austria with 20 and Slovakia with 19. In red text are the Member States still working on the implementation process.

Table 2 – Operational MS in January 2016 and respective connections to other MS

Member States	Connections for DNA data exchange	Total MS Exchange
BE	FR, NL	2
BG	SI, AT, NL, FR, RO, SK, DE, EE	8
CZ	PL, SK, AT, LT, NL, DE, SI	7
DK	Tests with DE, FI	
DE	AT, SI, LU, ES, NL, FR, LV, SK, RO, PL, HU, LT, CZ, BG, FI	15
EE	FI, AT, RO, NL, LT, SK, ES, PL, SE, FR, BG, LV	12
EL	CODIS installed - authorized to exchange	
ES	DE, AT, LU, SI, FR, NL, SK, LV, RO, PL, LT, CY, EE, PT, SE	15
FR	DE, ES, NL, AT, LU, SI, SK, BG, RO, PL, CY, BE, CZ, EE, LT	15
HR	Hardware acquired	
IE	Has DB software, needs legislation and technical implementation	
IT	CODIS implemented, ready for pilot tests	
CY	AT, NL, SK, RO, ES, LT, PL, MT, FR, CZ (testing with LU)	10
LV	AT, NL, DE, LT, FI, SK, RO, ES, PL, EE	10
LT	AT, LV, FI, NL, RO,SK, PL, ES, DE, FR, CY, EE, CZ, MT, SE	15
LU	AT, DE, ES, NL, SI, FR, SK (testing with BE)	7
HU	AT, NL, DE, SK, PL, RO, SI	7
MT	AT, NL, LT, CY, PL, SK	6
NL	AT, DE, SI, LU, FI, FR, ES, BG, SK, RO, LT, LV, HU, PL, CY, SE, EE, CZ, MT, BE, PT	21
AT	DE, ES, LU, SI, NL, FR, RO, BG, FI, SK, LT, LV, HU, PL, CY, EE, CZ, MT, SE, PT	20
PL	SK, NL, AT, ES, LT, DE, RO, CZ, FR, SI, HU, LV, CY, FI, EE, SE, MT	17
PT	ES, NL, AT	3
RO	AT, NL, SI, FR, SK, LV, LT, DE, ES, PL, CY, BG, EE, HU, CZ, SE	16
SI	BG, DE, AT, NL, ES, LU, SK, FR, RO, PL, HU, CZ	12
SK	AT, ES, NL, SI, LU, LV, DE, RO, LT, FR, FI, PL, CY, CZ, EE, HU, BG, SE, MT	19
FI	NL, AT, LV, LT, SK, EE, PL, SE, DE	9
SE	NL, FI, EE, PL, SK, LT, AT, RO, ES	9
UK	No info on status	
NO	Non-EU (CODIS 7.0 installed)	

Prüm Treaty (original)	Prüm Treaty (later sig.)	Non-EU

What have been the most "active" Member States?

From the documents produced during the process of implementation of Prüm, some proposals and decisions can be highlighted as relevant. The Dutch, German and Austrian delegations were the most active in proposing features, instruments, and procedures for implementation. The Dutch were more concerned with database compatibility (software, compatible DNA loci, compatibility with INTERPOL), whereas Germany proposed a Mobile Competence Team, and Austria the creation of a Prüm Helpdesk.

Problems towards operationalisation

What type of implementation problems were found?

During the Belgian presidency, on July 7 2010, a questionnaire was proposed by the Belgian delegation to assess the problems in implementing Prüm in MS.

A document from 2010-10-19 (14918/10) analyses the several categories of problems – legal issues, national structures, logistics, human resources, IT problems, funding. However, the answers to the questionnaire were anonymous, only stating how many MS pointed out the issues. It stated that: "*As opposed to the image created by several DAPIX initiatives (MCT, helpdesk), the problems reported are not just of a technical nature. It is true for DNA that IT problems make up the larger part, but they are closely followed by funding and human resources-related issues. These obstacles demand a completely different approach. For the three different data types* ***legal aspects and governmental decisions are a constant nuisance****. Instead of technical support of some sort,* ***a strong political response seems more appropriate when it comes to resolving this type of issue****. (…) it should be clear that the problem hampering the implementation of "Prüm Decisions" is not just a technical one*" (14918/10, p. 17, emphasis added).

Nevertheless a non-anonymous "*Semi-annual report on the implementation of automated data exchange provisions*" was published on 2011-12-05 (17761/11). The report presents a list divided into operational and non-operational Member States, stating the main implementation problems referred by each country.

Table 3 – Implementation problems reported by MS (2011)

Problem Categories	DNA	
	Operational	Non-operational
Legislation	AT, LU	BE, EE, IE, PL
Organization	AT, LU	MT
Human Resources	BG, ES, FR, LU, AT, SI, SK, FI	EE, EL, MT
Technical	DE, LT, LV, AT, RO, FI	CZ, EE, EL, IE, IT, MT, SE, UK
Financial	LT, LV, PT, RO	DK, EL, IT, UK
Other	LT, LU, LV, NL	CY, IE, UK

Given their diversity, the technical problems associated to the exchange of DNA data were broken down in another table, as reported by the non-operational MS:

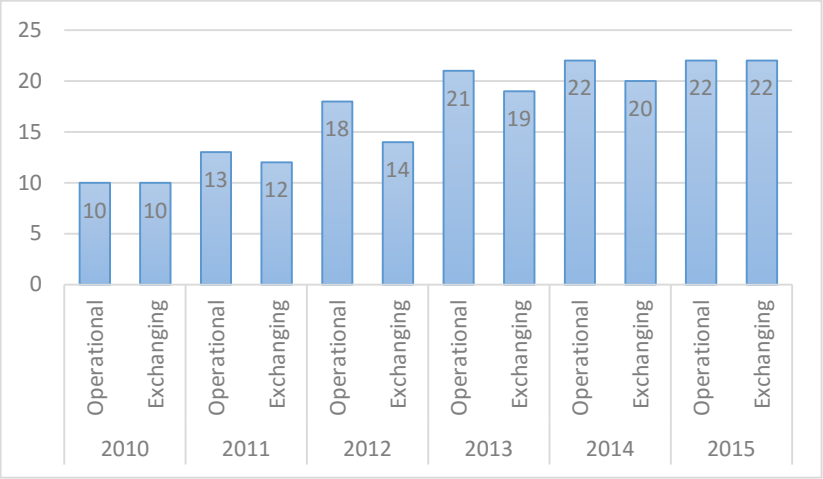
Table 4 – Technical problems reported by non-operational MS (2011)

DNA	
Setting up of national DNA data base	IE, IT, MT
Building up the IT-system for international automated data exchange	BE, GR, IE, IT, MT, UK
Receiving/installation of automated data exchange software	BE, CZ, IE, IT, SE
Connecting to the sTesta network	GR, IE, IT, PL
Setting up of NCP	IT
Other	EE, UK

What was the pace of development of the implementation?

