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for European Public Administrations

European Commission – ISA Work Programme

EUROPEAN INTEROPERABILITY ARCHITECTURE (EIA)

Phase 2 – Final Report: Common Vision for an EIA

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JOINING UP GOVERNMENTS

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1. EXECUTIVE SUMMARY

The European Interoperability Architecture (EIA) study explores the need for a European interoperability architecture facilitating the establishment of European public services (cross border eGovernment services). The objectives of the EIA study are:

- To help elaborating with the Member States and the concerned Commission services a common vision for an architecture facilitating interoperability for European Public Services (its scope, the articulation of the main architectural building blocks and the need for interface standards between such architectural building blocks), and
- To assess the need and the relevance of having common infrastructure services as part of that architecture.

This final report contributes to the objectives in reaching a common vision for an EIA and proposing concrete implementation actions for an EIA, including an assessment of the need and relevance of having common infrastructure services as part of an EIA.

In this final report, different ways of data gathering were used. The outcomes of the preparatory phase were taken into account. A learning day was organised to learn from previous experiences in member states. During workshop 1, the research approaches (explained in the next paragraph) were discussed. Two rounds of interviews were done to collect the corresponding data per approach. An overview of the interviewed EC projects and Member States (in green colour) is given in Figure 1. Next, a workshop with industry experts was organised to receive first feedback on the findings. In workshop 2, the common vision for an EIA was discussed with Member States. Finally, in workshop 3, the selection and prioritisation of the interoperability agreements for the common vision for EIA were discussed and possible solutions to be implemented were proposed. Furthermore, other feedback from Member States and DGs was processed, as well as remarks from DIGIT.

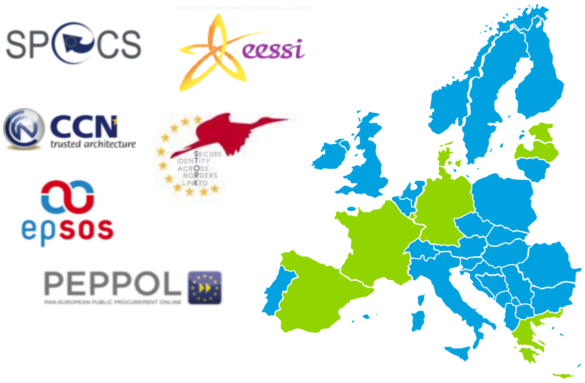
SPOCS
eessi
CCN trusted architecture
SECURE IDENTITY ACROSS BORDERS LINKED
epsos
PEPPOL
PAN-EUROPEAN PUBLIC PROCUREMENT ONLINE

Figure 1 - Interviewed EC Projects and Member States (green)

As shown in Figure 2, the research approaches for this study focused on four main aspects, i.e. the needs & requirements for cross-border interoperability, the Reference Interoperability Agreements (RIA), the Common Vision for a European Interoperability Architecture (EIA), and common interoperability solution instances at EU level.

The bottom-up and top-down approach investigated first the “Why?” by looking at existing interoperability solutions and at existing conceptual models in order to gather the needs and requirements for an EIA. Then, the combination approach investigates the “What?” was investigated by consolidating the needs and requirements based on the identification of common themes into a list of interoperability agreements, which is defined as RIA. This RIA contains agreements that are needed at European level for the setup of cross-border public services in a specific sector, and the corresponding solution specifications that implement these agreements. For instance, when a new sectoral project at EC level is initiated, the reference interoperability agreements can be reused to kick-start the interoperability aspects of the project.

Although the RIA contains interoperability agreements and solution specifications at European level, not all of these agreements and solution specifications are applicable across all sectors and across borders. The agreements of the RIA that are considered common among sectors and Member States can be promoted to the common vision for an EIA. For instance, when two EC projects define access points to organise their cross-border information exchange, the legal requirements for setting up access points can be defined in one common European interoperability agreement as part of the common vision for an EIA. Then, these legal requirements can be defined by means of *solution specifications*, such as Service Level Agreements that specify the quality requirements for these access points.

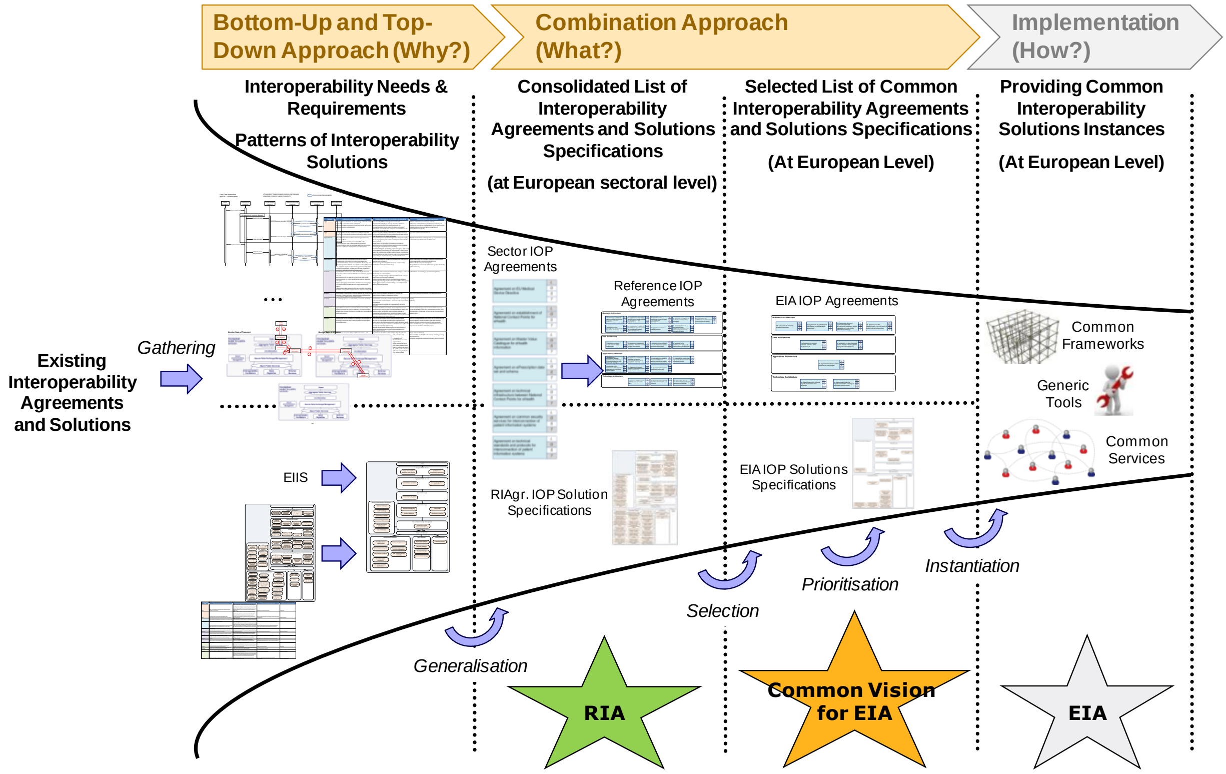
Bottom-Up and Top-Down Approach (Why?)
Combination Approach (What?)
Implementation (How?)
Interoperability Needs & Requirements
Patterns of Interoperability Solutions
Consolidated List of Interoperability Agreements and Solutions Specifications
(at European sectoral level)
Selected List of Common Interoperability Agreements and Solutions Specifications
(At European Level)
Providing Common Interoperability Solutions Instances
(At European Level)
Existing Interoperability Agreements and Solutions
Gathering
...
Sector IOP Agreements
Reference IOP Agreements
EIA IOP Agreements
Common Frameworks
Generic Tools
Common Services
EIIS
RIAgr. IOP Solution Specifications
EIA IOP Solutions Specifications
Instantiation
Prioritisation
Selection
Generalisation
RIA
Common Vision for EIA
EIA

Figure 2 - High-Level Overview of Approaches

When the common European interoperability agreements and solution specifications have been selected to represent the common vision for an EIA, the “How?” will be investigated by prioritising the interoperability solutions instances that are needed at the European level to implement the “What?”. For instance, in order to implement the legal requirements for setting up access points, different directives could be defined that are needed to implement this interoperability agreement.

It is important to stress the difference between the common vision for an EIA, and the EIA itself. The common vision for an EIA consists of the interoperability agreements that should be common on a European level, while the EIA consists of the solution specifications and solution instances that implement the common vision for an EIA.

For the visualisation of the common interoperability agreements, an architecture view is provided based on the commonly accepted architecture domains for an enterprise architecture (and supported by TOGAF), being Business Architecture, Data Architecture, Application Architecture, and Technology Architecture. In addition to the architecture domains, the architecture view is extended with the governance of an EIA.

As shown in Figure 3, the reference interoperability agreements as part of the RIA are positioned in one of the architecture domains or in the governance domain based on the specific theme that they address. Also, for each interoperability agreement, an indication is added related to the four interoperability levels (Legal, Organisational, Semantic and Technical) depending on the detailed agreements that are needed or impacted for a specific interoperability agreement.

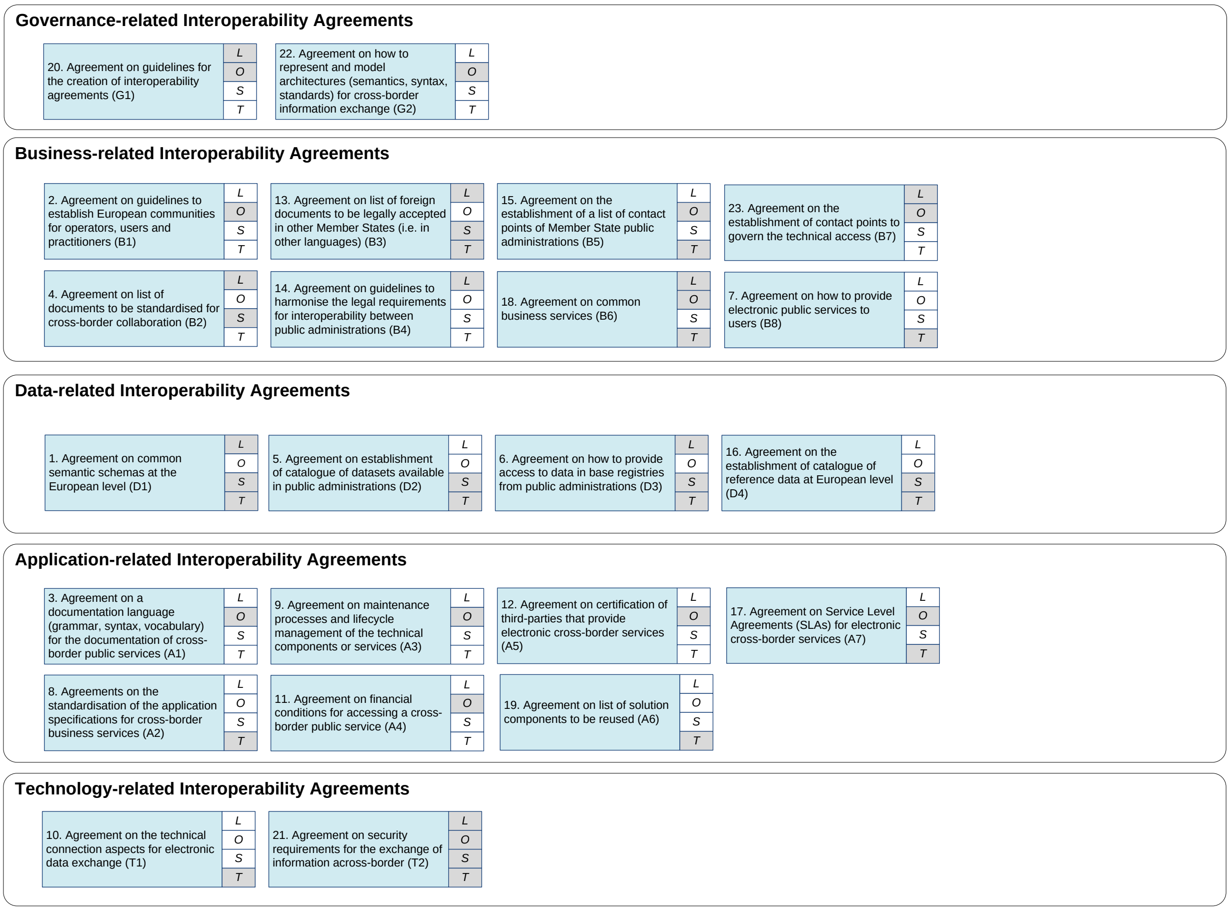
Governance-related Interoperability Agreements
20. Agreement on guidelines for the creation of interoperability agreements (G1) L O S T
22. Agreement on how to represent and model architectures (semantics, syntax, standards) for cross-border information exchange (G2) L O S T
Business-related Interoperability Agreements
2. Agreement on guidelines to establish European communities for operators, users and practitioners (B1) L O S T
13. Agreement on list of foreign documents to be legally accepted in other Member States (i.e. in other languages) (B3) L O S T
15. Agreement on the establishment of a list of contact points of Member State public administrations (B5) L O S T
23. Agreement on the establishment of contact points to govern the technical access (B7) L O S T
4. Agreement on list of documents to be standardised for cross-border collaboration (B2) L O S T
14. Agreement on guidelines to harmonise the legal requirements for interoperability between public administrations (B4) L O S T
18. Agreement on common business services (B6) L O S T
7. Agreement on how to provide electronic public services to users (B8) L O S T
Data-related Interoperability Agreements
1. Agreement on common semantic schemas at the European level (D1) L O S T
5. Agreement on establishment of catalogue of datasets available in public administrations (D2) L O S T
6. Agreement on how to provide access to data in base registries from public administrations (D3) L O S T
16. Agreement on the establishment of catalogue of reference data at European level (D4) L O S T
Application-related Interoperability Agreements
3. Agreement on a documentation language (grammar, syntax, vocabulary) for the documentation of cross-border public services (A1) L O S T
9. Agreement on maintenance processes and lifecycle management of the technical components or services (A3) L O S T
12. Agreement on certification of third-parties that provide electronic cross-border services (A5) L O S T
17. Agreement on Service Level Agreements (SLAs) for electronic cross-border services (A7) L O S T
8. Agreements on the standardisation of the application specifications for cross-border business services (A2) L O S T
11. Agreement on financial conditions for accessing a cross-border public service (A4) L O S T
19. Agreement on list of solution components to be reused (A6) L O S T
Technology-related Interoperability Agreements
10. Agreement on the technical connection aspects for electronic data exchange (T1) L O S T
21. Agreement on security requirements for the exchange of information across-border (T2) L O S T

Figure 3 - Architecture View for Interoperability Agreements of the RIA

As shown in Figure 4, the selected common interoperability agreements for the common vision for an EIA are similarly to the RIA positioned in one of the architecture domains or in the governance domain.

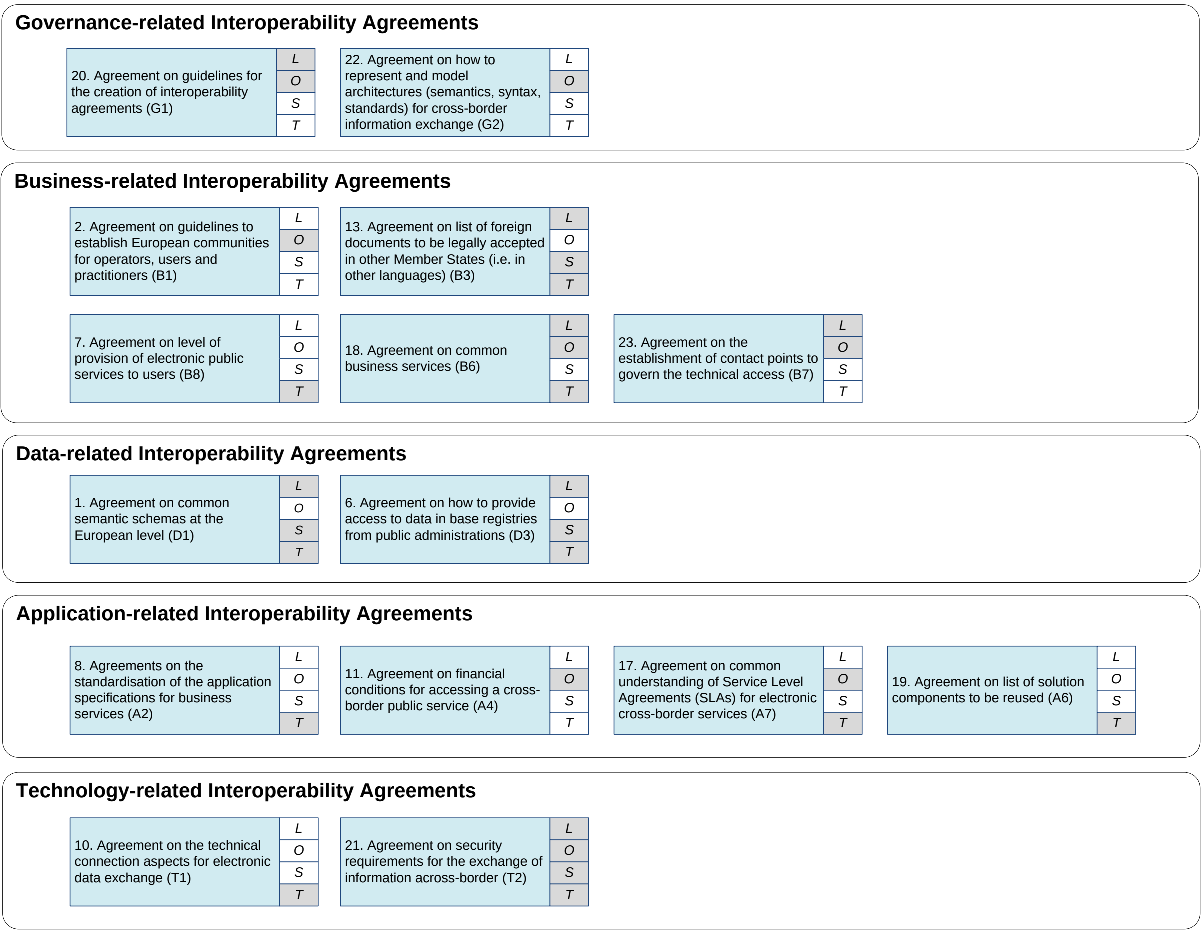
Governance-related Interoperability Agreements
20. Agreement on guidelines for the creation of interoperability agreements (G1)
22. Agreement on how to represent and model architectures (semantics, syntax, standards) for cross-border information exchange (G2)
Business-related Interoperability Agreements
2. Agreement on guidelines to establish European communities for operators, users and practitioners (B1)
13. Agreement on list of foreign documents to be legally accepted in other Member States (i.e. in other languages) (B3)
7. Agreement on level of provision of electronic public services to users (B8)
18. Agreement on common business services (B6)
23. Agreement on the establishment of contact points to govern the technical access (B7)
Data-related Interoperability Agreements
1. Agreement on common semantic schemas at the European level (D1)
6. Agreement on how to provide access to data in base registries from public administrations (D3)
Application-related Interoperability Agreements
8. Agreements on the standardisation of the application specifications for business services (A2)
11. Agreement on financial conditions for accessing a cross-border public service (A4)
17. Agreement on common understanding of Service Level Agreements (SLAs) for electronic cross-border services (A7)
19. Agreement on list of solution components to be reused (A6)
Technology-related Interoperability Agreements
10. Agreement on the technical connection aspects for electronic data exchange (T1)
21. Agreement on security requirements for the exchange of information across-border (T2)
L
O
S
T

Figure 4 - Architecture View with Selected Common Interoperability Agreements for Common Vision for an EIA

Based on the identified solutions to be implemented for an EIA, the need and relevance of having common infrastructure services as part of an EIA were assessed. Nine common infrastructure services were identified by the European Interoperability Infrastructure Services (EIIS) Study: audit trail & log, service registry, identity and access control, data certification, data transport, data translation, workflow management, document storage, and structured data storage.

As conclusion from the assessment, there is a definite need for common infrastructure services at national or sectoral level (based on RIA), and at European level (based on EIA). Furthermore, a special need for common infrastructure services to be provided at European level is indicated based on the prioritised interoperability agreements to be implemented for EIA. In this context, the common usage of infrastructure service on a European level can lower the implementation cost of a business service, as different member states can rely on shared and reusable infrastructure services.