The following chart illustrates a tendency for a certain lag between being “operational” and the actual exchange of DNA profiles.

Table 5 – Total number of operational and exchanging MS (by year)



In regard to statistics, there was a debate between “filtered” (only matches that can aid investigations) and “unfiltered” (all matches) statistics. DAPIX delegations discussed the statistics submitted at its meeting of 21 June 2012 (11367/12). The logic behind DNA match statistics as delivered by delegations on the basis of a model agreed upon at the DAPIX meeting of 22 September 2011 (14103/11) was different, and led to inconsistencies. For that reason, delegations agreed to replace the model for DNA match statistics for 2011.

The document which communicates the model for DNA match statistics explains that the Commission would prefer a “filtered” model that would present the statistics of results that could aid an investigation (“useful” matches). However, there was an understanding that not all MS were structurally in a position to comply. It was decided that there would be “unfiltered” statistics, by a majority of MS.

Nevertheless, there are several gaps in information justified with software limitations, or because unique DNA profiles that do not match the receiving database are not stored. There are match figures regarding the implementation of Prüm DNA data exchange since 2011, albeit with a few cases of missing data, which are detailed in Part 2 of this report.

What Member States are still not exchanging DNA data, and why?

In 4 May 2016, besides non-EU members like Norway, Iceland, Switzerland and Lichtenstein, the State of Play report (5017/3/16) listed as non-operational: Denmark, Greece, Croatia, Ireland, Italy, and the United Kingdom. The indicated status is follows:

> **Croatia**: The 2016 "State of Play" states the following: "*The Ministry of the Interior, Forensic Science Centre, has procured new computer equipment (a server and 4 client computers) for the purpose of automated DNA exchange system and installing CODIS version 7.0. For the purpose of installing CODIS 7.0 and education their users, the representative of the CODIS producer visited the Centre from 23rd to 27th Feb 2015 and carried out the installation and education*".
>
> **Denmark**: Preparations ongoing, CODIS 7.0 installed, tests with DE, FI. Although it has legislation since 2008 and has sent the data protection questionnaire, it does not have the pilot run, visit, and evaluation report.
>
> **Greece**: CODIS 7.0 installed. Has sent the data protection questionnaire, has had the pilot run, the visit and evaluation report by a team from the Netherlands. It lack the Council Decision.
>
> **Ireland**: The 2016 "State of Play" states the following: *Development of the National DNA Database System was completed in 2014 and is awaiting commencement of legislation before it can become operational. Some additional works to prepare for automated searching and data exchange under Prüm will be required once database commences operation.* Legislation was enacted in 2014, but still awaits for secondary legislation to be enacted.
>
> **Italy**: Has CODIS implemented and is ready for pilot tests. Italy is being assisted by a support team from Germany.
>
> **United Kingdom**: There is no information of the 2016 "State of Play" document. However, on the last "State of Play" document in 2015, the United Kingdom informed that: "*With reference to TFEU, Protocol No 36, Title VII, Art. 10, on transitional provisions, the UK will not seek to join the Prüm Decisions in autumn 2014, but it has agreed to undertake a full business and implementation case for the Prüm Decisions and publish that in the UK Parliament by 30 September 2015*".
>
> And also that: "*The UK has agreed to run a pilot Prüm-style test of 10,000 unsolved UK crime samples (DNA) with the Member States which are applying Prüm and publishing the results of this as part of the business and implementation case*".

Part II – Visualising implementation

Since the last update on 4 May 2016, DAPIX issued documents accounting for the following developments:

- Draft document on the creation of a European Area of Forensic Science (24 May 2016 | 8770/16)
- Presentation of a background paper on "Developing a 'toolkit' for assessing the necessity of measures that interfere with fundamental rights. (21 June 2016 | 10510/16)
- Presidency progress report on "Prüm Decisions" (22 June 2016 | 9823/1/16)
- Evaluation reports and Council Decisions authorizing Denmark (11219/16) and Greece (12211/16) to exchange DNA data
- Prüm's state of play of implementation of automated data exchange (12 October 2016 | 5017/6/16)

The "European Area of Forensic Science" was mentioned in a public document dated from 1 December 2011 (17537/11), stating the Council's vision for European Forensic Science 2020. Document 8770/16 reflected the conclusions of previous meetings with proposals for actions. It is worth noting that the implementation of the Action Plan on the way forward in view of the creation of a European Forensic Science Area claims to follow a rationale "*where routine forensic processes for the collection, processing, use and delivery of forensic data should be based on* ***equivalent minimum forensic science standards*** *and where forensic service providers should work on the basis of a* ***common approach to implementation of these standards*** *that fosters closer cooperation between them and the criminal justice systems*" (8770/16, p. 2).

In practice, this plan is composed by 6 actions, mainly involving coordination by ENFSI (European Network of Forensic Science Institutes) and CEPOL (The European Union Agency for Law Enforcement Training) in the development of training programmes and schedules:

- Action 1: 'Best Practice Manuals for forensic disciplines';
- Actions 2: 'Stimulating exchange of forensic information from databases, for example in the areas of weapons and ammunition, explosives and drugs';
- Action 3: 'Proficiency tests and collaborative exercises for forensic disciplines';
- Action 4: 'Forensic awareness and training for law enforcement and justice communities';
- Action 5: 'Stimulate accreditation of forensic service providers and competence of forensic personnel on a voluntary basis';

- Action 6: ‘Stimulating exchange of forensic data via Prüm and improving its quality’.

While this Action Plan is an overall approach to Forensic Science and does not privilege DNA technology in itself, Action 6 does foresee the involvement of the Dutch lead expert for DNA in leading the discussions to improve the quality of the exchange of forensic data (DNA and FP) via Prüm. Furthermore, Action 2 claims the objective of expanding the exchange of forensic information to the areas of weapons and ammunition, explosives and drugs. Also, it envisions the future possibility of constructing “forensic facial databases”, as a complementary biometrical identification parameter to fingerprints and DNA (8770/16).

Prüm State of Play

The DAPIX “State of Play” document of 12 October 2016 (5017/16) has new observations highlighting the operational status (with Council Decisions) of Greece and Denmark. Both MS were supported and evaluated by a NL team. However, these MS have yet to establish connections with other MS.

Of the MS that were still not operational, Croatia is still undergoing technical preparations and planning a pilot run in 2017. Ireland has established an operational national DNA database, and will require upgrade to the database facilities in order to establish automated data exchange. A new implementation plan will be formulated after upgrading is finished. Italy is ready for pilot tests, and is planning to have an evaluation visit until the end of 2016. The UK has not made declarations to the October report.

In the following pages, an analysis of the yearly Prüm statistics issued by DAPIX is presented. The data sources are mostly public, but there are some documents that require an access request to the European Council. The source for the data about national DNA databases was collected from periodical ENFSI Survey on DNA databases in Europe. The more recent reports can be found at the ENFSI website (http://www.enfsi.eu/about-enfsi/structure/working-groups/dna).

Table 6 maps the operational connections for DNA data exchange among MS. Highlighted in yellow are the recent connections. Malta and Hungary were the countries that established most connections since the May update, with 7 and 5 MS, respectively. Sweden and the Czech Republic have 4 new connections each. AT (21), NL (20) and SK (19) are still the MS with the most connections. Belgium (2), Bulgaria (8) and Luxemburg (7), are the countries with the least connections not to have added more MS since the last update.

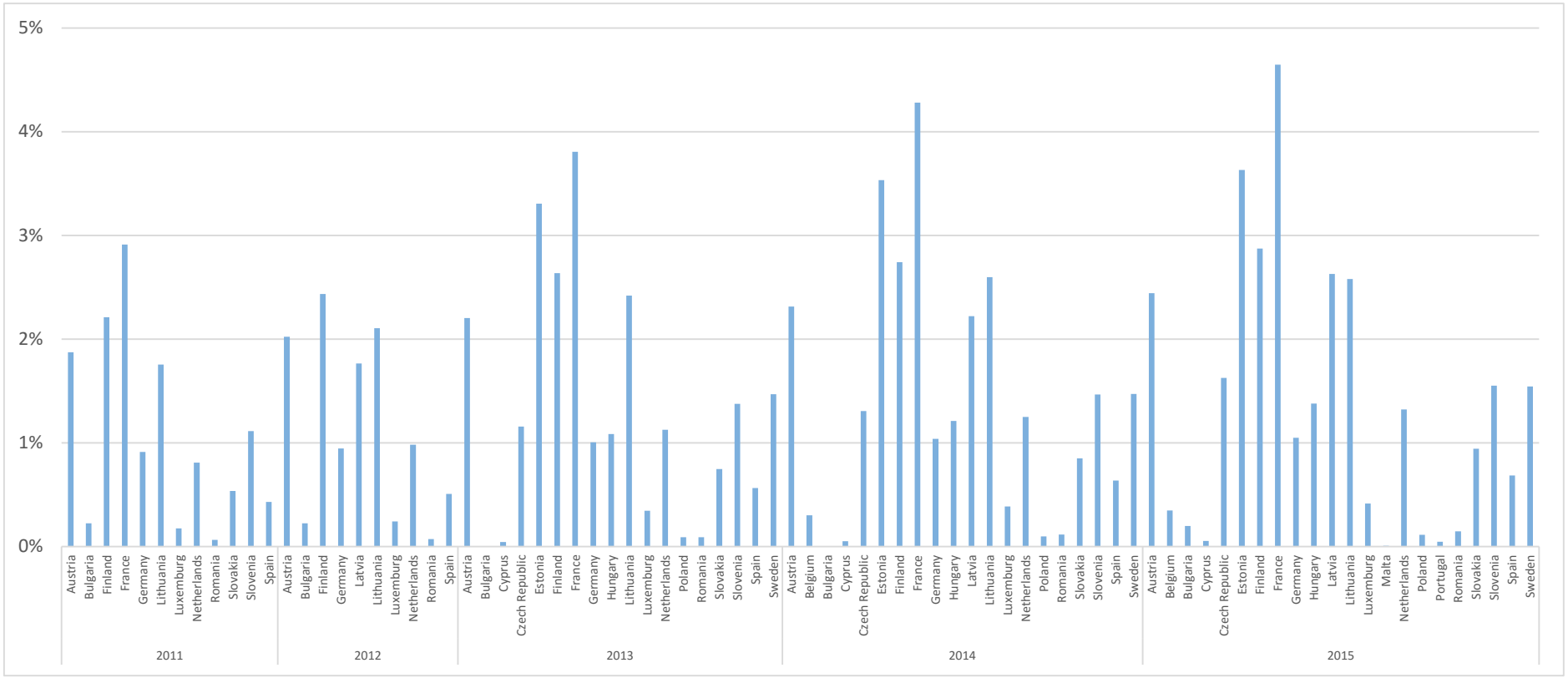
Table 6 - MS interconnections for DNA data exchange and total connections (October 2016)

DAPIX 2016	DNA OPERATIONAL DATA EXCHANGES																										
	BE	BG	CZ	DK	DE	EE	EL	ES	FR	HR	IE	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK
BE	X																											
BG		X																										
CZ			X																									
DK				X																								
DE					X																							
EE						X																						
EL							X																					
ES								X																				
FR									X																			
HR										X																		
IE											X																	
IT												X																
CY													X															
LV														X														
LT															X													
LU																X												
HU																	X											
MT																		X										
NL																			X									
AT																				X								
PL																					X							
PT																						X						
RO																							X					
SI																								X				
SK																									X			
FI																										X		
SE																											X	
UK																												X
TOTAL	2	8	16	X	16	15	X	17	16	X	X	X	10	13	17	7	12	13	21	20	17	5	18	14	19	11	14	X