As displayed by Figure 5, the assessment of the need and relevance of common infrastructure services indicated that **Data Certification** and **Identity and Access Management** are common infrastructure services with the highest need and relevance to be offered on a European level.

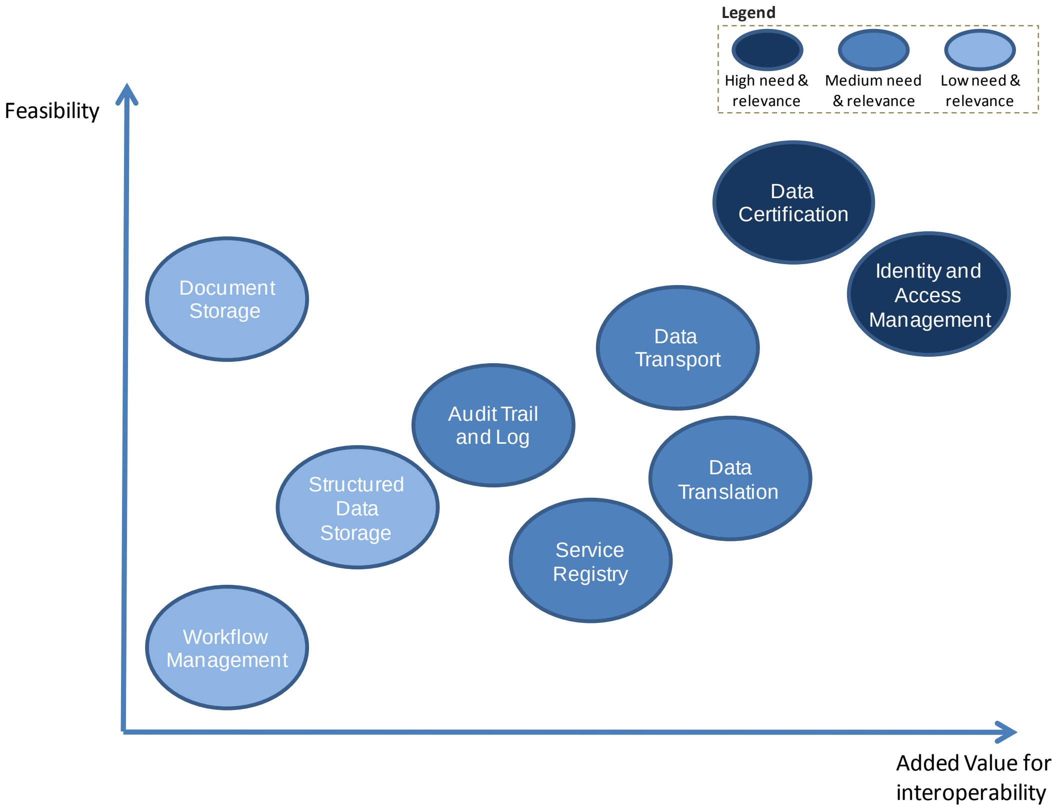

Figure 5- Estimations of Feasibility and Added Value of Common Infrastructure Services

The added value for providing the RIA and the common vision for EIA is investigated by means of two specific cases, namely DG TAXUD and the epSOS project. At this point in time, both DG TAXUD and the epSOS project have interoperability solutions in place, for which implicit or explicit interoperability agreements exist. In the context of the RIA, both DG TAXUD and the epSOS project largely cover all the agreements, leading to the conclusion that most agreements could be reused in the development of new public services (but not all, as the RIA should not be complete for all European projects). In the context of the common vision for EIA, both DG TAXUD and the epSOS project cover all the agreements, leading to the conclusion that all agreements of the common vision for EIA could be reused at European level in the development of new public services.

From the common vision for an EIA, the interoperability agreements were prioritised and concrete and practical solutions were discussed for the implementation of the top priority interoperability agreements. Based on this discussion, five actions were defined related to the prioritised interoperability agreements and one transversal action was defined based on agreement during the workshop. These actions were identified as key actions to be taken into account for the ISA Programme. As shown in Table 1, the solutions to be implemented for the six resulting actions include mostly common frameworks and common services.

Table 1 - High-level Overview for Implementation Actions

Action	Related to IOP agreement	Common Framework	Reusable Tool	Common Service
Action 1 - security requirements for the exchange of information across-border	21	Common specifications for security requirements of cross-border information exchange		
Action 2 - reuse of solution components	19	Framework for sharing and reuse of solution components		
Action 3 - central platform to publish interoperability assets				Central platform to publish interoperability assets
Action 4 - implementation of governance for EIA and RIA	20	Governance framework for EIA and RIA (including templates for interoperability agreements)		
Action 5 - technical connection aspects for electronic data exchange	10	Common specifications for technical connection aspects of cross-border data exchange		Common platform for electronic cross-border delivery
Action 6 - establishment of contact points to govern the technical access	23	Guidelines document on how to establish contact points		

For each action, an assessment is performed about the effort of implementing the action on the European Commission and on Member States. The effort is assessed on the four interoperability levels (being legal, organisational, semantic and technical). Based on the conclusions from the effort assessments, the actions are positioned in a quadrant with the effort on Member State and European Commission as shown in Figure 6. For each action, the relative size of the circle provides an indication of the expected effort (i.e. resources, budget, etc.) needed for the implementation of the action.

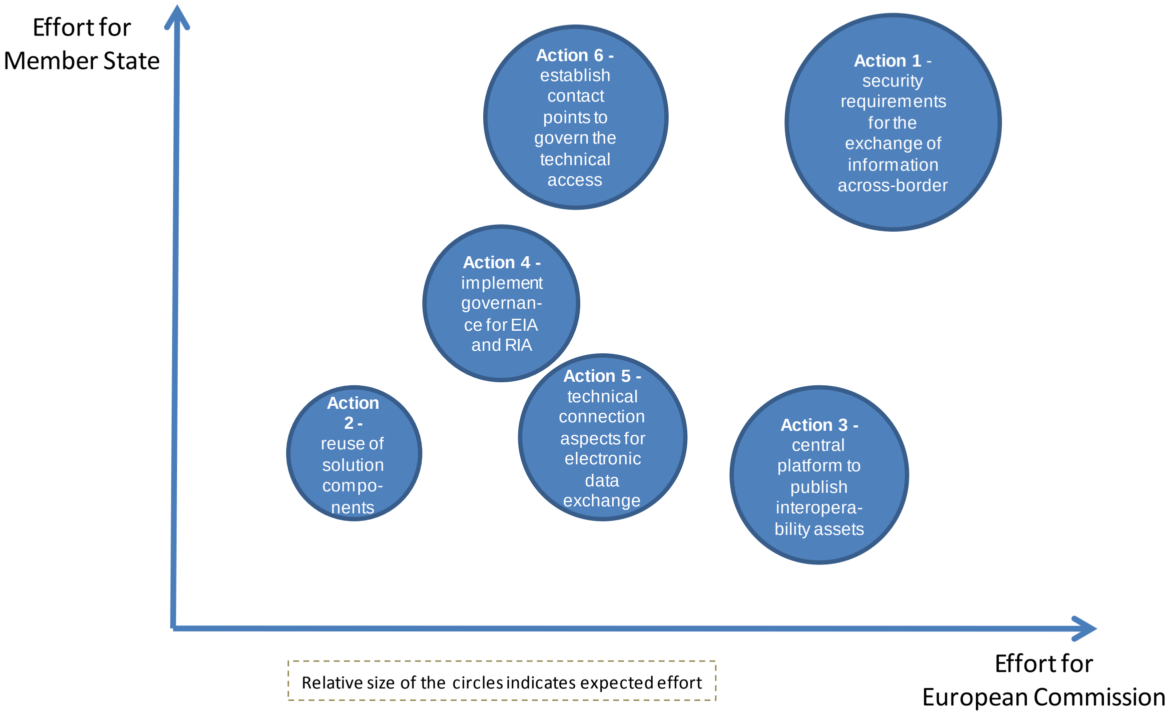

Figure 6 - Effort Assessment of Proposed Actions for Implementation of EIA

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2. INTRODUCTION

The objective of this chapter is to provide the reader with an introduction to the study on a European Interoperability Architecture. In the first section (Section 2.1), an overview is provided of the rest of this document. In Section 2.2, the background and context of the EIA study are provided. The scope and objectives of the EIA study are documented in respectively Section 2.3 and Section 2.4. The milestones and deliverables are outlined in Section 2.5 and the approaches to develop a common vision for an EIA are described in Section 2.6. The difference between interoperability agreement, solution and solution instance is defined in Section 2.7.

2.1 OVERVIEW OF THE DOCUMENT

In the following chapter of this document, the common vision for an EIA is introduced (Chapter 3). Next, the implementation plan for an EIA is proposed (Chapter 4).

The list of abbreviations is provided in Annex 1. The details of the interoperability agreements, solution specifications and solution instances can be found in Annex 2. The approaches that were used to develop a common vision for an EIA are described in more detail in Annex 3. The resulting refined EIF conceptual model and the mapping of solution specifications and instances can be found in Annex 4. The details of the nine interoperability infrastructure services that were identified in the European Interoperability Infrastructure Services (EIIS) Study are provided in Annex 5. The traceability of the interview findings (including the problems, needs and requirements, and interoperability solutions) from EC projects and Member States to the resulting reference interoperability agreements (RIA) is detailed in Annex 6. An enlarged version of the high-level overview of the approaches used in the study is provided in Annex 7. The added value of the RIA and the common vision for an EIA is detailed by means of two projects, i.e. DG TAXUD CCN2 and epSOS, in Annex 8.

2.2 BACKGROUND OF THE EIA STUDY

The Digital Agenda for Europe is one of the seven flagship initiatives within the Europe 2020 Strategy, and aims to deliver sustainable economic and social benefits from a digital single market based on fast and ultra fast internet and interoperable applications. In this context, Europe does not yet reap the maximum benefit from interoperability, as weaknesses in standard-setting, public procurement and coordination between public authorities prevent digital services and devices used by Europeans from working together as well as they should.

The role of the Digital Agenda in this area is to encourage the adoption of common standards and the use of open platforms. A key action to promote interoperability between public administrations is the

Commission's adoption of the European Interoperability Strategy (EIS) and the European Interoperability Framework (EIF) drawn up under the ISA programme (Interoperability Solutions for European Public Administrations[1]). Further information about interoperability in this context can be found in the communication document 'Towards interoperability for European public services'[2].

Within the interoperability initiatives at the European Commission (EC) as shown in Figure 7, the European Interoperability Architecture (EIA) is positioned as the practical and concrete implementation following the interoperability framework (EIF). Overall, the EIS focuses on the *governance* activities for interoperability towards European Public Services, the EIF looks at the *conception* of European Public Services, the EIA study investigates the *implementation* of European Public Services, and the European Interoperability Infrastructure Services (EIIS) support the *operation* of European Public Services.

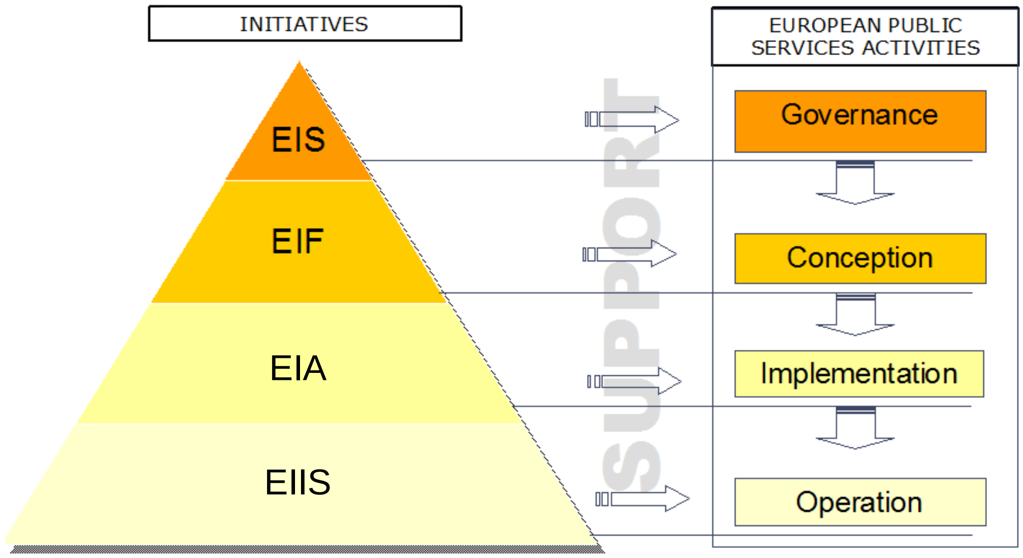

Figure 7 - Interoperability Initiatives at the European Commission

2.3 SCOPE OF THE EIA STUDY

The European Interoperability Architecture (EIA) study explores the need for a European interoperability architecture facilitating the establishment of cross-border and cross-sector European public services. The study looks at best practice examples, investigates the scope of such architecture and investigates the need to support the architecture via common infrastructure services and common interface standards. The goal of the study is to work toward a joint vision on the issue and to define the objectives and scope of further actions in this area.

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[1] The ISA Work Programme - http://ec.europa.eu/isa/workprogramme/

[2] COM(2010) 744 final -Towards interoperability for European public services - http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0744:FIN:EN:PDF

Hence, the scope of the EIA study[3] is limited to cross-border and cross-sector interactions between Member States and between Member States and Commission services, dealing with Administration-to-Administration (A2A) interactions. Although the scope of this study is limited to A2A interactions, businesses and citizens also play an important role in using the public services, so the examples in this study consider businesses, citizens and administrations.

The EIA study focuses on European public services with a full online availability and takes into account all four interoperability levels as specified in the EIF, being;

- Legal: Aligned legislation so that exchanged data is accorded proper legal weight
- Organisational: Coordinated processes in which different organisations achieve a previously agreed and mutually beneficial goal
- Semantic: Precise meaning of exchanged information which is preserved and understood by all parties
- Technical: Planning of technical issues involved in linking computer systems and services

2.4 OBJECTIVES OF THE EIA STUDY

The objectives of the EIA study are:

- **To help elaborating with the Member States and the concerned Commission services a common vision for an architecture facilitating interoperability for European Public Services (its scope, the articulation of the main architectural building blocks and the need for interface standards between such architectural building blocks), and**
- **To assess the need and the relevance of having common infrastructure services as part of that architecture.**

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[3] The European Commission aims to support with its eGovernment Action Plan 2011-2015 the provision of a new generation of eGovernment services for businesses and citizens. This action plan is based on the Malmö Declaration, agreed on 18 November 2009 at the 5th Ministerial eGovernment Conference in Malmö, Sweden. The Action Plan also builds on the results of cross-border services piloted by the ongoing EU Large Scale Pilot projects (STORK, PEPPOL, SPOCS and epSOS) with the aim to make it easier for citizens and businesses to access online services across the EU. Note that the analysis of the real economic or social need for these eGovernment services will only take place in Nov 2011, after the common vision for an EIA has been formulated.

2.5 MILESTONES AND DELIVERABLES FOR THE EIA STUDY

In order to reach the two objectives of the EIA study, a set of milestones and deliverables is planned during the course of the project (Figure 8). The first objective, to reach a common vision for an EIA, is detailed in Chapter 3. The second objective, to assess the implementation of the common vision, is described in Chapter 4.

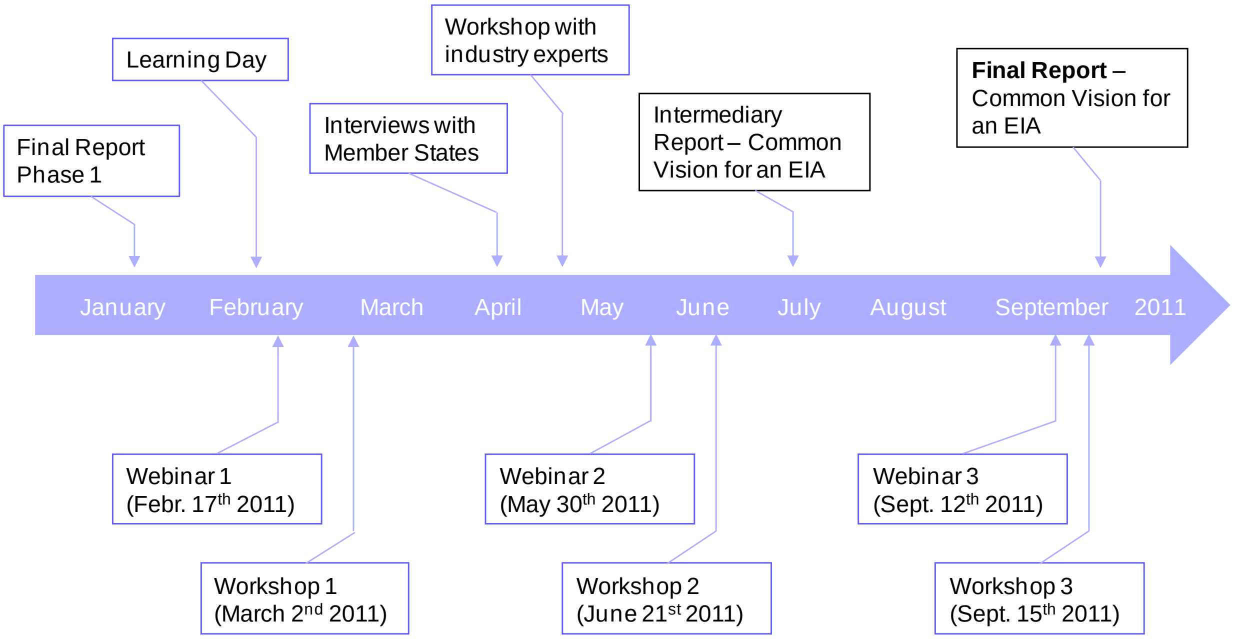
Learning Day
Workshop with industry experts
Final Report Phase 1
Interviews with Member States
Intermediary Report – Common Vision for an EIA
Final Report – Common Vision for an EIA
January
February
March
April
May
June
July
August
September
2011
Webinar 1 (Febr. 17th 2011)
Webinar 2 (May 30th 2011)
Webinar 3 (Sept. 12th 2011)
Workshop 1 (March 2nd 2011)
Workshop 2 (June 21st 2011)
Workshop 3 (Sept. 15th 2011)

Figure 8 - Overview of Milestones and Deliverables

As displayed in Figure 8, this final report is based on the findings of previous milestones and deliverables. Initially, the outcomes of the Phase 1 report were taken into account, and a learning day was organised to learn from previous experiences in Member States. Next, the methodology and research approaches were discussed during webinar 1 and workshop 1.

Based on these research approaches, two rounds of interviews were done to collect the corresponding data per approach. Firstly, a round of interviews was conducted with EC project officers and with Heads of Unit from different Directorates-General (DG). The EC projects were selected based on their specific domain or sectoral focus and the development of solutions for cross-border interoperability. More specifically, the selection of EC projects for participation in the interviews included EESSI, TAXUD CCN2, and the CIP pilot projects SPOCS, PEPPOL and epSOS. Furthermore, in the context of the EC projects, interviews were conducted with the Heads of Unit of DG REGIO and DIGIT directorate B (including DIGIT.B1, DIGIT.B3 and DIGIT.B4). Secondly, interviews were conducted with eight volunteering Member State administrations, including Latvia, Spain, Greece, Denmark, Estonia, Germany, Luxembourg and France.

In the beginning of May, a workshop with industry experts was organised to receive first feedback on the findings, and to assess the need for feasibility, standardisation, and governance of our study. After collecting all input from the different EC projects, Member States and industry experts, the results on the different visions for an EIA were presented in webinar 2 and workshop 2. A common vision for an EIA was discussed with the participants of workshop 2 which resulted in a validated and prioritised list of interoperability agreements[4] for an EIA.
During the months of August and September, all stakeholders were asked to provide feedback on the intermediary results of this study. In parallel, the implementation plan for an EIA was prepared, which was discussed during webinar 3 and workshop 3. Based on the input received, this report was finalised in order to conclude the overall study.