Growth and expansion of national DNA databases in Prüm

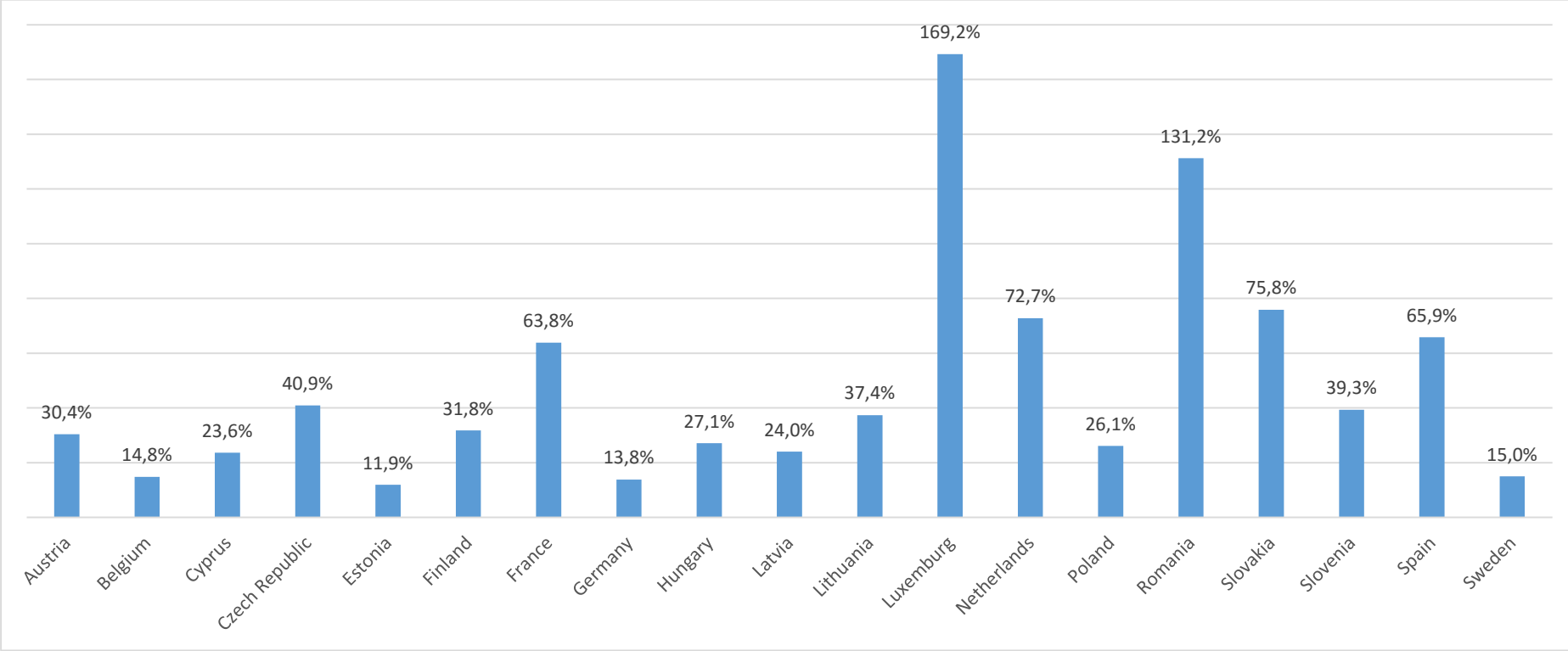
DNA database size growth from 2011 to 2015 shows that the DNA databases with the highest proportion of population included were France, Estonia, Lithuania, Austria, and Finland. These 5 countries tend to stand out from the other MS, insofar as their databases proportion of population included are well above average.

Graphic 1– Proportion of population included in national DNA databases (EU Member States operational in Prüm, 2011-2015)



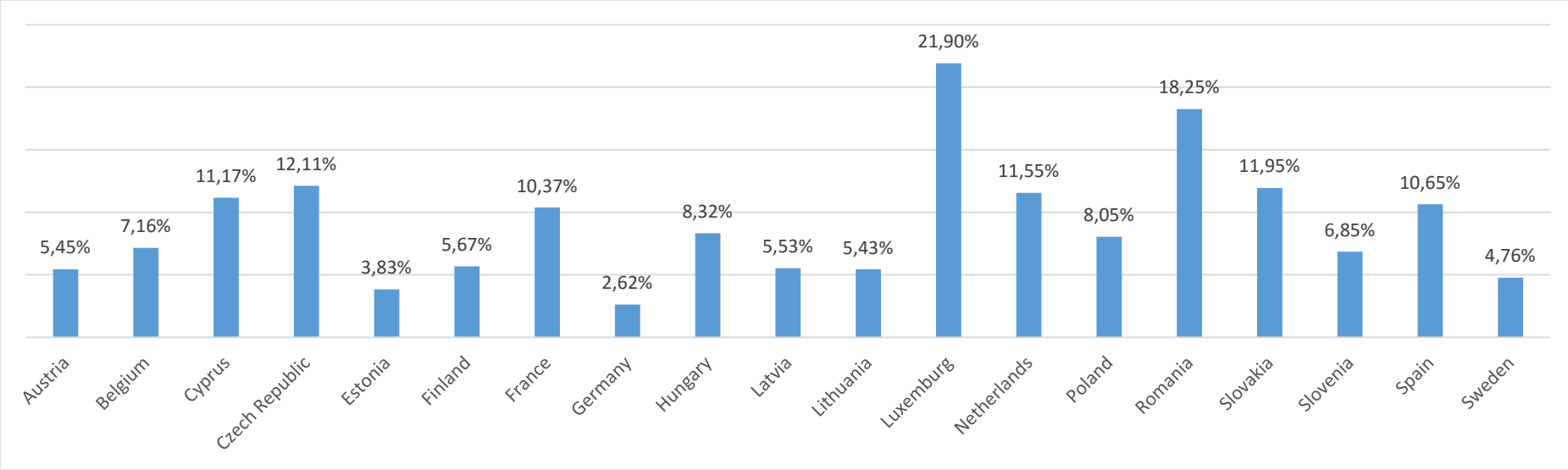
The total growth is also noteworthy. The calculation of the total growth of MS DNA databases **in terms of included persons** shows a steady relatively steady growth among all MS. Of course, smaller databases can grow in higher percentages due to their initial reduced number of included persons. Such is the example of Luxembourg (877 persons in 2011 to 2361 in 2015), or Romania (13906 in 2011 to 32149 in 2015). Countries that did not report data about included individuals to DAPIX or ENFSI (like Bulgaria), or that were outliers (like Portugal 374% growth in 3 years), or Malta (only 1 year reported), were excluded from the calculations.

Graphic 2 – Total growth of national DNA databases according to yearly reported data (EU Member States operational in Prüm, 2011-2015)



The annual growth rate show a similar scenario where smaller databases, like Luxembourg or Romania have the highest annual growth rates. When calculated for countries with complete available data from 2011 to 2015, there is an **average annual growth of 8.61%**. For countries that only have data for fewer years, an annual growth rate was calculated according to the years of data available. MS that had insufficient of missing data were excluded. Again, like the total growth rate, it is important to view these figures in light of the overall size of the database in terms of included individuals. France clearly stands out as having an annual growth rate of 10%, which in absolute figures represents about 250.000 individuals being included in the database each year. If we compare with a country with the most similar population and database size – which is Germany – we may evaluate the exponential growth of France's database. In the same period, Germany's database grew 2.62% per year to a total 5 year growth of 13.8%. In absolute figures, this means that in the period of operation of Prüm under scrutiny, about 20.000 individuals were added to Germany's database.

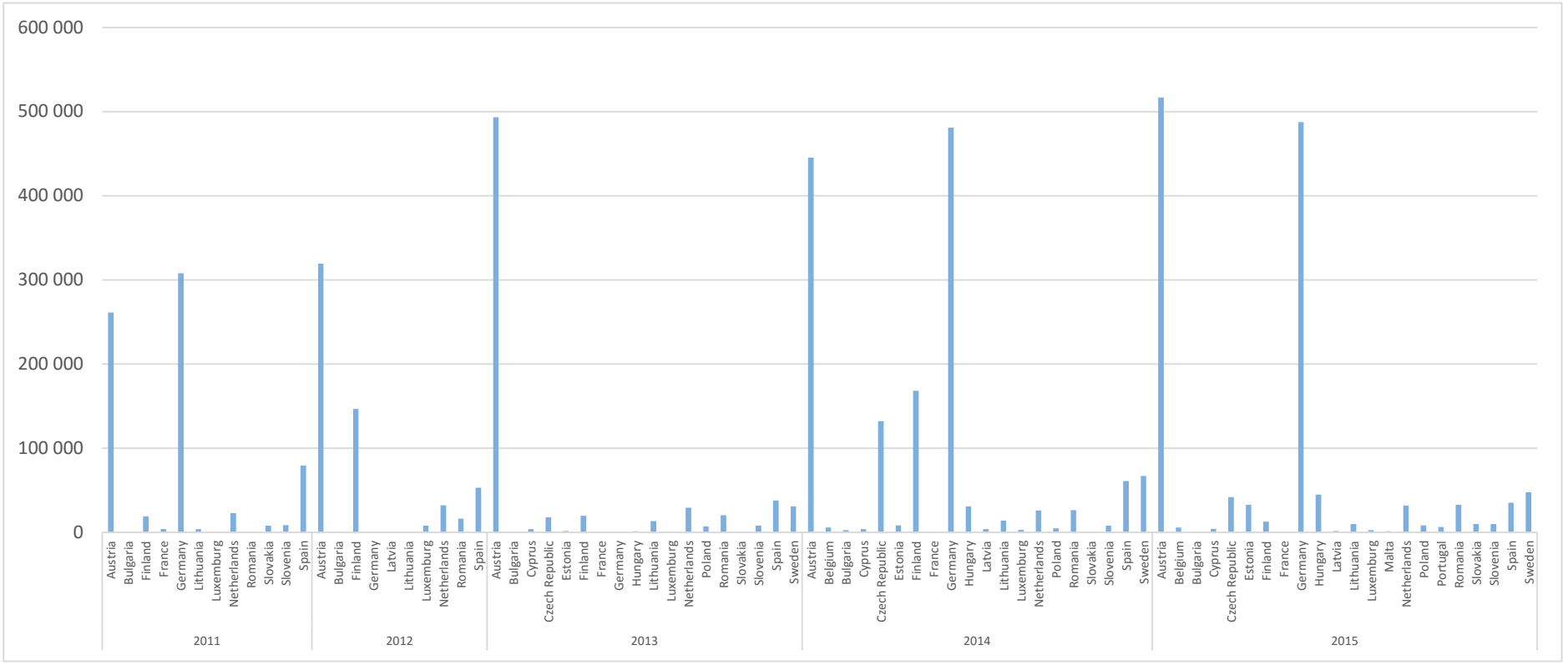
Graphic 3 - Annual growth rate of national DNA databases according to yearly reported data (EU Member States operational in Prüm, 2011-2015)



Volume of Prüm operation

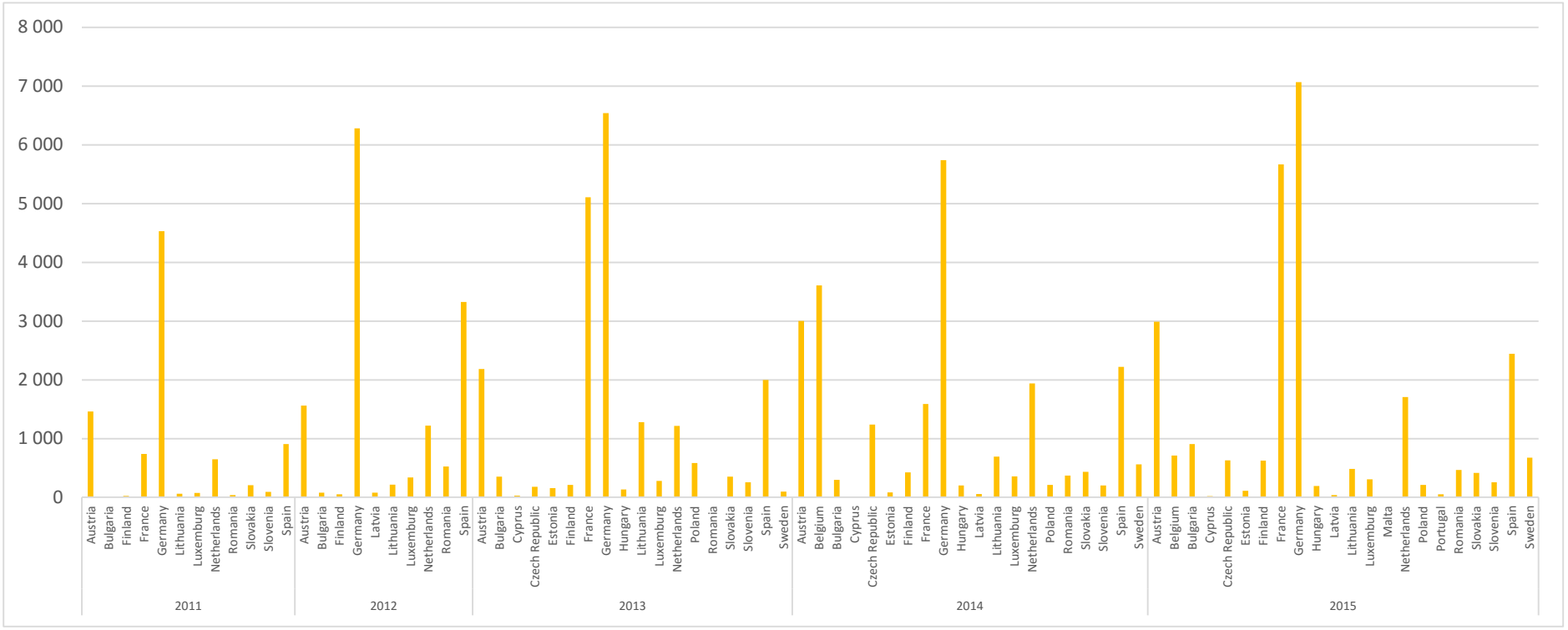
A visualization showing the volume of exchanges by country can be given by the number of profiles sent. Several countries do not communicate figures of received profiles, in order not to duplicate counting. These figures include both stains and persons profiles that were reported as sent by each country. Countries like France, due to technical design, does not keep account of the number of profiles sent. In the case of Bulgaria, only stain profiles are sent. The highlights of this graph in terms of **volume of exchanges** are Austria and Germany.