2.6 APPROACHES TO DEVELOP A COMMON VISION FOR AN EIA

The approaches to develop a common vision for an EIA were discussed during workshop 1, and were subsequently aligned with the approaches provided by The Open Group Architecture Framework (TOGAF). TOGAF is a de facto standard for the development of architectures, of which the Architecture Development Method (ADM) describes the development of an Architecture Vision in Phase A (Figure 9).

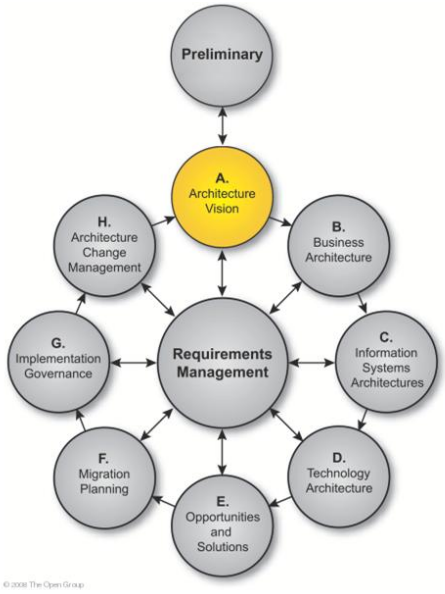
Preliminary
A. Architecture Vision
B. Business Architecture
C. Information Systems Architectures
D. Technology Architecture
E. Opportunities and Solutions
F. Migration Planning
G. Implementation Governance
H. Architecture Change Management
Requirements Management
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Figure 9 - TOGAF ADM

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[4] As defined by the EIF, (written) interoperability agreements are concrete and binding documents which set out the precise obligations of different parties cooperating across an ‘interface’ to achieve interoperability

In Phase A of TOGAF ADM, an Architecture Vision is articulated and the value proposition is formalised that demonstrates a response to the stakeholder requirements and constraints. Such an Architecture Vision should include a definition of the key business requirements to be addressed in the architecture effort, the scope of, and identification and prioritisation of the components of, the Baseline Architecture effort. Overall, TOGAF recommends the following three approaches to describe an Architecture Vision:

- **To identify key high-level needs and requirements from all stakeholders. Business scenarios are an appropriate technique to discover these needs and requirements, and to document them accordingly.**
- **To identify the building blocks of the Baseline Architecture.**
- **To articulate an Architecture Vision that demonstrates a response to the needs and requirements.**

In the context of our study, these three TOGAF approaches were adapted to our specific needs, and were referred to as the bottom-up approach, the top-down approach and the combination approach.

- **In the bottom-up approach, we used a practical modelling technique (e.g. use cases) to study and communicate the commonalities and differences among needs and requirements for interoperability at national level (e.g. RISER in Germany, @Firma in Spain), and at sectoral level (e.g. epSOS, CCN2, PEPPOL, SPOCS, EESSI)**
- **In the top-down approach, we started from the EIF conceptual model for public services and refined the building blocks of this model.**
- **In the combination approach, we combined and analysed the results of the bottom-up and top-down approaches, studied possible visions for an EIA and worked towards an agreement on a common vision for an EIA.**

As given by Figure 10, the first two approaches investigated the “Why?” by looking at existing interoperability solutions and at existing conceptual models in order to gather the needs and requirements for an EIA.

Then, the combination approach investigates the “What?” by consolidating the needs and requirements based on the identification of common themes into a list of interoperability agreements and solution specifications, which is defined as the *Reference Interoperability Agreements (RIA)*. This RIA contains agreements that are needed at European sectoral level for the setup of cross-border eGovernment services. Hence, the RIA is defined as a list of possible interoperability agreements that facilitate the interoperability of electronic public services of cross-border (i.e. European), sectoral or cross-sectoral nature. For instance, when a new sectoral project at EC level is initiated, the RIA interoperability agreements can be used to kick-start the interoperability aspects of the project.

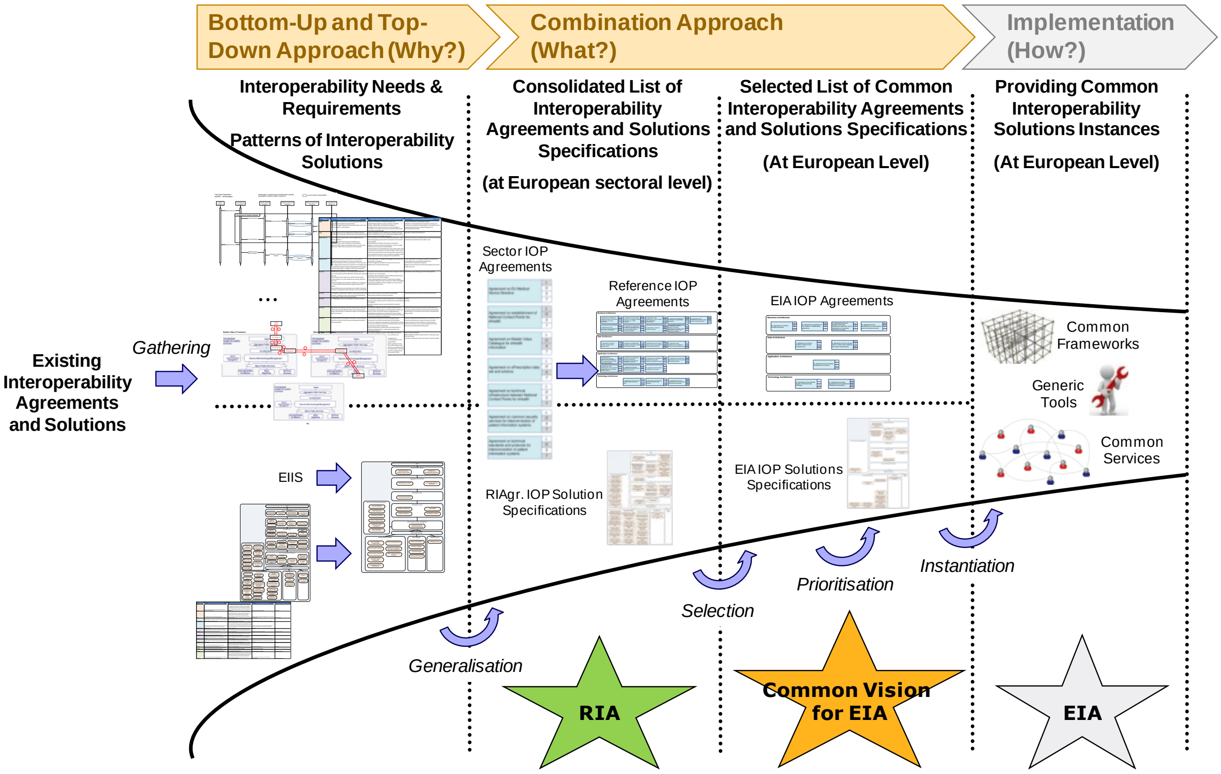

Bottom-Up and Top-Down Approach (Why?)
Combination Approach (What?)
Implementation (How?)
Interoperability Needs & Requirements
Patterns of Interoperability Solutions
Consolidated List of Interoperability Agreements and Solutions Specifications
(at European sectoral level)
Selected List of Common Interoperability Agreements and Solutions Specifications
(At European Level)
Providing Common Interoperability Solutions Instances
(At European Level)
Existing Interoperability Agreements and Solutions
Gathering
EIIS
Sector IOP Agreements
Reference IOP Agreements
RIAgr. IOP Solution Specifications
EIA IOP Agreements
EIA IOP Solutions Specifications
Common Frameworks
Generic Tools
Common Services
Generalisation
Selection
Prioritisation
Instantiation
RIA
Common Vision for EIA
EIA

Figure 10 – High-Level Overview of Approaches (cfr. Annex 7 for larger version)

Although the RIA defines interoperability agreements at European level, not all of these agreements are applicable across sectors and across borders. Hence, the part of the RIA that is considered common between different sectors and different Member States, can be selected into the *Common Vision for a European Interoperability Architecture (EIA)*. The common vision for an EIA is defined as a common set of interoperability agreements that are cross-border (i.e. European) and cross-sectoral, and have a high feasibility and high added value to implement. For instance, when two EC sectoral projects define access points to organise their cross-border information exchange, the technical setup might require two different interoperability agreements (part of the RIA), while the legal requirements might be defined in one common European interoperability agreement (part of the common vision for an EIA).

When the common European interoperability agreements have been selected, the “How?” will be investigated by prioritizing the interoperability solution instances that are needed at the European level to implement the “What?”. For instance, in order to implement the legal requirements for access points, different Service Level Agreements might be needed to implement this interoperability agreement.

It is important to stress the difference between the common vision for an EIA, and the EIA itself. The common vision for an EIA consists of the interoperability agreements that should be common on a European level, while the EIA consists of the solution specifications and solution instances that implement the common vision for an EIA.

2.7 DIFFERENCE BETWEEN INTEROPERABILITY AGREEMENT, SOLUTION SPECIFICATION AND SOLUTION INSTANCE

In using the refined EIF conceptual model, the relationships between interoperability agreement, solution specification and solution instance (e.g., of the RIA, analogue to the common vision for the EIA) can be visualised, as is shown in Figure 11. The details of the refined EIF conceptual model and an enlarged version of Figure 11 can be found in Annex 4.

An interoperability agreement consists of one or more interoperability solution specifications, and an interoperability solution specification can be implemented by means of one or more interoperability solution instances.

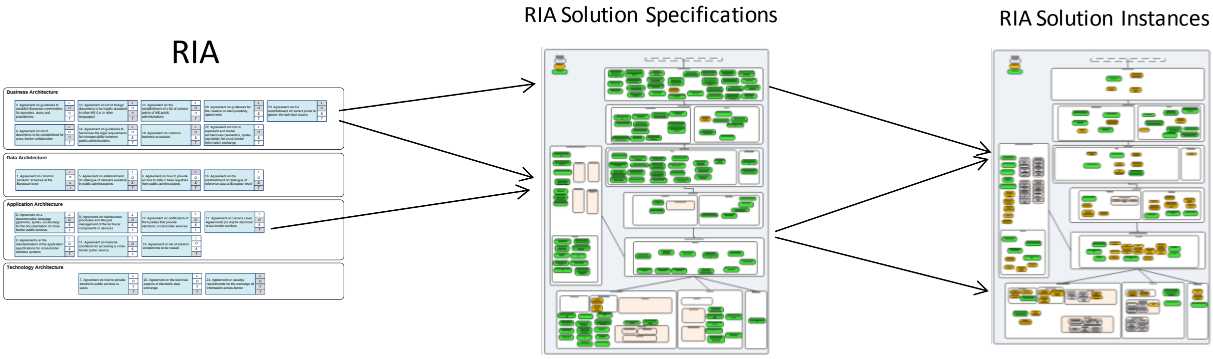


Figure 11 - Link between RIA, Solution Specification and Solution Instances

As explained by Figure 12, existing interoperability agreements and solutions were analysed to gather needs and requirements and identify patterns for interoperability solutions. For instance, the EESSI and epSOS projects were analysed on the EC level, and specific cases were investigated in Spain and Greece. Later on, the needs and requirements were consolidated into RIA interoperability agreements, and the identified patterns for interoperability solutions were consolidated into RIA interoperability solution specifications. The existing interoperability solutions were consolidated in a first list of solution instances in order to illustrate the RIA solution specification. Based on the agreements and solution specifications of the RIA, a selection was made for the common agreements and solutions specifications for the common vision for the EIA. Finally, the priorities were determined to start the implementation of the common EIA solution specifications.

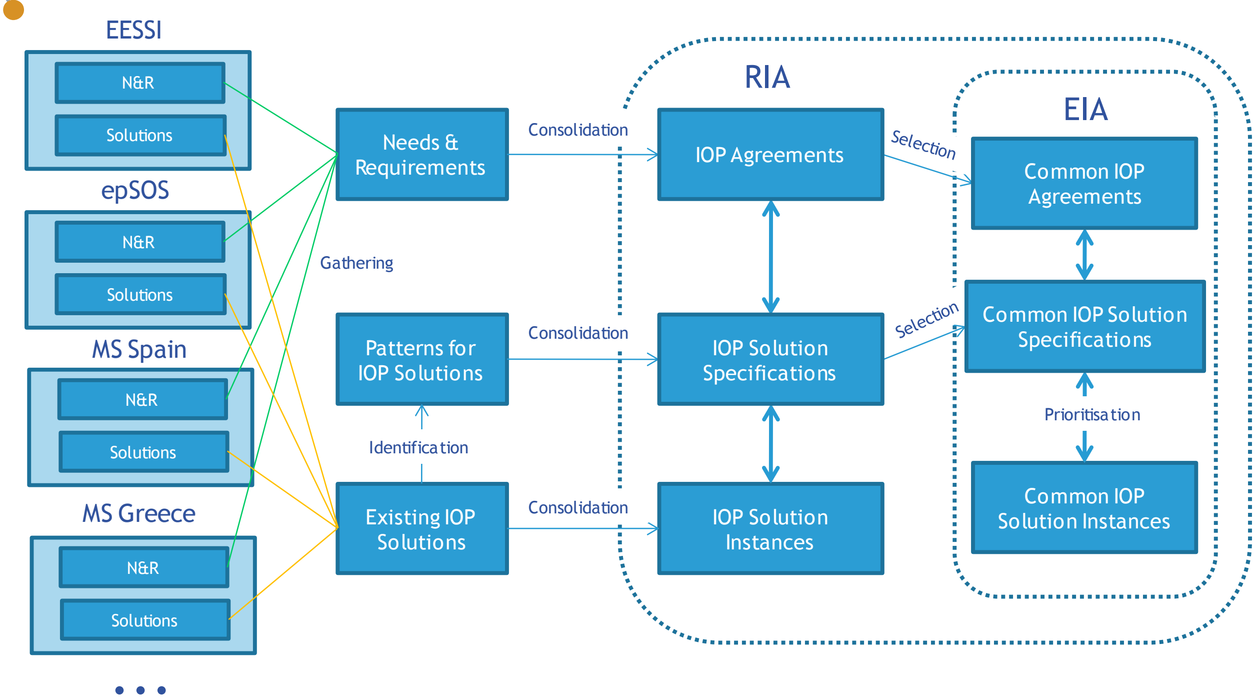

EESSI
N&R
Solutions
epSOS
N&R
Solutions
MS Spain
N&R
Solutions
MS Greece
N&R
Solutions
• • •
Gathering
Needs & Requirements
Patterns for IOP Solutions
Identification
Existing IOP Solutions
Consolidation
Consolidation
Consolidation
RIA
IOP Agreements
IOP Solution Specifications
IOP Solution Instances
Selection
Selection
EIA
Common IOP Agreements
Common IOP Solution Specifications
Prioritisation
Common IOP Solution Instances

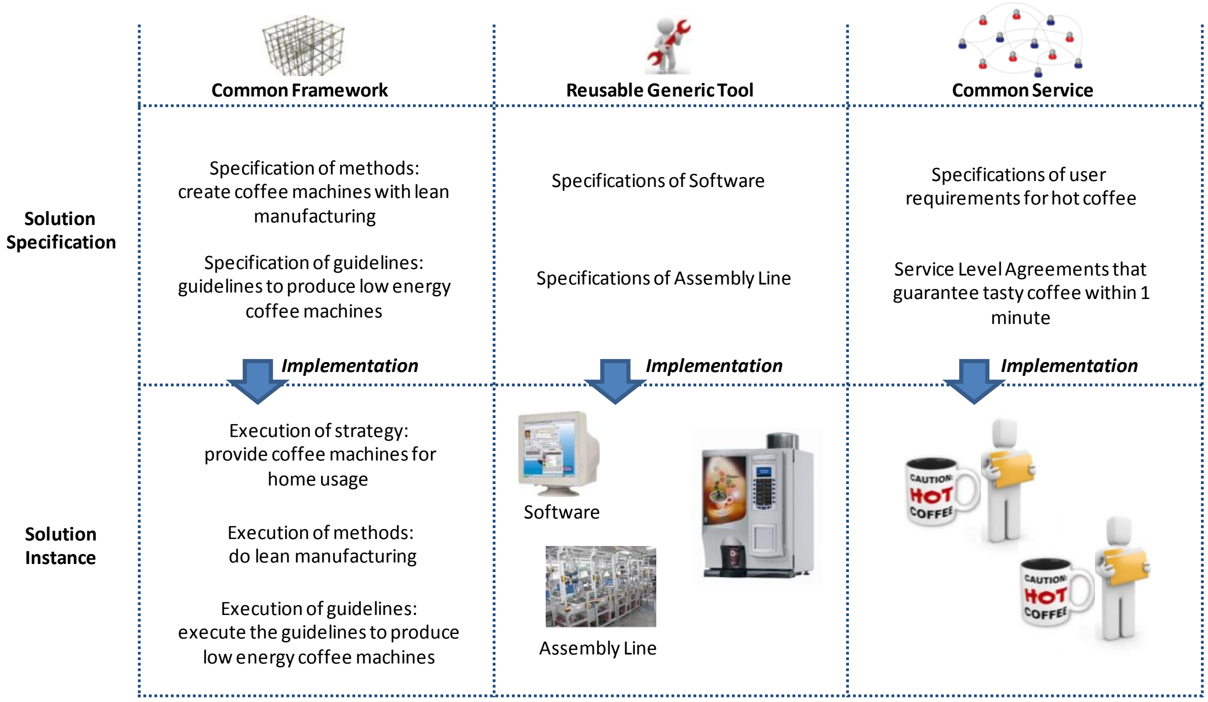
Figure 12 - Relationships between Different Concepts

We will give an overview of the different definitions, and illustrate these definitions by means of a simple, real-world example (i.e., a coffee machine).

- **A solution specification defines the characteristics of a solution by means of a common framework, reusable generic tool or common service.**
- **A solution instance is the real-world implementation of a solution specification, which can be the implementation of a common framework, the implementation of a reusable generic tool or the implementation of a common service.**
- **A common framework is something that you can build on, such as strategies, methods and guidelines.**
    - **A strategy is a plan of action designed to achieve a particular goal**
    - **A method is a step-by-step description of a given procedure or process**
    - **A guideline is a statement by which to determine a course of action**
- **A common service is a service of a generic nature which meets common user requirements across multiple policy areas. It is basically a consumable service that any user in multiple policy areas can consume AS IS, e.g. without modification, in support of the implementation of his/her policy.**
- **A reusable generic tool is a component that can be used to produce a system or part thereof. Normally, it needs customisation to meet specific needs. It is reusable across multiple policy areas and it is not a service.**

In order to show the different nuances between solution specifications and solution instances, Figure 13 takes the simple example of a coffee machine. First, frameworks are needed to specify the strategies, methods and guidelines. Then, tools are specified to support these frameworks, and the service delivered by the resulting product is also specified.

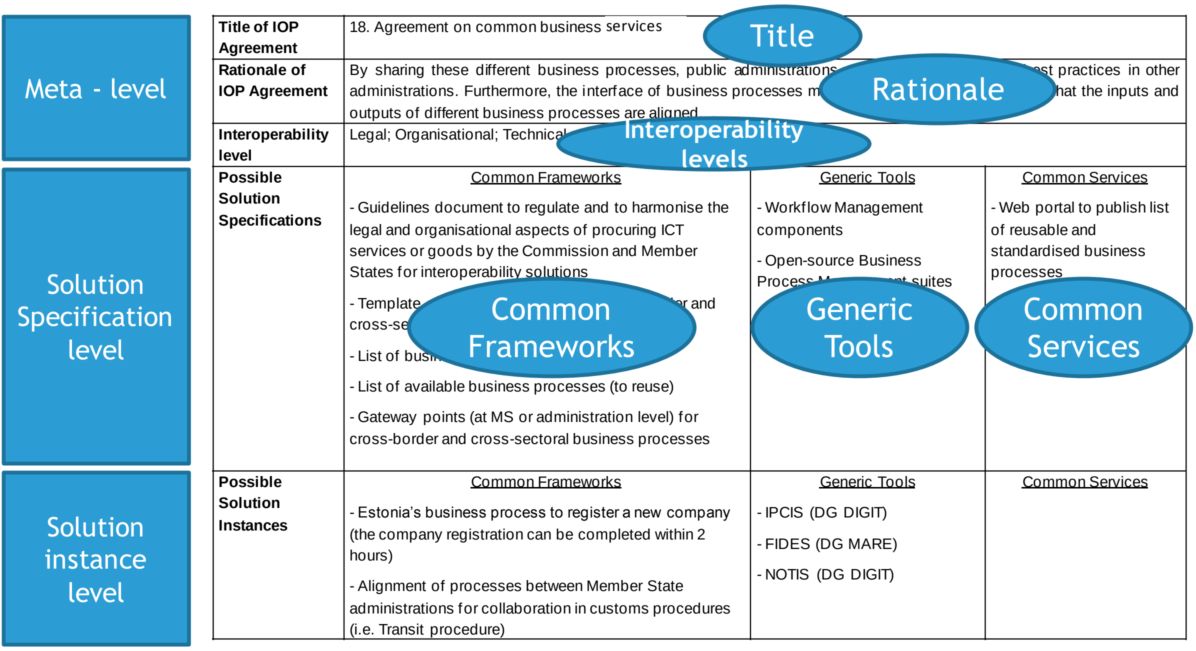
Finally, after implementing all specifications, the frameworks to design a coffee machine are executed, the tools to manufacture the coffee machine are used, and the resulting coffee machine delivers the service "Provide hot coffee" to the intended users.