Graphic 4 – Total profiles sent (stains and persons), reported to DAPIX, by year and MS (2011-2015)



In terms of the volume of matches obtained, the numbers reported by year and country show Germany, more recently followed by France, as a centre where matches with persons and stains from other European countries are detected. These two MS, along with Austria and Spain are followed by the Netherlands as the MS that obtained most matches in the period between 2011 and 2015. Other MS, either can be classified as newcomers, or have very small databases (e.g. MS like Malta, Portugal, or Cyprus). The case of Luxembourg is interesting in the sense that it has a small database (in December 2015, it had 3182 stains and 2121 persons), but it still obtains a significant volume of matches.

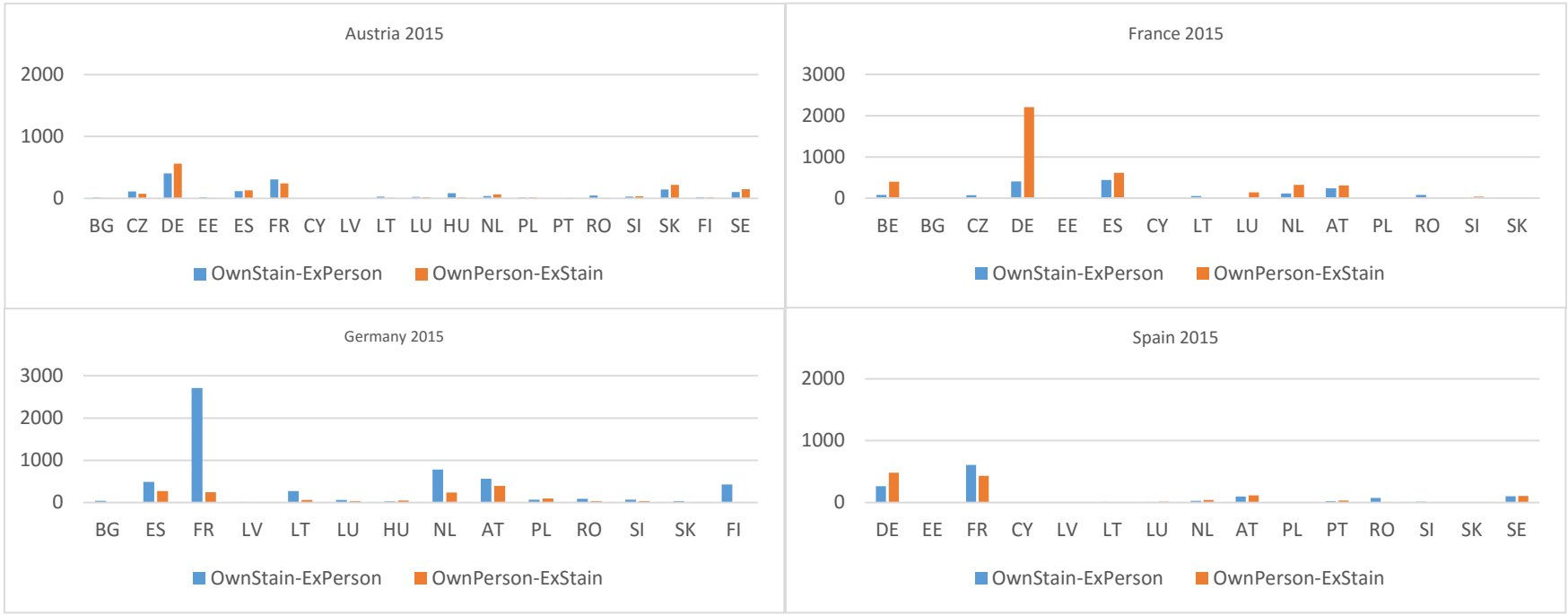
Graphic 5 – Total volume of matches (hits) reported to DAPIX, by year and MS (2011-2015)



Cross-border matches

A closer look at the top four countries in terms of matches for 2015 (year with more countries exchanging DNA data) may reveal finer details of the match figures. For example, in 2015, it can be seen that Germany's matches were obtained mainly with France, and also that the matches were predominantly OwnStain (OS) to ExternalPerson (EP). In contrast, France's matches are predominantly OwnPerson (OP) to ExternalStain (ES), meaning that crime scene stains (particularly in Germany, but also Spain and Belgium) were identified with persons in France's database. The countries where France obtains identification for its crime scene stains more than the opposite are mainly Eastern Europe countries like Czech Republic, Romania, and Lithuania. These comparisons will be made clearer and significant once all MS are interconnected.

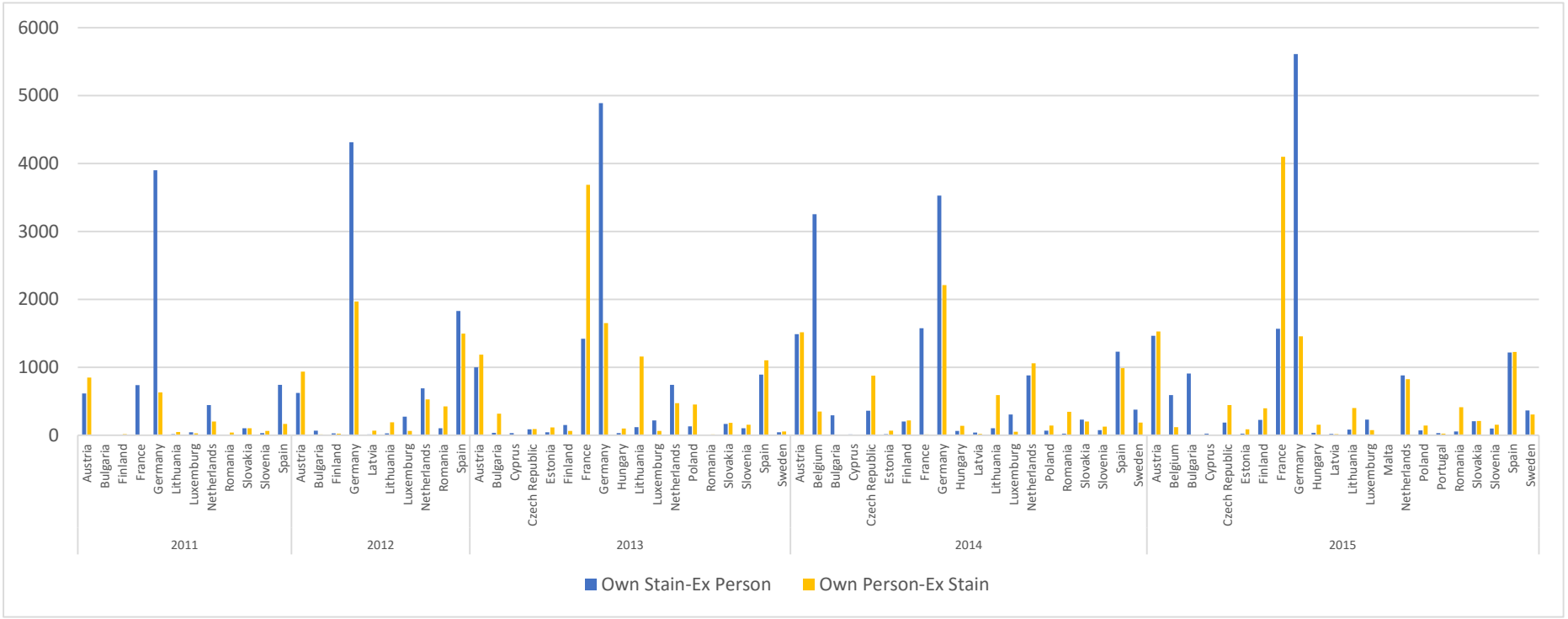
Graphic 6 – Volume of matches and matching MS reported to DAPIX by the top four countries with more matches (2015)



Direction and type of matching: Own and External, Persons and Stains

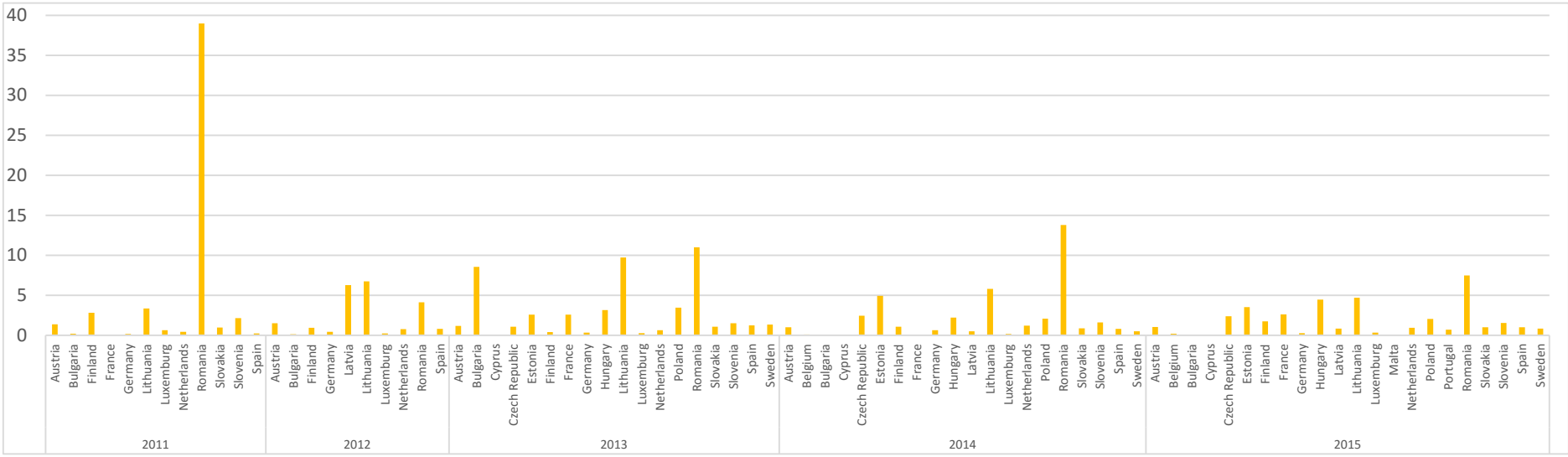
The following graph illustrates the yearly volume of matches for each operational MS that provided data in terms of the type of match: OwnStain to ExternalPerson / OwnPerson to ExternalStain (OS-EP/OP-ES). There are, however, some cases of missing data, and 2012 was perhaps a transitory period where a few countries had to conform their database files to changes in legislation and decided not to report matches. This graph clearly shows the tendency of Germany to report a substantial higher number of total matches and to have more OwnStain to ExternalPerson matches. The opposite can be observed in France, although it is more difficult to assess a trend because of missing data.

Graphic 7 – Total volume of matches (by type of match) reported to DAPIX, by year and MS (2011-2015)