	Common Framework	**Reusable Generic Tool**	**Common Service**
Solution Specification	Specification of methods: create coffee machines with lean manufacturing Specification of guidelines: guidelines to produce low energy coffee machines	Specifications of Software Specifications of Assembly Line	Specifications of user requirements for hot coffee Service Level Agreements that guarantee tasty coffee within 1 minute
	Implementation	***Implementation***	***Implementation***
Solution Instance	Execution of strategy: provide coffee machines for home usage Execution of methods: do lean manufacturing Execution of guidelines: execute the guidelines to produce low energy coffee machines	Software Assembly Line	

Figure 13 - Illustration of Solution Specifications and Solution Instances for a Coffee Machine

In this context, it is important to differentiate between the *implementation of the common vision for an EIA*, and the *implementation of concrete implementation actions* (dealing with solution specifications and solution instances), as both aspects are situated on a different level of abstraction. Firstly, the *common vision for an EIA* is implemented on the *meta-level* by means of templates for interoperability agreements, and by means of a common set of interoperability agreements that are cross-border (i.e. European), cross-sectoral, highly feasible and have a high added value for interoperability. For instance, Figure 14 shows such a template (including the title, rationale and levels of the agreement) for agreement 18 titled « Agreement on common business services ». Secondly, the *concrete implementation actions* define the creation of common frameworks, reusable generic tools and common services that implement solution specifications and solution instances. For instance, Figure 14 shows examples of common frameworks, reusable generic tools and common services that implement agreement 18 titled « Agreement on common business services ».


Meta - level
Solution Specification level
Solution instance level
Title
Rationale
Interoperability levels
Common Frameworks
Generic Tools
Common Services

Title of IOP Agreement	18. Agreement on common business services		
Rationale of IOP Agreement	By sharing these different business processes, public administrations [illegible] est practices in other administrations. Furthermore, the interface of business processes m[illegible] hat the inputs and outputs of different business processes are aligned.		
Interoperability level	Legal; Organisational; Technical		
Possible Solution Specifications	Common Frameworks - Guidelines document to regulate and to harmonise the legal and organisational aspects of procuring ICT services or goods by the Commission and Member States for interoperability solutions - Template [illegible] er and cross-se[illegible] - List of busi[illegible] - List of available business processes (to reuse) - Gateway points (at MS or administration level) for cross-border and cross-sectoral business processes	Generic Tools - Workflow Management components - Open-source Business Process M[illegible] suites	Common Services - Web portal to publish list of reusable and standardised business processes
Possible Solution Instances	Common Frameworks - Estonia's business process to register a new company (the company registration can be completed within 2 hours) - Alignment of processes between Member State administrations for collaboration in customs procedures (i.e. Transit procedure)	Generic Tools - IPCIS (DG DIGIT) - FIDES (DG MARE) - NOTIS (DG DIGIT)	Common Services

Figure 14 – Illustrating the Different Implementation Levels for EIA

3. INTRODUCING A COMMON VISION FOR AN EIA

The objective of this chapter is to introduce a common vision for a European Interoperability Architecture (EIA). This chapter contains a step-by-step explanation of the main activities for the different approaches described before, and uses examples from the epSOS project to illustrate each step (cfr. Figure 15). Please note that epSOS project is only one example out of the thirteen projects that have been interviewed, and that not all detailed findings have been included in this final report, but are part of a complement interview findings report.

In section 3.1, the different models that define the needs and requirements of the epSOS project are presented. In section 3.2, the Reference Interoperability Agreements (RIA) are introduced, which contains the consolidated list of interoperability agreements and solutions at European sectoral level. In section 3.3, the selection of common interoperability agreements and solutions for an EIA is described. The common vision for an European Interoperability Architecture (EIA) contains a list of interoperability agreements and potential interoperability solutions implementing these agreements. In section 3.4 the prioritisation of the key interoperability agreements is explained, and finally, section 3.5 introduces common interoperability solutions for the key interoperability agreements.

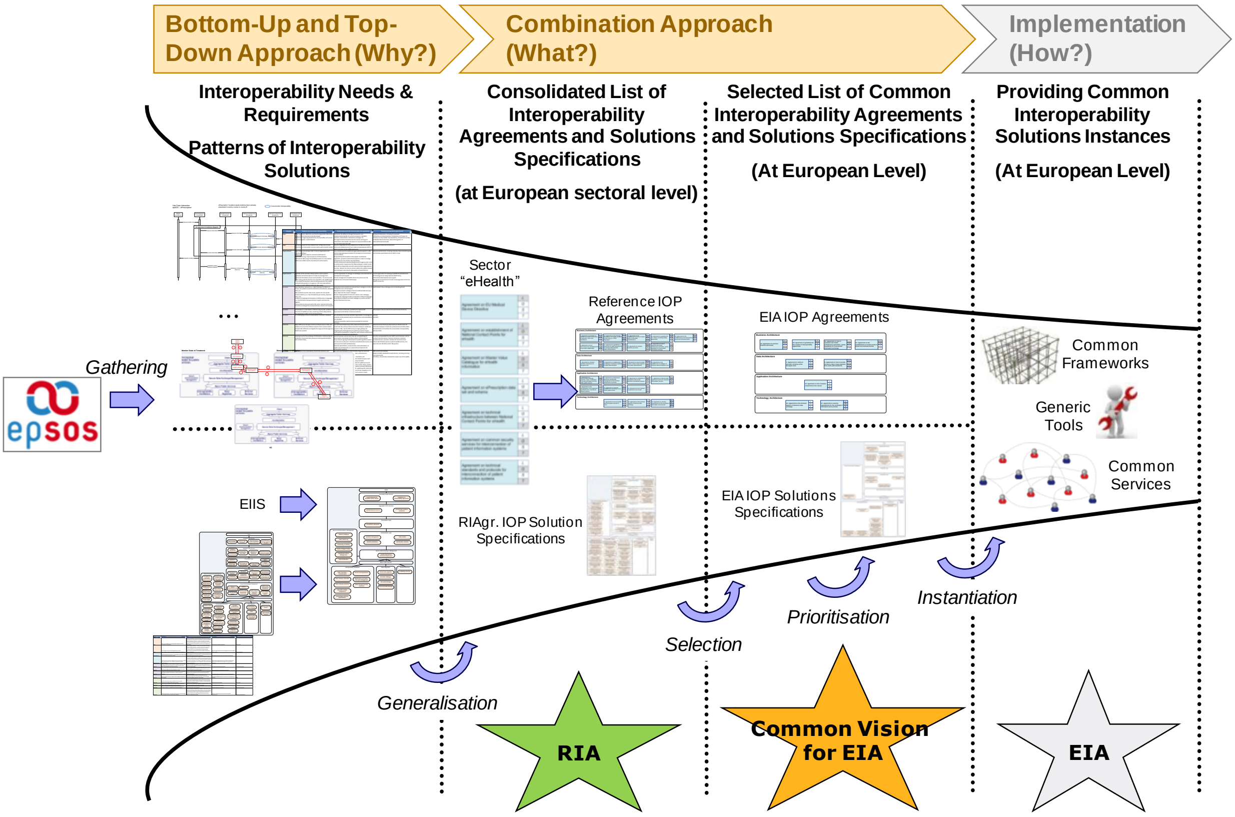

Bottom-Up and Top-Down Approach (Why?)
Combination Approach (What?)
Implementation (How?)
Interoperability Needs & Requirements
Patterns of Interoperability Solutions
Consolidated List of Interoperability Agreements and Solutions Specifications
(at European sectoral level)
Selected List of Common Interoperability Agreements and Solutions Specifications
(At European Level)
Providing Common Interoperability Solutions Instances
(At European Level)
Gathering
epsos
…
EIIS
Sector "eHealth"
Reference IOP Agreements
EIA IOP Agreements
Common Frameworks
Generic Tools
Common Services
RIAgr. IOP Solution Specifications
EIA IOP Solutions Specifications
Instantiation
Prioritisation
Selection
Generalisation
RIA
Common Vision for EIA
EIA

Figure 15 – Illustrating the EIA Approaches by Means of the epSOS Project

3.1 GATHERING NEEDS AND REQUIREMENTS FOR CROSS-BORDER INTEROPERABILITY

Three kinds of models were used to illustrate the needs and requirements: an UML interaction diagram (e.g. Figure 16), the EIF conceptual model annotated with elements from the UML interaction diagram (e.g. Figure 17) and a table with problems, requirements and solutions that correspond to the selected use case (e.g. Table 2).

Figure 16 shows the use case when a patient needs a medicine in Country B that has already been prescribed in Country A. In this case the Health Care Professional (HCP) Distributor should be able to electronically access the prescription from the same eHealth interface he or she uses for prescriptions ordered in the local country. When the medicine is provided, the system should notify the patient’s National Contact Point (NCP) in country A about the dispensed drugs.

According to this use case description, the HCP Distributor (e.g. pharmacist) must know what medicine has been prescribed (e.g. after a doctor’s consultation). The HCP Distributor accesses the necessary data to be able to dispatch the medicine. After the medicine is dispensed the system informs the NCP in country A about the dispatch.

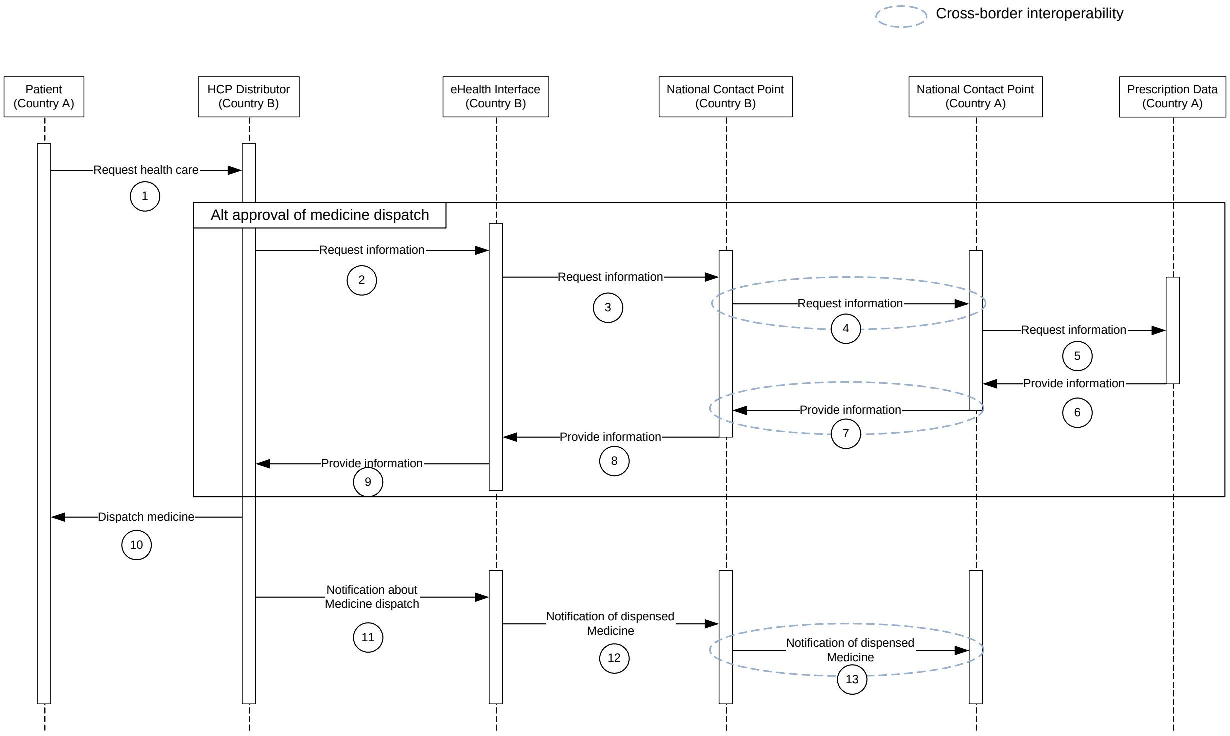

Cross-border interoperability
Patient (Country A)
HCP Distributor (Country B)
eHealth Interface (Country B)
National Contact Point (Country B)
National Contact Point (Country A)
Prescription Data (Country A)
Request health care
1
Alt approval of medicine dispatch
Request information
2
Request information
3
Request information
4
Request information
5
Provide information
6
Provide information
7
Provide information
8
Provide information
9
Dispatch medicine
10
Notification about Medicine dispatch
11
Notification of dispensed Medicine
12
Notification of dispensed Medicine
13

Figure 16 - ePrescription Use Case from epSOS Project

Next, Figure 17 shows the EIF conceptual model annotated with elements from the UML interaction diagram. The EIF conceptual model gives context to the national level (Figure 17: Member State of Treatment, Member State of Affiliation), and to the European level (Figure 17: EC).

To increase the visual traceability between the UML interaction diagram and the EIF conceptual models, the sequence numbers of the UML interaction diagram were added to the interactions of the EIF conceptual model (e.g. the interaction ‘Request Health Care’ between a patient and a HCP Distributor received number 1 both on Figure 16 and Figure 17).

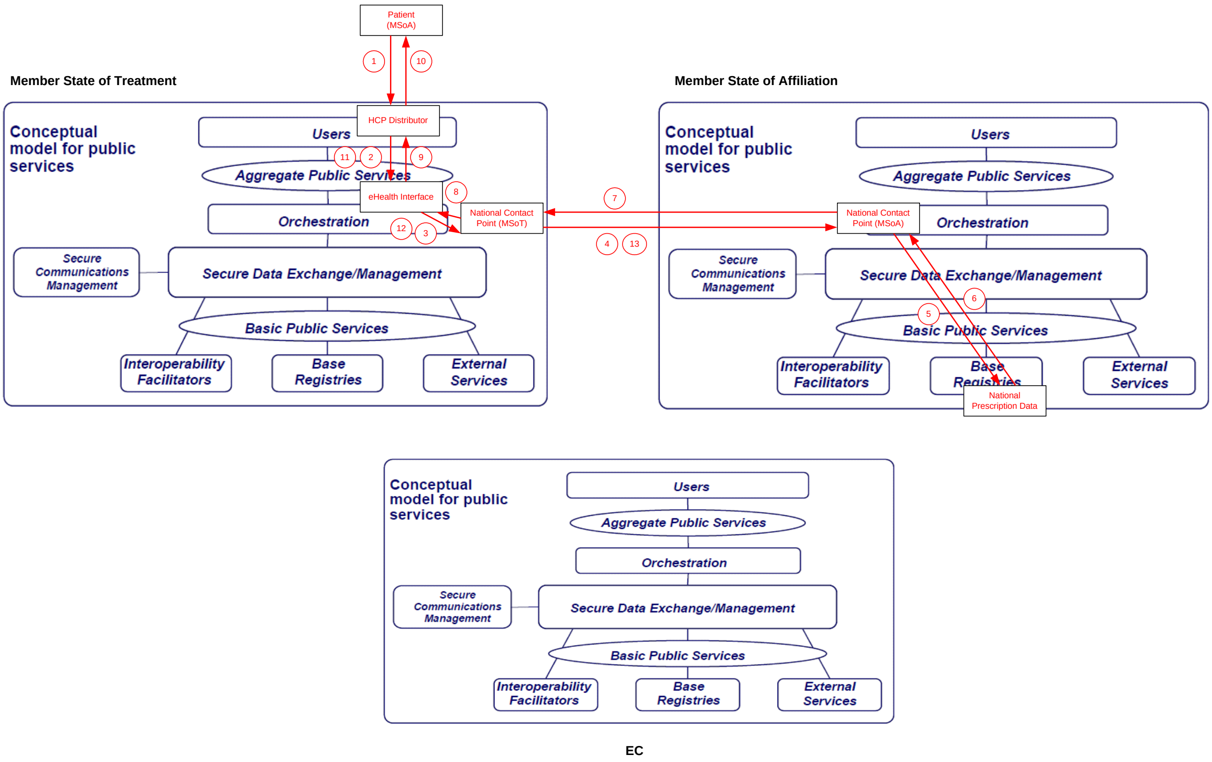

Patient (MSoA)
1
10
Member State of Treatment
Member State of Affiliation
Conceptual model for public services
Users
HCP Distributor
11
2
9
Aggregate Public Services
8
eHealth Interface
Orchestration
National Contact Point (MSoT)
12
3
Secure Communications Management
Secure Data Exchange/Management
Basic Public Services
Interoperability Facilitators
Base Registries
External Services
7
4
13
Conceptual model for public services
Users
Aggregate Public Services
National Contact Point (MSoA)
Orchestration
Secure Communications Management
Secure Data Exchange/Management
5
6
Basic Public Services
Interoperability Facilitators
Base Registries
National Prescription Data
External Services
Conceptual model for public services
Users
Aggregate Public Services
Orchestration
Secure Communications Management
Secure Data Exchange/Management
Basic Public Services
Interoperability Facilitators
Base Registries
External Services
EC

Figure 17 - EIF Conceptual Model Annotated with Elements from the UML Interaction Diagram

As illustrated by Figure 17, there is no direct involvement of the EC in this use case, which does not mean that the EC is not relevant to the epSOS project. To have a more general view on the matter, the use case findings were extrapolated into a more general context as illustrated by Table 2. Here, a summary was made of the interoperability solutions that were in place in the epSOS project, the problems that are solved by these solutions, and the needs and requirements that correspond to these problems. This table is structured per interoperability level as defined by the EIF, i.e. Legal, Organisational, Semantic and Technical.

For instance, on the Organisational level, the epSOS project has an interoperability solution called ‘National Contact Point’, which is an organisation delegated by each participating country, acting as a bidirectional way of interfacing between the existing different national functions provided by the national IT infrastructures and those provided by the common European infrastructure.

Possible problems that are solved by this solution are:

- **Major differences between Member State in internal organisation and internal workflows.**
- **Different solutions based on assumed workflows for ePrescriptions (e.g. how to provide an ePrescription).**
- **Difficulty for Member State to align the workflows which run cross-border.**
- **Differences of Member State in terms of practices for ePrescription.**

Based on these insights, one requirement was identified, i.e. the need to use a contact point to coordinate organisational aspects in a Member State, which could be a single gateway and broker for all aspects of cross-border communication.

Table 2 - Needs and Requirements Identified for epSOS Project

Category	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
Legal	Some regulations affect the use of technology within MS and this causes different solutions to be developed. Difference in legal requirements for security by MS, such as end-to-end encryption, authentication.	Harmonize the different EU legal frameworks, and implementation by MS, for security measures, standards selection, data formats, information exchange, etc. The legal elements should ensure the secure exchange of information cross-border, and where it is assumed that one MS can not look inside other MS.	Multiple EU Directives, including for example; EU Directive on data protection, EU Directive on Privacy, EU Directive on cross-border interoperability of electronic records, EU Medical Device Directive, Mutual Recognition of Doctors/Pharmacists by MS
Legal	Missing legal basis for the establishment of National Contact Points for the cross-border communication within Health domain.	Require a legal basis for the establishment of National Contact Points and establishment of trust relationships between NCPs in order to connect to the epSOS community.	Legal base for National Contact Point
Organisational	Major differences between MS in internal organisation and internal workflows. Different solutions based on assumed workflows for ePrescriptions (e.g. how to dispense an ePrescription). Difficulty for MS to align the workflows which run cross-border. Differences of MS in terms of practices for ePrescription.	Use a contact point to coordinate organisational aspects in a MS, mostly single gateway and broker for all aspects of cross-border communication. Responsibility for translation of European into National legislation, semantics and technical aspects in order to manage complexity for cross-border interoperability. Central contact point operated by government agency (and not EC as central point), requirement for data exchange in Health sector where MS as responsible and with a decentralised organisational structure. Reduce the time to connect a MS to the epSOS network by providing an easy step-by-step guide and specifications.	National Contact Point, including a step-by-step connection guide and interface specifications for an NCP in a box.
Organisational	Translate all the selected coding systems used in patient summaries and ePrescriptions in order to exchange their contained information across country borders. If a country used other coding systems that the ones selected in the epSOS project they needed to map their national coding systems to the epSOS selected Coding system. To organise it the same way without investing in many different tools for many users.	Central organisation to manage the Catalogue and small team for development and support. Provide management of epSOS community and ensure the establishment of trusted relationships.	Central organisation for Catalogue (epSOS Central Reference Terminology Server using CareCom HealthTerm), CCD team for development and support, Manage the trusted service list and trusted signature list for the epSOS community.
Semantic	Most MS define semantics (i.e. XML standards) for Patient or Person, but problem exists for definitions of medicines, physician roles, etc. Main problems are the codes to be used for all cross-border communications, (i.e. lists of medicines per country, physician roles, etc). Problem of mapping and translation of differences in languages, (i.e. transformation between Britisch English and American English). These problems also exist within MS, when medical information should be exchanged for example between doctors and hospitals.	Standardize local semantics at national level, and agree on the set of codes for use in ePrescription. Taking the semantic catalogues from the different MS and input these codes into the master catalogue. Provide mapping tables from/to this master value catalogue, including the mapping of codes and between different languages. Providing the complete semantic catalogue as central element whithin federated structure.	epSOS Master Value Catalogue (central building block)
Semantic	ePrescription is understood in different ways by MS, problems for extention of epSOS use cases, assuming common MS practices, but specialities of MS in terms of ePrescription	Define minimum data sets, possibility for optional MS requirements and define a maximum data set.	ePrescription data set and schema (central data structure)
Semantic	It is challenging to ensure sustainability in semantic standards	Use standards provided by standard organisations, to manage the evolution of the standard and the maintenance and sustainability of a standard. Standards should be used as much as possible for semantic solutions.	eProfile, IG Profile
Technical	Major differences between technical infrastructures in MS, and problem to ensure the different aspects of the communication between MS. Difficulty to integrate the large set of heterogenous Health care systems.	Use technical infrastructure of the National Contact Point to coordinate the communication connection between health care systems in MSs. Use the NCP mainly as single gateway for integrating the heterogeneous IT systems by means of open, international standards (in compliance with relevant national and international standards and regulations).	National Contact Point provides technical infrastructure for connection between health care professionals and other NCPs. Standardisation of interfaces for cross-border interoperability between NCPs.
Technical	Ensuring trust for the exchange of information, and ensuring the protection of personal data, privacy (including authentication) and confidentiality.	A set of common services are to be set up supporting and securing the cross-border communication of ePrescription. Ensure secure signing of ePrescriptions by NCP signatures (which are not end-to-end), but in the future should be done by the end-points (such as health professionals). Need for identification, authentication and authorisation of health care professionals (i.e. physicians) and patients for ePrescription systems.	Security is encapsulated by each NCP in set of services, such as Common Security Service, Common ID Service, Common Semantic Service, Common interface for interconnection. Patient identification system as part of epSOS solution, but physicians are identified within MS systems.
Technical	Maintenance and sustainability of technical solutions, and providing components for IG Profiles.	Use technical standards in order to better align the technical solutions. Benefit from the management, evolution and sustainability of standards. Technical choices should be based on standards, and modifications or adaptations should be limited because it will reduce the potential benefits from using standards. Build upon standards that are applicable for epSOS (such as IG Profiles), and are considered open to the market. Many vendors that integrate IG Profiles into their products, and each MS should contact their own provider for the NCP. epSOS specific extentions are provided as open source components to be integrated in IG Profile products. (although only 1 current vendor is used)	XML as technical standard, WSDL and SOAP standards for web services, including ensuring trust and security IG Profiles, and provide components as open source for epSOS,

3.2 GENERALISATION OF INTEROPERABILITY AGREEMENTS AND SOLUTIONS SPECIFICATIONS FOR AN RIA

The gathered needs and requirements for cross-border interoperability are consolidated in two steps into a list of interoperability agreements, which is defined as the Reference Interoperability Agreements (RIA). First, the interview findings are consolidated into sectoral interoperability agreements at European level (in Section 3.2.1). Next, the sectoral interoperability agreements at European level are again consolidated in common interoperability agreements at European level (in Section 3.2.2), based on the identification of common themes in the sectoral interoperability agreements.

3.2.1 Consolidation of Sectoral Interoperability Agreements at European Level

From the different use cases for the EC projects and Member States, the gathered needs and requirements are consolidated first into sectoral interoperability agreements at European level. An example is shown in Figure 18, where consolidated interoperability agreements for the eHealth sector are identified based on the needs and requirements from the epSOS project.

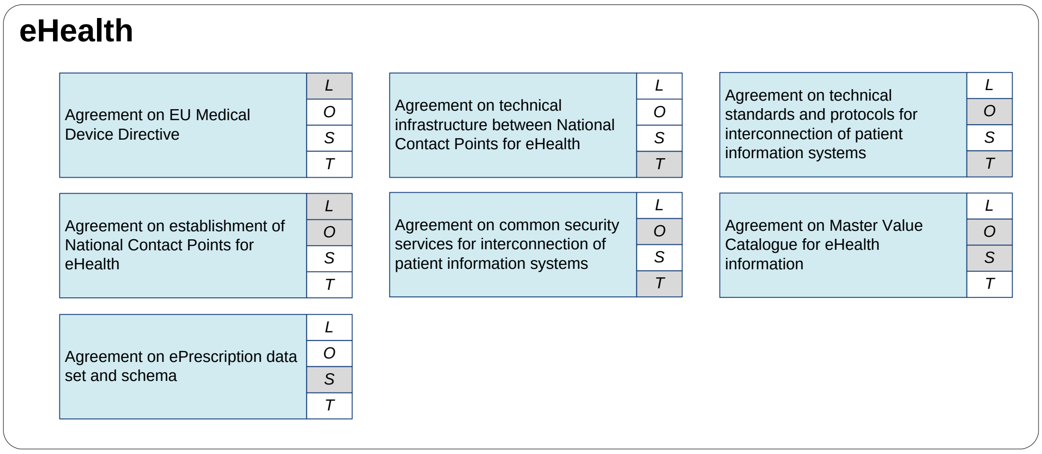

eHealth
Agreement on EU Medical Device Directive
L
O
S
T
Agreement on technical infrastructure between National Contact Points for eHealth
L
O
S
T
Agreement on technical standards and protocols for interconnection of patient information systems
L
O
S
T
Agreement on establishment of National Contact Points for eHealth
L
O
S
T
Agreement on common security services for interconnection of patient information systems
L
O
S
T
Agreement on Master Value Catalogue for eHealth information
L
O
S
T
Agreement on ePrescription data set and schema
L
O
S
T

Figure 18 - Consolidated Interoperability Agreements for eHealth Sector Based on epSOS Project

The different sectoral interoperability agreements are added to the RIA. As a result, new projects at EC level can benefit by identifying and reusing these RIA sectoral interoperability agreements to kick-start the interoperability aspects of the project. For instance, “Agreement on technical standards and protocols for interconnection of patient information systems” contains the technical descriptions to connect different patient information systems, as well as the governance structure to monitor defects in the protocol.

3.2.2 Consolidation of Interoperability Agreements at European Level

For the RIA, the different sectoral interoperability agreements are further consolidated into interoperability agreements at European level. The complete list of sectoral interoperability agreements was taken and common themes were identified, for example the theme on defining data sets. Based on these common themes, the different sectoral interoperability agreements are consolidated and common interoperability agreements at European level are defined.

An example of a European interoperability agreement is shown in Figure 19, which consolidates the eHealth sectoral interoperability agreement and other sectoral interoperability agreements on defining appropriate data sets. The complete traceability of the interview findings (including the problems, needs and requirements, and interoperability solutions) from EC projects and Member States to the resulting reference interoperability agreements (RIA) is detailed in Annex 6.

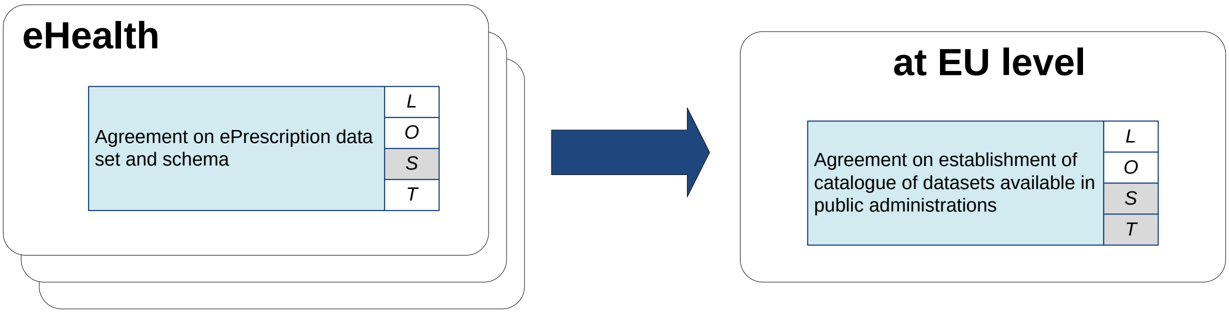

eHealth
Agreement on ePrescription data set and schema
L
O
S
T
at EU level
Agreement on establishment of catalogue of datasets available in public administrations
L
O
S
T

Figure 19 - Example of Interoperability Agreements at European Level

The consolidated European interoperability agreements are added to the RIA. These European interoperability agreements are potential candidates to be selected for the Common Vision for an EIA. The resulting list of European interoperability agreements for the RIA is illustrated using an architecture view, as shown in Figure 20. The in-depth details of the interoperability agreements are documented in Annex 2.

As suggested by Enterprise Architecture frameworks such as The Open Group Architecture Framework (TOGAF), architecture elements can be modelled by means of views, i.e. illustrations of a related set of concerns. As stated in TOGAF, an architecture view may be depicted by a model to demonstrate to stakeholders their areas of interest in the architecture. For the RIA view, the commonly accepted architecture domains for an enterprise architecture (and supported by TOGAF) are used and are the following;

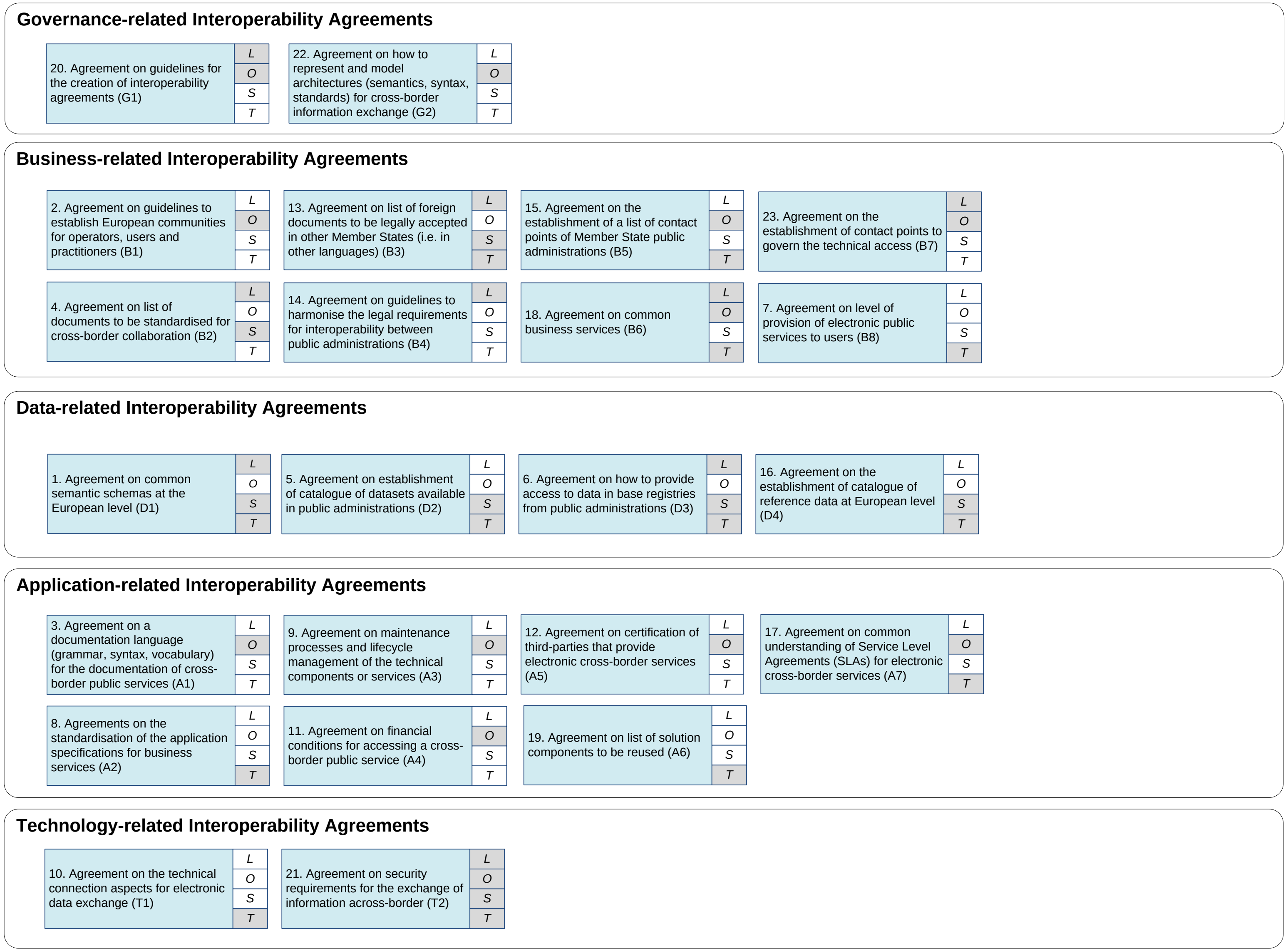
- **Business Architecture**
- **Data Architecture**
- **Application Architecture**
- **Technology Architecture**

In addition to the architecture domains, the RIA view is extended with the governance domain. For the RIA, a interoperability agreement at European level is positioned in one of the architecture domains or in the governance domain based on the specific theme that it addresses.

For example the interoperability agreement on ‘list of business objects to be legally defined’ is positioned within Data Architecture because it addresses the theme business objects, which relates to logical and physical data assets e.g. an invoice.

Furthermore, interoperability is defined as the viewpoint for the architecture view and resulted in adding an indication (marked grey) to each interoperability agreement for the four interoperability levels: Legal (L), Organisational (O), Semantic (S) and Technical (T). The indications of the interoperability levels depend on the detailed agreements that are needed or impacted for a specific interoperability agreement, for example the agreement on ‘guidelines to establish contact points to govern technical access’ contains legal and organisational aspects.

Please note that alternative numbering codes are suggestions at the end of the agreement title (e.g. (G1) to identify 20 - Agreement on guidelines for the creation of interoperability agreements). This alternative number is suggested to be used during the follow up phase of this project, during the execution of the EIA governance activities.



Governance-related Interoperability Agreements

20. Agreement on guidelines for the creation of interoperability agreements (G1)

22. Agreement on how to represent and model architectures (semantics, syntax, standards) for cross-border information exchange (G2)

Business-related Interoperability Agreements

2. Agreement on guidelines to establish European communities for operators, users and practitioners (B1)

13. Agreement on list of foreign documents to be legally accepted in other Member States (i.e. in other languages) (B3)

15. Agreement on the establishment of a list of contact points of Member State public administrations (B5)

23. Agreement on the establishment of contact points to govern the technical access (B7)

4. Agreement on list of documents to be standardised for cross-border collaboration (B2)

14. Agreement on guidelines to harmonise the legal requirements for interoperability between public administrations (B4)

18. Agreement on common business services (B6)

7. Agreement on level of provision of electronic public services to users (B8)

Data-related Interoperability Agreements

1. Agreement on common semantic schemas at the European level (D1)

5. Agreement on establishment of catalogue of datasets available in public administrations (D2)

6. Agreement on how to provide access to data in base registries from public administrations (D3)

16. Agreement on the establishment of catalogue of reference data at European level (D4)

Application-related Interoperability Agreements

3. Agreement on a documentation language (grammar, syntax, vocabulary) for the documentation of cross-border public services (A1)

9. Agreement on maintenance processes and lifecycle management of the technical components or services (A3)

12. Agreement on certification of third-parties that provide electronic cross-border services (A5)

17. Agreement on common understanding of Service Level Agreements (SLAs) for electronic cross-border services (A7)

8. Agreements on the standardisation of the application specifications for business services (A2)

11. Agreement on financial conditions for accessing a cross-border public service (A4)

19. Agreement on list of solution components to be reused (A6)

Technology-related Interoperability Agreements

10. Agreement on the technical connection aspects for electronic data exchange (T1)

21. Agreement on security requirements for the exchange of information across-border (T2)

Figure 20 - Architecture View for Interoperability Agreements of the RIA

3.3 SELECTION OF INTEROPERABILITY AGREEMENTS OF THE COMMON VISION FOR AN EIA

In the common vision for an EIA, a consensus is expressed on interoperability agreements that are needed at European level for cross-border and cross-sector interoperability between public administrations. Using the common vision for an EIA, EC projects and Member State administrations can benefit from reusing the interoperability agreements and solutions that are provided or implemented at European level.

The interoperability agreements that should be included in the common vision for an EIA represent a selection of the interoperability agreements of the RIA. During workshop 2, such a selection was made based on a scoring exercise and a consensus discussion with all participants, leading to a working hypothesis of the common vision. During workshop 3, this working hypothesis was revisited, by discussing whether these EIA agreements should be added, changed or removed.

In Figure 21, the resulting list of interoperability agreements are shown. To depict these agreements, the architecture view of the RIA is used, including the indications for the four interoperability levels.