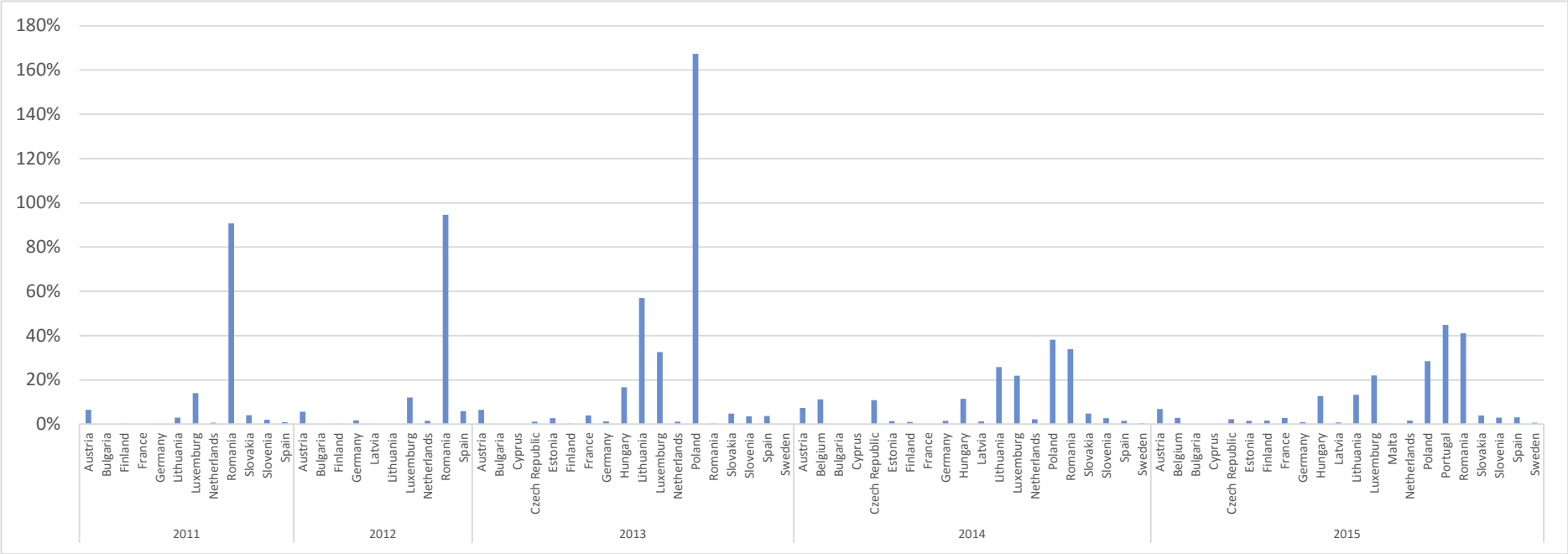
In order to clarify trends in the reporting of matches between OwnPerson to ExternalStain, is was possible to calculate a ratio that shows the proportion of OP-ES matches to OS-EP. In this case, a number close to 1 indicates parity between what a MS contributes to identify stains of other MS and what it gains to identify their own crime scene stains. A figure below 1 indicates the opposite, meaning that a MS is having internal benefits by identifying their own crime scene stains with foreign persons. Here, the graph shows a tendency for Eastern European countries like Lithuania, Romania, Czech Republic, or Hungary, to contribute with crime scene stains to identify persons in other MS. Countries with a ratio lower than 1 tend to be Central European countries like Luxembourg, France, Germany, and the Netherlands. The peak regarding Romania in 2011 is explained by 39 OP-ES matches and 0 OS-EP. This scenario may illustrate national DNA databasing inclusion criteria, but also local policing and criminal investigation strategies. For example, one interviewee from an Eastern Europe country explained how the national databasing strategy privileged the inclusion of person profiles, rather than crime scene stains, as it was seen as more cost effective. Note that in 2011 Romania had 0 OwnStain to ExternalPerson matches. This was changed to 1 to allow division.

Graphic 8 – Ratio OS-EP/OP-ES (type of match), by MS, and year (2011-2015)



Therefore, it is also important to ponder how the operation of Prüm compares to the operation of the national DNA database in each MS. This was calculated by dividing the ENFSI performance ratio (Person-stain matches/per person) by a "Prüm performance ratio" (OwnPerson-ExternalStain matches/per person). This figure, in percentage, shows how the persons included in each MS national DNA database are effectively contributing to generate matches with stains in other countries. If the ENFSI performance ratio can indicate if the "right" people are in the database for internal criminal investigation, the Prüm performance ratio would indicate if the persons included in a MS database are the "right" people that will aid criminal investigations in other MS. The size of the database, or the operational status in a given year, and migratory/mobility patterns of the population, appear to play a role in the proportion of Prüm matches vs. national matches. The cases of Romania and Poland, but also Luxemburg would be good examples of this.

Graphic 9 – Proportion of reported national DNA database P-S matches per person (ENFSI) to Prüm OP-ES matches per person (DAPIX)



Glossary

CEPOL - The European Union Agency for Law Enforcement Training

CEU – Presidency of the Council of the European Union

CODIS – Combined DNA Index System

COREPER – Committee of Permanent Representatives in the European Union

DAPIX – Working Party on Information Exchange and Data Protection (former *Ad Hoc Group on Information Exchange*)

EC – European Council

ENFSI – European Network of Forensic Science Institutes

EP – External Person – individual profile included in the national DNA database of another Member State

ES – External Stain – crime scene stain profile included in the national DNA database of another Member State

EU – European Union

EUROPOL - European Police Office

INTERPOL - International Criminal Police Organization

MCT – Mobile Competence Team

MS – Member State(s)

OP – Own Person – individual profile included in a Member State's own national DNA database

OS – Own Stain – crime scene stain included in a Member State's own national DNA database

OS-EP/OP-ES – OwnStain-ExternalPerson / OwnPerson-ExternalStain – Proportion of matches for a given MS between OS-EP and OP-ES

PCR – Polymerase Chain Reaction

STR – Short Tandem Repeat

ISO Country Codes

Short name (source language)	Short name (English)	Official Name	Code
Belgique/België	Belgium	Kingdom of Belgium	BE
България (Bulgaria)	Bulgaria	Republic of Bulgaria	BG
Česká Republika	Czech Republic	Czech Republic	CZ
Danmark	Denmark	Kingdom of Denmark	DK
Deutschland	Germany	Federal Republic of Germany	DE
Eesti	Estonia	Republic of Estonia	EE
Éire/Ireland	Ireland	Ireland	IE
Ελλάδα (Elláda)	Greece	Hellenic Republic	EL
España	Spain	Kingdom of Spain	ES
France	France	French Republic	FR
Hrvatska	Croatia	Republic of Croatia	HR
Italia	Italy	Italian Republic	IT
Κύπρος (Kýpros)	Cyprus	Republic of Cyprus	CY
Latvija	Latvia	Republic of Latvia	LV
Lietuva	Lithuania	Republic of Lithuania	LT
Luxembourg	Luxembourg	Grand Duchy of Luxembourg	LU
Magyarország	Hungary	Hungary	HU
Malta	Malta	Republic of Malta	MT
Nederland	Netherlands	Kingdom of the Netherlands	NL
Österreich	Austria	Republic of Austria	AT
Polska	Poland	Republic of Poland	PL
Portugal	Portugal	Portuguese Republic	PT
România	Romania	Romania	RO
Slovenija	Slovenia	Republic of Slovenia	SI
Slovensko	Slovakia	Slovak Republic	SK
Suomi/Finland	Finland	Republic of Finland	FI
Sverige	Sweden	Kingdom of Sweden	SE
United Kingdom	United Kingdom	United Kingdom of Great Britain and Northern Ireland	UK

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