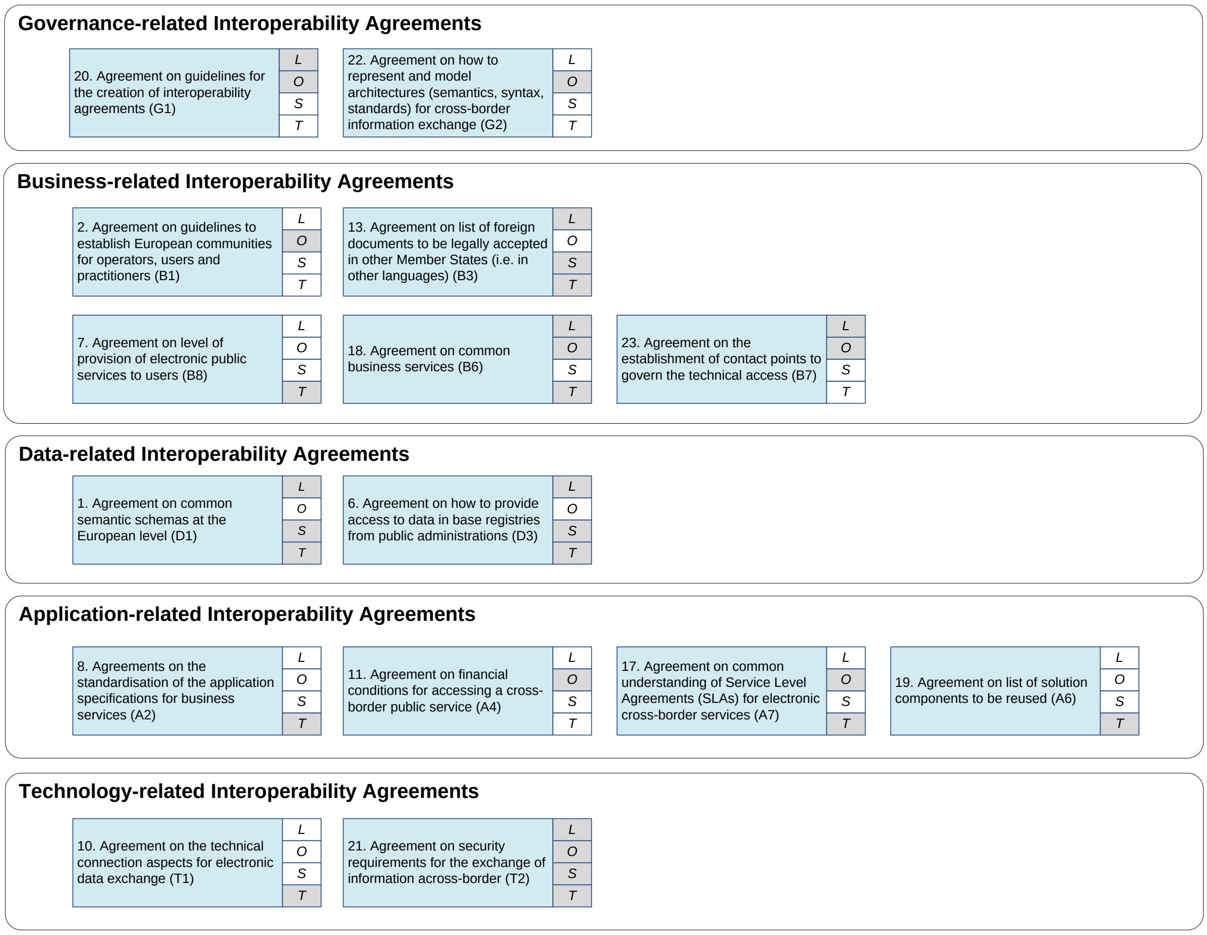

Governance-related Interoperability Agreements
20. Agreement on guidelines for the creation of interoperability agreements (G1)
L
O
S
T
22. Agreement on how to represent and model architectures (semantics, syntax, standards) for cross-border information exchange (G2)
L
O
S
T
Business-related Interoperability Agreements
2. Agreement on guidelines to establish European communities for operators, users and practitioners (B1)
L
O
S
T
13. Agreement on list of foreign documents to be legally accepted in other Member States (i.e. in other languages) (B3)
L
O
S
T
7. Agreement on level of provision of electronic public services to users (B8)
L
O
S
T
18. Agreement on common business services (B6)
L
O
S
T
23. Agreement on the establishment of contact points to govern the technical access (B7)
L
O
S
T
Data-related Interoperability Agreements
1. Agreement on common semantic schemas at the European level (D1)
L
O
S
T
6. Agreement on how to provide access to data in base registries from public administrations (D3)
L
O
S
T
Application-related Interoperability Agreements
8. Agreements on the standardisation of the application specifications for business services (A2)
L
O
S
T
11. Agreement on financial conditions for accessing a cross-border public service (A4)
L
O
S
T
17. Agreement on common understanding of Service Level Agreements (SLAs) for electronic cross-border services (A7)
L
O
S
T
19. Agreement on list of solution components to be reused (A6)
L
O
S
T
Technology-related Interoperability Agreements
10. Agreement on the technical connection aspects for electronic data exchange (T1)
L
O
S
T
21. Agreement on security requirements for the exchange of information across-border (T2)
L
O
S
T

Figure 21 – Architecture View for Selected Interoperability Agreements of Common Vision for EIA

3.4 PRIORITISED INTEROPERABILITY AGREEMENTS TO BE IMPLEMENTED FOR EIA

During the prioritisation exercise in workshop 3, each participant was given three Post-its, and was asked to give its three first preferred interoperability agreements on these Post-its, taking into account their feasibility and added value for the implementation of an EIA. The consolidated results of the prioritisation exercise lead to the top 4 agreements to be implemented for EIA as shown in Figure 22.

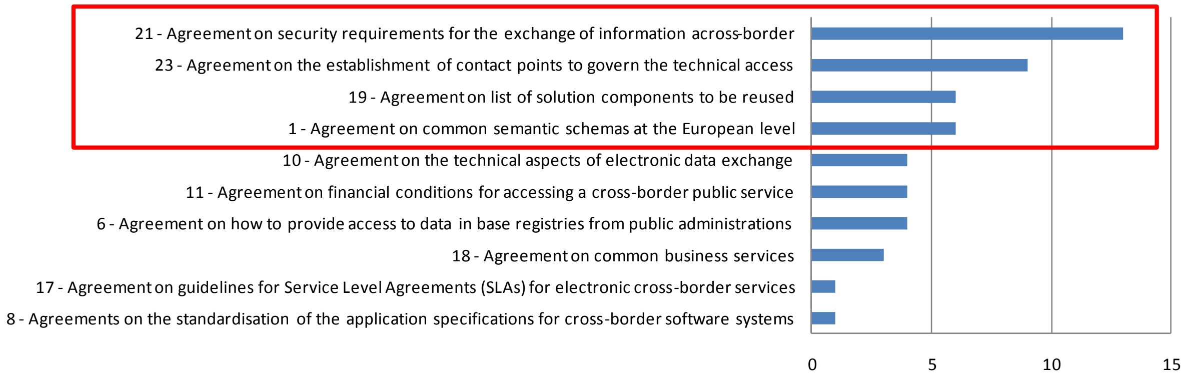


Figure 22 –Results from Prioritisation Exercise during Workshop 3

3.5 IDENTIFICATION OF SOLUTIONS FOR KEY INTEROPERABILITY AGREEMENTS IN EIA

In the context of the four EIA interoperability agreements that were prioritised, a brainstorm session was organised during workshop 3 to identify possible solutions that could implement these agreements. The total group of participants was split into three groups, and each group was asked to identify possible solutions to implement these agreements. Afterwards, the input of the three groups was consolidated and discussed in a plenary session.

As a result of the discussion, the following main solutions were proposed for the four prioritised EIA interoperability agreements:

- **21. Agreement on security requirements for the exchange of information across-border (T2)**
  - **Framework to establish trust, including security standards, security methods (e.g. ISO27000), and security environments**
  - **Establishment of a European security certification authority**
- **23. Agreement on the establishment of contact points to govern the technical access (B7)**
  - **Open-ended list of contact points per country or per service, preferably linked to the organisational structure of the contact points**

- **19. Agreement on list of solution components to be reused (A6)**
  - **Vision document, architecture and guidelines for reusable common solutions**
  - **List of reusable components, together with a minimum set of information to implement the reusable components (e.g. deliverables, service levels, contact points)**
- **1. Agreement on common semantic schemas at the European level (D1)**
  - **Monitoring of work done by DG Enterprise around European standards, and of work done by SEMIC around core assets**

Next to the solutions for the four prioritised EIA interoperability agreements, the participants of the workshop discussed and found consensus on two additional solutions:

- **20. Agreement on guidelines for the creation of interoperability agreements (G1)**
  - **Implementation of governance for EIA and RIA**
  - **Governance framework for EIA and RIA (including templates for interoperability agreements)**
- **Solution providing a central platform to publish interoperability assets**
  - **Transversal solutions**
  - **Central platform to publish interoperability assets (Semantic, Technical, Organisational, Legal)**

3.6 CHECKING THE ADDED VALUE OF RIA AND COMMON VISION FOR EIA

For the purpose of this document, an initial check is performed of the added value of providing an RIA and the common vision for EIA. In Annex 8, the added value is investigated by means of two example cases which are taken from the interviewed EC projects and Member States. The first selected case relates to DG TAXUD CCN2 project, related to a centrally-organised infrastructure across borders (CCN/CSI), whereas the second case deals with epSOS project, as this is a representative example of a federally-organised approach.

Our approach to check the added value is based on the following reasoning. At this point in time, both DG TAXUD CCN2 project and epSOS project have interoperability solutions in place, for which implicit or explicit interoperability agreements exist. When these projects would have to be redone from scratch, which interoperability agreements (proposed by the RIA and the common vision for the EIA) could be reused to kick-start these projects? The expectation is that most agreements of the RIA could be reused (but not all, as the RIA should not be complete for all European projects), and that all agreements of the common vision for the EIA should be reused (indicating the completeness of the common vision for the EIA).

In the context of the twenty three RIA agreements, DG TAXUD CCN2 project has twenty-two and epSOS project has twenty solution occurrences. This leads to an overall coverage of the RIA of 95% for DG TAXUD CCN2 project and 86% for epSOS project. In the context of the fifteen agreements in the common vision for EIA, both DG TAXUD CCN2 project and epSOS project have fifteen solution occurrences, leading to an overall coverage of the common vision for the EIA of 100%. As a result, no major gaps are expected to implement the common vision of an EIA in the context of DG TAXUD CCN2 project and epSOS project, illustrating the possibility for project officers to kick-start future EC project using the common vision for an EIA.

4. IMPLEMENTATION OF AN EIA

The objectives of the EIA study are, firstly, to help the Member States and the concerned Commission services to elaborate a common vision for an architecture facilitating interoperability for European Public Services, and secondly, to assess the need and the relevance of having common infrastructure services as part of that architecture. This chapter will provide an answer to the second objective of this study, and will provide possible implementation actions for key interoperability agreements of an EIA. The input from workshop 3 and other feedback received from Member States and Commission services have been taken into account before elaborating the conclusions of this chapter.

In Section 4.1, the key findings of this chapter are explained, introducing the need and relevance of common infrastructure services, and explaining the proposed actions for implementation of key interoperability agreements in EIA. Next, section 4.2 provides the detailed assessment of need and relevance of common infrastructure services, and section 4.3 elaborates on the details of the proposed implementation actions, together with a discussion of their objectives, possible implementation approaches and effort assessment.

4.1 KEY FINDINGS FOR THE IMPLEMENTATION OF AN EIA

In this section, a summary of the key findings for the implementation of an EIA is given. Further details about these findings are given in section 4.2 (detailing the need and relevance of common infrastructure services), and section 4.3 (detailing the proposed actions for implementation of key interoperability agreements in EIA).

4.1.1 Key Findings for Need and Relevance of Common Infrastructure Services

Nine common infrastructure services were identified by the European Interoperability Infrastructure Services (EIIS) Study[5]: audit trail & log, service registry, identity and access control, data certification, data transport, data translation, workflow management, document storage, and structured data storage. More explanation of these different common infrastructure services can be found in Annex 5.

From the assessment of the need for common infrastructure services, it is indicated that there is a need for common infrastructure services at national or sectoral level (based on RIA), and a need for specific common infrastructure services at European level (based on EIA). However, for the prioritised interoperability agreements to be implemented for EIA, only four common infrastructure services are supported, indicating a special need for these common infrastructure services to be provided at European level.

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[5] EIIS Study as part of the IDABC Programme: http://ec.europa.eu/idabc/en/document/7795.html

Overall, the assessment of the need and relevance of common infrastructure services indicated that **Data Certification** and **Identity and Access Management** are common infrastructure services with the highest need and relevance to be offered on a European level.

4.1.2 Key Findings for Proposed Actions for Implementation of Key Interoperability Agreements in EIA

Based on the prioritisation and feasibility of the proposed solutions for the prioritised EIA interoperability agreements, Table 3 shows an overview of the essential implementation actions that are advised to be taken in the short to medium term. Overall, Table 3 shows that the suggested interoperability solutions are mostly common frameworks (five out of six agreements refer to common frameworks), with some attention to common services (two out of six agreements). From the prioritisation and feasibility of the actions, no reusable tools were selected to be implemented on the short or medium term (although the details in Annex 2 suggested several reusable tools for agreements).

Table 3 – Overview of Essential Implementation Actions

Action	Related to IOP agreement	Common Framework	Reusable Tool	Common Service
Action 1 - security requirements for the exchange of information across-border	21	Common specifications for security requirements of cross-border information exchange		
Action 2 - reuse of solution components	19	Framework for sharing and reuse of solution components		
Action 3 - central platform to publish interoperability assets				Central platform to publish interoperability assets
Action 4 - implementation of governance for EIA and RIA	20	Governance framework for EIA and RIA (including templates for interoperability agreements)		
Action 5 - technical connection aspects for electronic data	10	Common specifications for technical connection		Common platform for electronic cross-

exchange		aspects of cross-border data exchange		border delivery
Action 6 - establishment of contact points to govern the technical access	23	Guidelines document on how to establish contact points		

For each action, an assessment is performed about the effort of implementing the action on the European Commission and on Member States. The details of the effort assessment are provided in the details of the actions, as described in the sections 4.3.1 to 4.3.6. Based on the effort assessment, the efforts required for the implementation of the actions are summarised as follows:

- **Action 1 requires large organisational efforts and large efforts to define common semantic schemas for the security aspects from both the European Commission and Member States. Furthermore, large technical effort is required from the European Commission to adapt the technical systems and networks for the defined security requirements.**
- **Action 2 requires only limited organisational and semantic efforts from the European Commission and Member States to define and adapt to the framework for the reuse of solution components.**
- **Action 3 requires large technical and organisational efforts from the European Commission to develop and operate the central platform to share interoperability assets. For the Member States, only limited organisational efforts are required in order to collaborate on the central platform.**
- **Action 4 requires only large organisational efforts from both the European Commission and Member States in order to establish the governance for EIA and RIA.**
- **Action 5 requires only large technical efforts from both the European Commission and Member States in order to provide the technical connection aspects.**
- **Action 6 requires large legal efforts from both the European Commission and Member States in order to establish the legal basis for contact points. Furthermore, organisational efforts are required from the European Commission and Member States to align and establish the contact points to govern the technical access.**

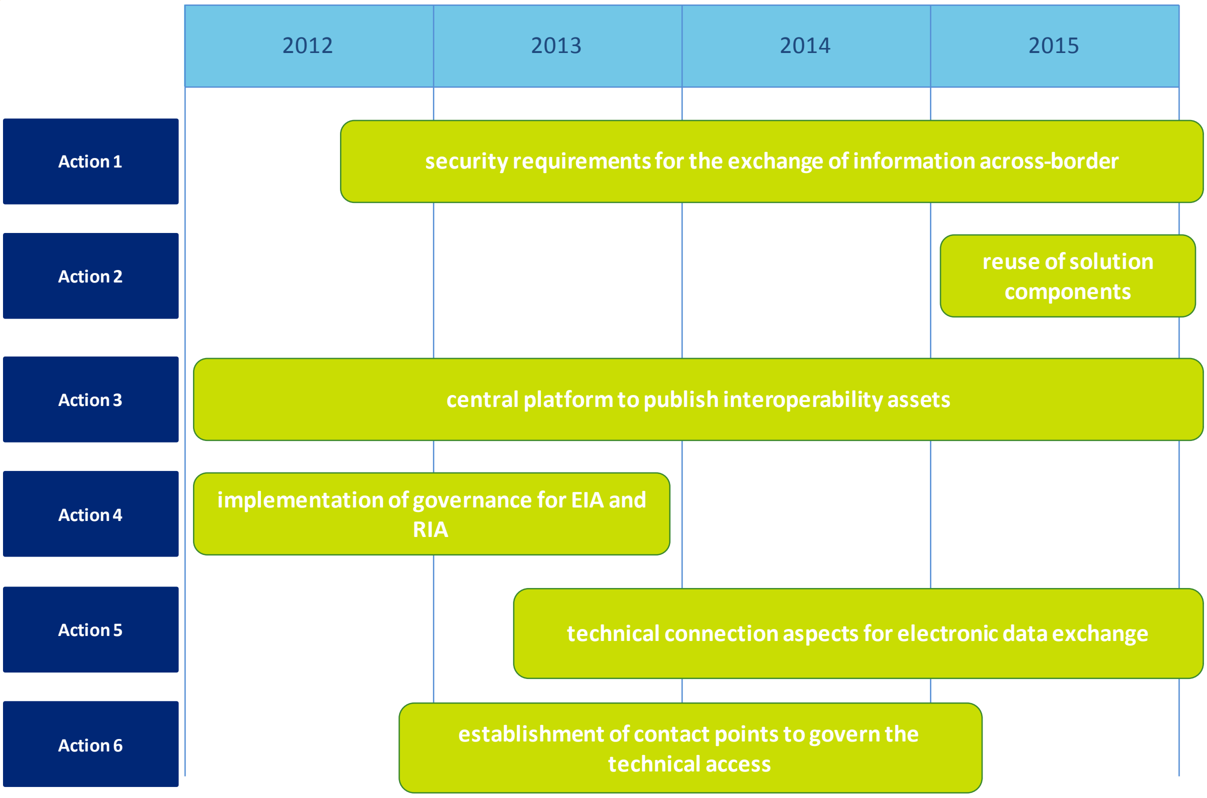

Figure 23 - High-Level Implementation Roadmap

Based on the effort assessment of the actions, a high-level roadmap for the implementation of the actions is developed, as shown by Figure 23. **Error! Reference source not found.**In order to estimate the implementation time per action, the assumption was taken that actions requiring a certain level of implementation effort, require a corresponding level of time. For instance, the estimated implementation effort for action 2 is rather limited compared to the other actions, corresponding to the shortest implementation time (around one year).

The sequencing of the implementation actions is based on the identified dependencies between these actions. Actions 1, 5 and 6 have strong interdependencies, which causes them to start more or less at the same time. Although actions 5 and 6 are strongly related, it would be preferred to start with action 6 as this focuses on organisational aspects, after which action 5 can tackle the technical aspects. Actions 3 is a transversal action, which can be started from the beginning and can continue to support the distribution of interoperability assets untill the end of the timeline. Action 4 can also be started from the beginning of the timeline, building the foundations of governance during the first two years. At the end of the timeline, action 2 can promote the reuse of solution components.

4.2 DETAILED ANALYSIS OF NEED AND RELEVANCE OF COMMON INFRASTRUCTURE SERVICES

As part of the objectives for this study, the needs and relevance of providing common infrastructure services at European level are assessed. In this study, a *solution specification* defines the characteristics of a solution by means of a common framework, reusable generic tool or common service, and a *solution instance* is the real-world implementation of a solution specification. In this context, a *common service* is a service of a generic nature which meets common user requirements across multiple policy areas, and is a service that any user or public administration can consume. *Common infrastructure services* are considered to be a special kind of common service, which are used during the operation of a public service to ensure the interaction between the public administrations involved.

It is important to note that common infrastructure services provide 'technical functionality', rather than more generic Business Services[6] which provide 'business functionality'. 'Business functionality' is provided by a system to support one or more business processes and is tangible for end-users, whilst the 'technical functionality' of a system supports the delivery of one or multiple business services and is not directly accessible to end-users. Hence, the common usage of infrastructure services on a European level can improve and support the provision of European Public Services for public administrations and Member States, and can for example lower the implementation cost.

In this assessment of providing common infrastructure services at European level, the nine identified common infrastructures services from the EIIS study[7] are considered: Audit Trail and Log, Service Registry, Identity and Access Management, Document Storage, Workflow Management, Data Certification, Data Transport, Data Translation and Structured Data Storage.

The need and relevance of common infastructure services were operationalised via two dimensions, being *feasibility* and *added value*. Per common infrastructure service, an estimation of feasibility and added value of implementing this service, was made based on data gathered from different sources (during the EIIS study, the third workshop of this study, and the details given in Annex 2 of this report). In this context, the main source of input was the final EIIS report (version 1.1), of which the section on *EIIS implementation scenarios* explained the feasibility per common infrastructure service, and the section on *EIIS business value* describes the added value per common infrastructure service. During the third workshop of this study, additional feedback on feasibility and added value was received, which was tested by means of the details given in Annex 2 of this report.

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[6] Another kind of common service is called *fundamental service*, which is used by the forthcoming study "On cloud and service oriented architectures for e-government" by DG INFSO. The notion of *fundamental service* differs from *common infrastructure service* in the sense that *fundamental services* provide 'business functionality'.

[7] European Interoperability Infrastructure Services (EIIS) Study as part of the IDABC programme: http://ec.europa.eu/idabc/en/document/7795.html

Section 4.2.1 explains the feasibility of implementing common infrastructure services, Section 4.2.2 details the added value of implementing common infrastructure services, and Section 4.2.3 uses the input of the two previous sections to conclude on the need and relevance of common infrastructure services.

4.2.1 Feasibility of Implementing Common Infrastructure Services

In order to define the concept *feasibility*, three variables were used, i.e. *ease of technical integration*, *speed of time-to-market* and *ease of implementation efforts*. Table 4 provides the description and possible values of these variables.

Table 4 - Variables to Define Feasibility

Variables	Description	Possible Values
Ease of Technical Integration	The ease of integrating the common infrastructure service in the technical environment (i.e., are there a lot of dependencies? is it a standalone component or does it require complex integration?)	{Very high, high, medium, low, very low}
Speed of Time-to-Market	The speed with which the common infrastructure service can be implemented in the daily way of working (i.e., can we reuse existing components? is there a standard component in the market, or should different components be combined?)	{Very high, high, medium, low, very low}
Ease of implementation efforts	The financial cost and the human effort needed to support the implementation of the common infrastructure service	{Very high, high, medium, low, very low}

Based on the values of the variables described in Table 4, Table 5 provides an overall score by estimating the average score of the three variables. For instance, the scoring of Audit Trail & Log is ‘Medium’, as *ease of technical integration* scores ‘Medium’, *speed of time-to-market* scores ‘High’ and *ease of implementation efforts* scores ‘low’. For more details on the scores in Table 5, please consult the different implementation scenarios in the final EIIS report (version 1.1).

Table 5 – Scoring the Feasibility of Implementing Common Infrastructure Services

Common Infrastructure Service (by EIIS Type)	**Ease of Technical Integration**	**Speed of Time-to-Market**	**Ease of implementation efforts**	**Overall Score**
Audit Trail and Log	Medium	High	Low	Medium
Service Registry	Medium	Low	Very low	Low
Identity and Access Management	High	High	Medium	High
Data Certification	High	Very high	Very high	Very High
Data Transport	High	Medium	Low	Medium
Data Translation	Medium	Low	Very low	Low
Workflow Management	Very low	Medium	Very low	Very low
Document Storage	Very high	High	High	High
Structured Data Storage	Very low	Low	Low	Low

4.2.2 Added Value of Implementing Common Infrastructure Services

In order to define the concept *added value*, three variables were used, i.e. *prioritisation during workshop 3*, *impact on interoperability* and *future benefits for interoperability*. Table 6 provides the description and possible values of these variables.

Table 6 - Variables to Define Added Value

Variable	**Description**	**Possible Values**
Prioritised during workshop 3	During workshop 3 on this study, a decision was made to prioritise four interoperability agreements. When a prioritised agreement can be implemented by means of a common infrastructure service, this indicates possible added value of this common infrastructure service.	- Yes / No - If Yes, include number of relevant interoperability agreement
Impact on interoperability	When this common infrastructure service improves data exchange between heterogeneous systems, the interoperability of these systems is positively impacted.	{Very high, high, medium, low, very low}
Future benefits for interoperability	The qualitative benefits of implementing the common infrastructure service in the short term perspective (1 to 3 years)	Free text

Based on the values of the variables described in Table 6, Table 7 provides an overall score by estimating the average score of the three variables. For instance, the scoring of Audit Trail & Log is ‘High’, as *prioritisation during workshop 3* scores ‘Yes’ (as it relates to interoperability agreement 21), *impact on interoperability* scores ‘high’ and the *future benefits for interoperability* stresses aspects that are very relevant to interoperability, such as the ability to compare security logs. For more details on the scores in Table 7, please consult the different sections on business value in the final EIIS report (version 1.1).

Table 7 – Scoring the Added Value of Implementing Common Infrastructure Services

Common Infrastructure Service (by EIIS Type)	**Prioritised during workshop 3**	**Impact on interoperability**	**Future benefits for interoperability**	**Overall Score**
Audit Trail and Log	Yes (interoperability agreement 21)	High	- Comparing security logs - Standardised reporting - Good lifecycle management	High
Service Registry	No	Medium	- Lower maintenance cost - Faster development speed	Medium
Identity and Access Management	Yes (interoperability agreement 21)	High	- More confidence between actors during informatio exchange - Easier maintenance access rights	Very high
Data Certification	Yes (interoperability agreement 21)	High	- Decrease of exchange of paper-based documents - Electronic signatures are more difficult to forge than handwritten ones	High
Data Transport	No	Low	- Flexible data format - Increase reliability of data exchange	Medium
Data Translation	Yes (interoperability agreement 1)	Very high	- Improves data consistency - Allows both common and different definitions	High
Workflow Management	No	Medium	- Standardisation and automation of different procedures	Low
Document Storage	No	Low	- Eases finding and sharing information	Very low
Structured Data Storage	No	Low	- Eases access to complex databases - Manages metadata	Low

4.2.3 Conclusions on Need & Relevance for Common Infrastructure Services

Based on the input of the two previous sections, this section concludes on the need and relevance of common infrastructure services. As shown by Figure 24, the nine types of common infrastructure services can be prioritised by means of the evaluated feasibility (Table 5 – Overall score) and added value (Table 7 – Overall score).

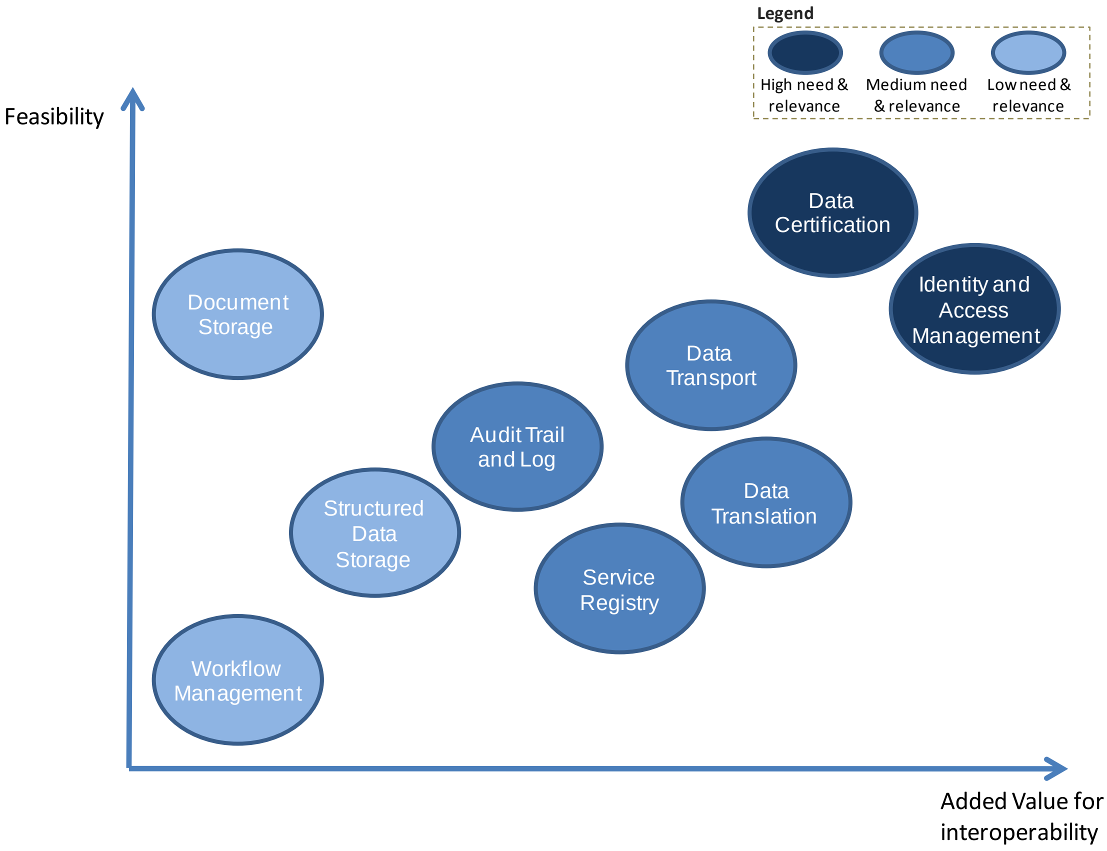

Figure 24 - Estimations of Feasibility and Added Value of Common Infrastructure Services

As displayed by Figure 24, three groups of common infrastructure services can be identified :

1. **Identity and Access Management and Data Certification score high both on feasibility and added value for interoperability, which make them perfect candidates to be offered on European level.**
2. **Audit Trail and Log, Data Transport, Data Translation and Service Registries are scored medium in terms of feasibility and added value, indicating that these common infrastructure services could play a role on European level.**
3. **Document Storage, Structured Data Storage and Workflow Management have been evaluated with the lowest added value for interoperability, and should not be considered to be offered on European level.**

Overall, we can conclude that **Data Certification** and **Identity and Access Management** are common infrastructure services with the highest need and relevance to be offered on a European level.

4.3 DETAILED PROPOSED ACTIONS FOR IMPLEMENTATION OF KEY INTEROPERABILITY AGREEMENTS

Before the implementation actions for EIA can be prioritised, it is important to understand the existing European solutions that implement these interoperability agreements, and the European solutions that are under development to support these interoperability agreements. Figure 25 provides an overview of the existing European solutions per interoperability agreement.

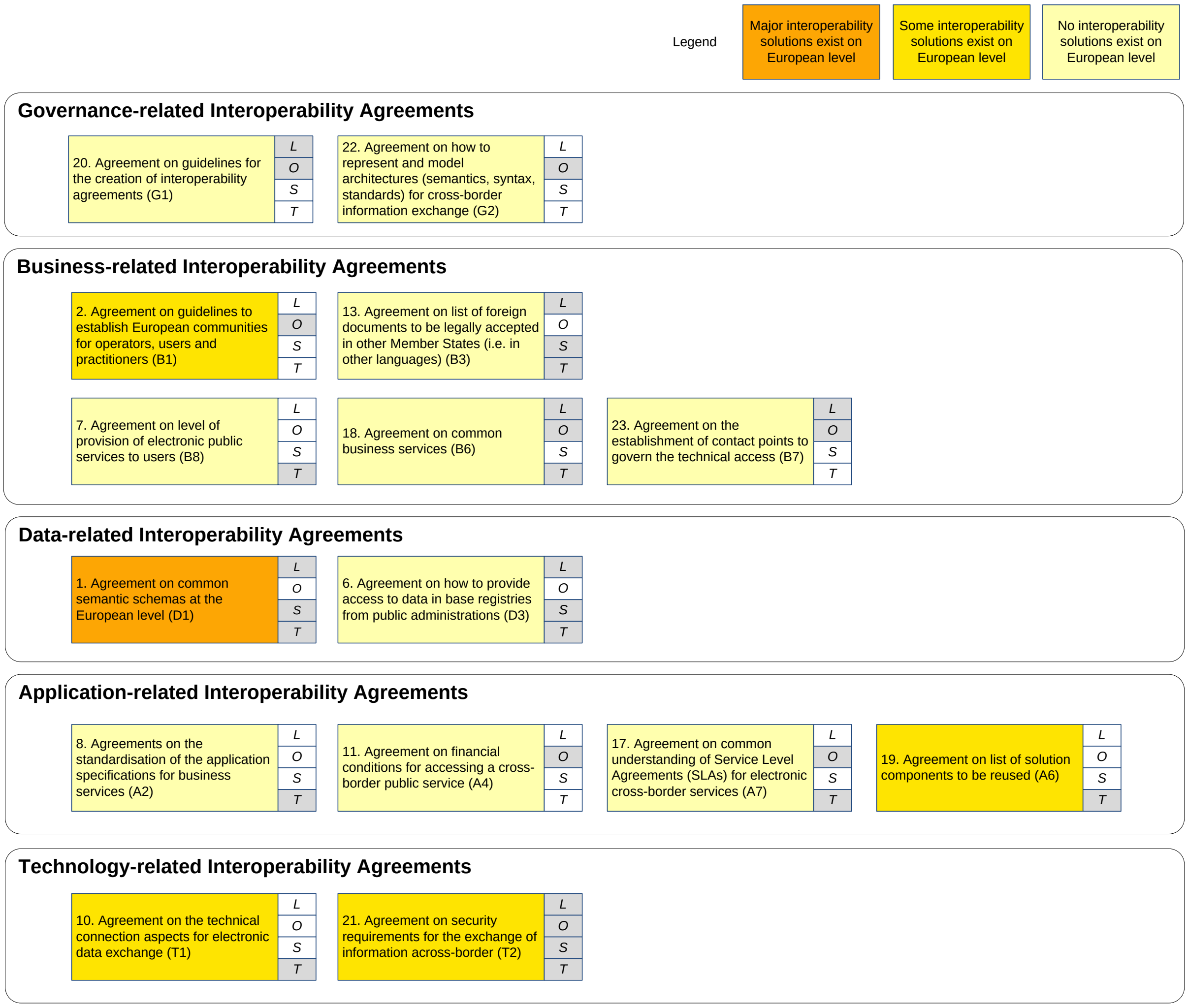
Legend
Major interoperability solutions exist on European level
Some interoperability solutions exist on European level
No interoperability solutions exist on European level
Governance-related Interoperability Agreements
20. Agreement on guidelines for the creation of interoperability agreements (G1)
22. Agreement on how to represent and model architectures (semantics, syntax, standards) for cross-border information exchange (G2)
Business-related Interoperability Agreements
2. Agreement on guidelines to establish European communities for operators, users and practitioners (B1)
13. Agreement on list of foreign documents to be legally accepted in other Member States (i.e. in other languages) (B3)
7. Agreement on level of provision of electronic public services to users (B8)
18. Agreement on common business services (B6)
23. Agreement on the establishment of contact points to govern the technical access (B7)
Data-related Interoperability Agreements
1. Agreement on common semantic schemas at the European level (D1)
6. Agreement on how to provide access to data in base registries from public administrations (D3)
Application-related Interoperability Agreements
8. Agreements on the standardisation of the application specifications for business services (A2)
11. Agreement on financial conditions for accessing a cross-border public service (A4)
17. Agreement on common understanding of Service Level Agreements (SLAs) for electronic cross-border services (A7)
19. Agreement on list of solution components to be reused (A6)
Technology-related Interoperability Agreements
10. Agreement on the technical connection aspects for electronic data exchange (T1)
21. Agreement on security requirements for the exchange of information across-border (T2)
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Figure 25 – Currently Existing European Solutions in EIA Agreements

As displayed by Figure 25, most interoperability agreements are not yet supported by means of European solutions, with the exception of five agreements (1, 2, 10, 19 and 21). For agreement 1, major interoperability solutions exist on the European level, such as the SEMIC.EU platform and the core concepts framework. For the four other agreements (2, 10, 19 and 21), some interoperability solutions exist on European level, such as the sTESTA network (for agreement 10), the OSOR.EU platform (for agreements 2 and 19), and the eID STORK component (for agreement 21).

During workshop 3, the existing and currently developed European solutions were discussed based on Figure 25 and taking into account the prioritised EIA interoperability agreements. Future solutions were proposed and evaluated based on their feasibility and added value in order to define specific actions. As a result, the following actions were identified as key actions to be taken into account for the ISA Programme:

- **Action 1 about security requirements for the exchange of information across-border (related to agreement 21)**
- **Action 2 about the reuse of solution components (related to agreement 19)**
- **Action 3 about a central platform to publish interoperability assets**
- **Action 4 about the implementation of governance for EIA and RIA (related to agreement 20)**
- **Action 5 about technical connection aspects for electronic data exchange (related to agreement 10)**
- **Action 6 about the establishment of contact points to govern the technical access (related to agreement 23)**

Based on the prioritisation and feasibility of the actions, Table 8 shows an overview of the essential implementation actions that are advised to be taken in the short to medium term (from 1 to 5 years). Overall, Table 8 shows that the suggested interoperability solutions are mostly common frameworks (five out of six agreements refer to common frameworks), with some attention to common services (two out of six agreements). Although the details in Annex 2 suggest several reusable tools for agreements, no reusable tool was selected to be implemented as no specific interest was found to prioritise this in the short or medium term.

Table 8 - Overview of Essential Implementation Actions

Kind of Action	**Related to IOP agreement**	**Common Framework**	**Reusable Tool**	**Common Service**
Action 1 - security requirements for the exchange of information across-border	21	Common specifications for security requirements of cross-border information exchange		
Action 2 - reuse of solution components	19	Framework for sharing and reuse of solution components		
Action 3 - central platform to publish interoperability assets				Central platform to publish interoperability assets
Action 4 - implementation of governance for EIA and RIA	20	Governance framework for EIA and RIA (including templates for interoperability agreements)		
Action 5 - technical connection aspects for electronic data exchange	10	Common specifications for technical connection aspects of cross-border data exchange		Common platform for electronic cross-border delivery
Action 6 - establishment of contact points to govern the technical access	23	Guidelines document on how to establish contact points		

For each action, an assessment is performed of the effort of implementing the action on the European Commission and Member States (see details of each action in the next sections). Based on the conclusions from the effort assessments, the actions are positioned in a quadrant with the effort on Member State and European Commission as shown in Figure 26. For each action, the relative size of the circle provides an indication of the expected effort (i.e. resources, budget, etc.) needed for the implementation of the action.

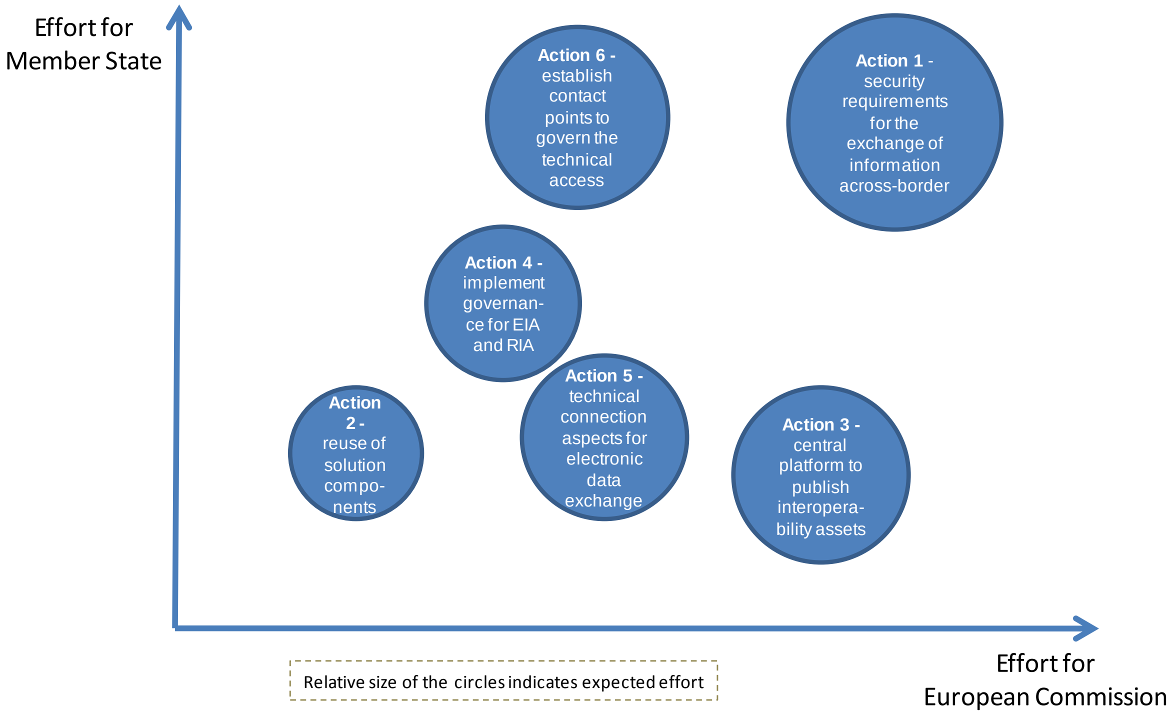

Figure 26 - Effort Assessment of Proposed Actions for Implementation of EIA

In the next sections we describe each selected action in more detail using the following topics:

- ***Objective*: defining the objective of the action and the details of the related interoperability agreement and solution to be implemented**
- ***Proposed Implementation Approach*: describing the proposed implementation approach (using centralised, federated or distributed) and the possible involvement of the European Commission or Member States in the implementation of the interoperability solutions.**
  - **Centralised approach: the European Commission develops and provides at a central level the frameworks, tools and services which are shared and can be used by Member States**
  - **Federated approach: the European Commission provides the frameworks to be aligned by Member States, or specifies the tools or services to be developed or offered by Member States**
  - **Distributed approach: the European Commission only supports Member States in their development of frameworks, tools and services**

- ***Effort Assessment*: describing an initial assessment of the potential effort of the proposed interoperability solutions on the European Commission or Member States and providing an evaluation of the feasibility and added value of the action and the interoperability solutions to be implemented**

4.3.1 Action 1 about Security Requirements for the Exchange of Information Across Border

Objective

The objective of action 1 is to implement the interoperability agreement 21 from the common vision for an EIA, in order to provide a definition of the security requirements that supports the trusted exchange of information.

During workshop 3, the interoperability solutions to be implemented for agreement 21 were discussed in detail and prioritised. As a result, the interoperability agreement 21 should include a part on solutions specifications describing ‘Common specifications for security requirements of cross-border information exchange’, such as:

- Definition of minimum security requirements for accessing public services
- Defining a list of security standards and methodologies accepted for providing public services (e.g. ISO27000 family)
- Definition of security levels for data to be implemented for data exchange in public services
- Definition of technical network security requirements

Proposed Implementation Approach

In order to provide the interoperability solution ‘Common specifications for security requirements of cross-border information exchange’, a federated implementation approach would be proposed for the European Commission and Member States. This means that the European Commission should align with Member States on the common specifications to be described in the document and that Member States should provide input from their work on common specifications for security requirements.

Effort Assessment

Based on an effort assessment (see details below), the implementation of action 1 requires large organisational efforts and large efforts to define common semantic schemas for the security aspects from both the European Commission and Member States. Furthermore, large technical effort is required from the European Commission to adapt the technical systems and networks for the defined security requirements.

In the following table, the expected effort of implementing this action is indicated (using No, Low, Medium and High) for the European Commission and Member States using the different interoperability levels as defined by EIF (being Legal, Organisational, Semantic and Technical).

Table 9 - Details of Effort Assessment for Action 1

	Member States	Rationale
Legal	Low	
Organisational	High	Adaptation and implementation of the organisational processes for the defined security standards and methodologies
Semantic	High	Adaptation and implementation of the defined common semantic schemas for the security aspects and the security levels for data
Technical	Medium	

	European Commission	Rationale
Legal	Low	
Organisational	High	Adaptation and implementation of the organisational processes for the defined security standards and methodologies
Semantic	High	Adaptation and implementation of the defined common semantic schemas for the security aspects and the security levels for data
Technical	High	Adaptation of the technical systems and networks to the defined technical network security requirements, and access requirements for public services

4.3.2 Action 2 about Reuse of Solution Components

Objective

The objective of action 2 is to implement the interoperability agreement 19 from the common vision for an EIA, in order to establish a list of standard software components which could be reused or shared by multiple public administrations for the establishment of cross-border public services. Reusing components by different parties improves interoperability by harmonizing the differences between components, resulting in a more similar IT Architecture and more harmonious IT Landscape.

During workshop 3, the interoperability solutions to be implemented for agreement 19 were discussed in detail and prioritised. As a result, the interoperability agreement 19 should include a part on solutions specifications describing a ‘Framework for sharing and reuse of solution components’.

Proposed Implementation Approach

For the development of the framework for sharing and reuse of solution components, a federated implementation approach would be proposed for the European Commission and Member States. This means that the European Commission should align with Member States on the framework components and that Member States should provide input on their requirements for the framework.

Effort Assessment

Based on an effort assessment (see details below), the implementation of action 2 requires only limited organisational and semantic efforts from the European Commission and Member States to define and adapt to the framework for the reuse of solution components.

In the following table, the expected effort of implementing this action is indicated (using No, Low, Medium and High) for the European Commission and Member States using the different interoperability levels as defined by EIF (being Legal, Organisational, Semantic and Technical).

Table 10 - Details of Effort Assessment for Action 2

	Member States	**Rationale**
Legal	Low	
Organisational	Medium	Usage of the framework in organisational processes to define and select reusable components for the establishment of public services
Semantic	Medium	Adaptation of Member State semantic models to the framework definitions
Technical	Low	

	European Commission	**Rationale**
Legal	Low	
Organisational	Medium	Provide possible overview of reusable components in the different structures of the framework
Semantic	Medium	Adaptation of semantic models to the framework definitions
Technical	Low	

4.3.3 Action 3 about Central Platform to Publish Interoperability Assets

Objective

The objective of action 3 is to implement the request to provide a transversal platform to publish interoperability assets, including legal, organisational, semantic and technical assets.

During workshop 3, the interoperability solutions to be implemented for an EIA were discussed in detail and prioritised. As a result, a transversal interoperability solution ‘Central platform to publish interoperability assets’ was proposed to be implemented for an EIA. This solution should provide a central web portal for the European Commission and Member States:

- to publish and share interoperability assets, including legal, organisational, semantic and technical assets
- to link the interoperability assets from other initiatives or portals
- structure the interoperability assets for the RIA interoperability agreements
- align with the framework for sharing and reuse of solution components

Proposed Implementation Approach

For the establishment of a central platform to share interoperability assets, a centralised approach would be proposed. This means that the European Commission would develop and provide the central platform, which is accessible by Member States to publish and to share interoperability assets.

Effort Assessment

Based on an effort assessment (see details below), the implementation of action 3 requires large technical and organisational efforts from the European Commission to develop and operate the central platform to share interoperability assets. For the Member States, only limited organisational efforts are required in order to collaborate on the central platform.

In the following table, the expected effort of implementing this action is indicated (using No, Low, Medium and High) for the European Commission and Member States using the different interoperability levels as defined by EIF (being Legal, Organisational, Semantic and Technical).

Table 11 - Details of Effort Assessment for Action 3

	Member States	Rationale
Legal	No	
Organisational	Medium	Integration of the central platform in the organisational processes to establish or improve public services
Semantic	Low	
Technical	Low	

	European Commission	Rationale
Legal	No	
Organisational	High	Organisational processes and resources for the set up and maintenance of the technical aspects of the central platform
Semantic	Low	
Technical	High	Development and operation of the central platform to share interoperability assets

4.3.4 Action 4 about Implementation of Governance for EIA and RIA

Objective

The objective of action 4 is to implement the governance tools and procedures for an EIA and RIA. Overall, within the ISA Programme, the governance for an EIA and RIA will be part of the portfolio management in the higher level EIS governance structure (see Figure 27). In this context, the ownership of the EIA / RIA governance will be part of the EIS goverance, so there is no need for a new EIA / RIA governance framework. The following section will describe how this embedded EIA / RIA governance structure could look like.

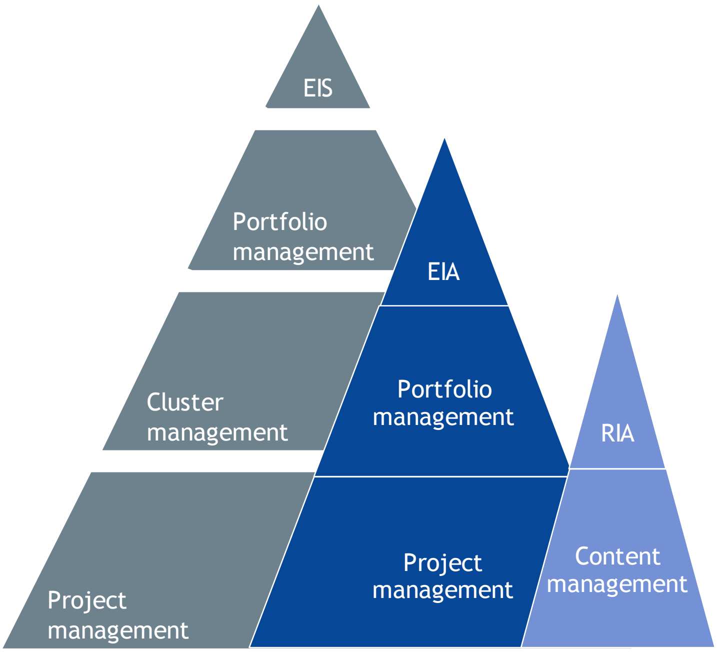
EIS
Portfolio management
Cluster management
Project management
EIA
Portfolio management
Project management
RIA
Content management

Figure 27 - EIA Governance within Portfolio Management of EIS Governance Structure

Within the portfolio management in the EIS governance structure, a governance structure for EIA is proposed and consists of three levels, being;

- Governance of the EIA

  - ➔ Define, maintain and improve the common vision for an EIA
  - ➔ Strategic alignment with EIS
  - ➔ Prioritise between initiatives based on effort, progress and risk indicators
- Governance at portfolio management level
  - ➔ Translate the common vision into executable projects
  - ➔ Define processes, responsibilities, goals and metrics
  - ➔ Assess and plan for risks, identify and resolve issues, measure achievements and indicate performance
- Governance at project management level
  - ➔ Plan, execute, and control individual projects
  - ➔ Assessment of contributions of projects to an EIA

Within the EIA governance structure, a specific governance structure is proposed for the RIA which consists of two levels, being;

- Governance of the RIA
  - ➔ Define, maintain and improve the overall RIA
  - ➔ Align and provide input to the EIA governance
- Governance at content management level
  - ➔ Define processes, responsibilities, goals and metrics for governing the content of the RIA platform

The implementation of the EIA and RIA governance structures will not be further detailed in this report. However, during Workshop 3, a specific interoperability agreement (i.e., number 20) was identified to be implemented for the governance of EIA and RIA, which works towards an agreement on guidelines for the creation of interoperability agreements. This agreement aims to reduce the time for the development of agreements and to avoid discussions on responsibilities, solutions, concepts, and ownership of data.

As part of the interoperability agreement 20, the interoperability solution specification ‘Guidelines and templates to set up an interoperability agreement’ should describe the following elements;

- the definition of an interoperability agreement
- the definition of the lifecycle of an interoperability agreement

Proposed Implementation Approach

For developing the guidelines and templates facilitating the set up of an interoperability agreement, a centralised implementation approach would be proposed. This means that the European Commission will develop the documentation and guidelines on interoperability agreements in collaboration with Member States.

A proposed implementation approach for the key interoperability solutions is described in high-level steps as follows:

- Determine the scope and objectives for the documentation and guidelines on interoperability agreement and architecture modelling, by the Member States and European Commission
- Gather the requirements for the documentation and guidelines on interoperability agreement and architecture modelling from the relevant stakeholders
- Define and execute the project plan for the development of the documentation and guidelines on interoperability agreement and architecture modelling
- Communicate and share the documentation and guidelines with the relevant stakeholders on a central portal or CIRCABC

Effort Assessment

Based on an effort assessment (see details below), the implementation of action 4 requires only large organisational efforts from both the European Commission and Member States in order to establish the governance for EIA and RIA.

In the following table, the expected effort of implementing this action is indicated (using No, Low, Medium and High) for the European Commission and Member States using the different interoperability levels as defined by EIF (being Legal, Organisational, Semantic and Technical).

Table 12 - Details of Effort Assessment for Action 4

	Member States	**Rationale**
Legal	Low	
Organisational	High	Aligning with the governance of EIA and RIA, and using the guidelines and templates to create interoperability agreements
Semantic	No	
Technical	No	

	European Commission	**Rationale**
Legal	Low	
Organisational	High	Implementing the governance procedures for EIA and RIA, and providing the resources. Aligning interoperability agreements with the guidelines and templates.
Semantic	No	
Technical	No	

4.3.5 Action 5 about Technical Connection Aspects for Electronic Data Exchange

Objective

The objective of action 5 is to implement the interoperability agreement 10 from the common vision for an EIA, in order to agree on the technical connection aspects for electronic data exchange during the establishment of cross-border public services. Note that the setup of technical access points is included in this agreement, but the definition of security requirements is excluded (cfr. action 1).

During workshop 3, the interoperability solutions to be implemented for agreement 10 were discussed in detail and prioritised. As a result, the interoperability agreement 10 should include a part on solutions specifications describing a common framework (Common specifications for technical connection aspects of cross-border data exchange), and a common service (Common platform for electronic cross-border delivery).

Proposed Implementation Approach

Firstly, in order to implement the solution ‘Common specifications for technical connection aspects of cross-border data exchange’, a federated implementation approach would be proposed for the European Commission and Member States. This means that the European Commission should align with Member States on the common specifications to be described in the document and that Member States should provide input from their work on common specifications for technical connection aspects of cross-border data exchange.

Secondly, for the establishment of a common platform for electronic cross-border delivery, a centralised approach would be proposed. This means that the European Commission would develop and provide the central platform, which is accessible by Member States to deliver electronic services across borders.

Effort Assessment

Based on an effort assessment (see details below), the implementation of action 5 requires only large technical efforts from both the European Commission and Member States in order to provide the technical connection aspects.

In the following table, the expected effort of implementing this action is indicated (using No, Low, Medium and High) for the European Commission and Member States using the different interoperability levels as defined by EIF (being Legal, Organisational, Semantic and Technical).

Table 13 - Details of Effort Assessment for Action 5

	Member States	Rationale
Legal	Low	
Organisational	Low	

Semantic	Low	
Technical	High	- Adaptation of the technical systems and networks to the defined technical network requirements, and access requirements for public services - Aligning to the agreed technical standards and protocols

	European Commission	**Rationale**
Legal	Low	
Organisational	Low	
Semantic	Low	
Technical	High	- Provision of a platform for electronic delivery - Reaching a consensus on technical standards

4.3.6 Action 6 about the Establishment of Contact Points to Govern the Technical Access

Objective

The objective of action 6 is to implement the interoperability agreement 23 from the common vision for an EIA, in order to agree on the establishment of contact points to govern the technical access of electronic public services. Note that this agreement focuses on legal and organisational elements of establishing contact points, while action 5 deals with the technical aspects of these contact points.

During workshop 3, the interoperability solutions to be implemented for agreement 23 were discussed in detail and prioritised. As a result, the interoperability agreement 23 should include a part on solutions specifications describing a ‘Guidelines document on how to establish contact points’.

Proposed Implementation Approach

In order to implement the solution ‘Guidelines document on how to establish contact points’, a federated implementation approach would be proposed for the European Commission and Member States. This means that the European Commission should align with Member States on the common specifications to be described in the document and that Member States should provide input from their work on how to establish such contact points.

Effort Assessment

Based on an effort assessment (see details below), the implementation of action 6 requires large legal efforts from both the European Commission and Member States in order to establish the legal basis for contact points. Furthermore, organisational efforts are required from the European Commission and Member States to align and establish the contact points to govern the technical access.

In the following table, the expected effort of implementing this action is indicated (using No, Low, Medium and High) for the European Commission and Member States using the different interoperability levels as defined by EIF (being Legal, Organisational, Semantic and Technical).

Table 14 - Details of Effort Assessment for Action 6

	Member States	Rationale
Legal	High	Member States should understand the national legislation that support contact points, and solve possible conflicting issues
Organisational	Medium	The roles and responsibilities, together with the processes of the contact point, should align with the current national contact points
Semantic	Low	
Technical	Low	

	European Commission	Rationale
Legal	Medium	The exchange of information by means of different cross-border contact points should be legally supported on the European level
Organisational	Medium	Creation of guidelines for roles and responsibilities, processes, etc. should be provided
Semantic	Low	
Technical	Low	

ANNEX 1: LIST OF ABBREVIATIONS

Abbreviation	Description
A2A	Administration-to-Administration
BII	Business Interoperability Interfaces
CCN2	Common Communications Network version 2
CEN	European Committee for Standardisation
CEMR	Council of European Municipalities and Regions
CIO	Chief Information Officer
CIP	Competitiveness and Innovation Framework Programme
DIGIT	Directorate-General for Informatics
DG TAXUD	Directorate for Taxation and Customs Union
EA	Enterprise Architecture
EC	European Commission
ECAS	European Commission's Authentication Service
EESSI	Electronic Exchange of Social Security Information
EIA	European Interoperability Architecture
eID	Electronic Identity
EIF	European Interoperability Framework
EIIS	European Interoperability Infrastructure Services
EIS	European Interoperability Strategy
epSOS	Smart Open Services for European Patients

ETSI	European Telecommunications Standards Institute
EU	European Union
FEAF	Federal Enterprise Architecture Framework
IOP	Interoperability
ISA	Interoperability Solutions for European Public Administrations
ISO RM-ODB	International Organization for Standardization Reference Model of Open Distributed Processing
NIF	National Interoperability Framework
OASIS	Organization for the Advancement of Structured Information Standards
PEPPOL	Pan European Public Procurement Online
PEPPOL BIS	Pan European Public Procurement Online – Business Interoperability Specification
SED	Structured Electronic Data
SFC2007	System for Fund Management in the European Community 2007
SOAP	Simple Object Access Protocol
SPOCS	Simple Procedures Online for Cross-border Services
STORK	Secure Identity Across Borders Linked
TOGAF	The Open Group Architecture Framework
VIES	VAT (Value Added Tax) Information Exchange System
W3C	World Wide Web Consortium
WEBIC	Web Interface for Clerks
WSDL	Web Services Description Language

ANNEX 2: DETAILED INTEROPERABILITY AGREEMENTS OF COMMON VISION FOR AN EIA

The objective of this chapter is to describe the details of the interoperability agreements of the common vision for a European Interoperability Architecture (EIA). For each interoperability agreement, the title, rationale, interoperability level, possible solution specifications and solution instances are documented.

Title of Interoperability Agreement	1. Agreement on common semantic schemas at the European level (D1)					
Rationale of Interoperability Agreement	A semantic schema is a model with entities and the relations between these entities. As such, semantic schemas define business objects at the European level. Therefore, it is important to harmonise the identification of business objects across Member States.					
Interoperability Level	Legal	X		Semantic	X	
	Organisational			Technical	X	
Relations to Other IOP Agreements	16, 22					
Solutions at National and Sectoral Level:						
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services			
Existing Solution Instances	Common Frameworks - Federation idea based on Asset Description Metadata Schema (ADMS) - Legal basis for invoice - Semantic schema of the electronic prescription of medicine in European countries (e-Prescription) - CEN ISSS WS/BII Profiles (TransactionDataModel) - Data models of Public Procurement	Generic Tools - IMI (DG DIGIT) - EUCARIS (Consortium) - e-PRIOR (DG DIGIT) - TACHONET (DG TREN) - PEPPOL BIS (TransactionDataModel - using CEN ISSS WS/BII Profiles) - X-DIS (DG ESTAT) - IPCIS and e-PRIOR	Common Services - Estonian public sector ontologies, classificators and data schemas (https://riha.eesti.ee/) - Finnish Ontology Library Service ONKI (http://onki.fi/en/)			

	- INSPIRE data specifications incl. feature concept dictionary, consolidated UML data model - WCO data schema and its implementation (DG TAXUD) - DIH (Data Integration Harmonisation group for Customs) (DG TAXUD) - Transit Declaration Sheet – DG TAXUD data model for declaration sheet	services (DG DIGIT) - CCN/CSI (DG TAXUD - Spring integration in Open e-PRIOR (DG DIGIT)	
Solutions at European Level (cross-border and cross-sectoral):			
Existing Common Solutions	Common Frameworks - Core concepts	Generic Tools	Common Services - SEMIC as European metadata repository
Possible Common Solutions	Common Frameworks - Template legal document on business object definition (such as unique identification of person, including combinations of name, birth date, unique ID number, etc) - Template XML definition and mapping schemes for data set - List of semantic and technical syntax standards - List of possible data types - List of possible business objects - Guidelines on methods for composing and using ontologies and other	Generic Tools - Data transformation components - Data translation components	Common Services - Web portal to publish list of semantic assets (business objects, semantic models, standards, metadata, ontologies, technical syntax standards) - European Data Translation service (including semantic translation, syntax translation and multilingualism capabilities) - Visual tablet applications representing the semantic schemas in a graphical way

	semantic data		

<table>
<tr><td>Title of Interoperability Agreement</td><td colspan="6">2. Agreement on guidelines to establish European communities for operators, users and practitioners (B1)</td></tr>
<tr><td>Rationale of Interoperability Agreement</td><td colspan="6">In order to improve collaboration and communication between Member States on cross-border solutions being developed, disparate groups (including providers, consumers and other key stakeholders) can develop standardisation within specific domains and select cost effective solutions. Including also the governance and central point of access within the European communities.</td></tr>
<tr><td rowspan="2">Interoperability Level</td><td>Legal</td><td></td><td rowspan="2"></td><td>Semantic</td><td></td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td>X</td><td>Technical</td><td></td></tr>
<tr><td>Relations to Other IOP Agreements</td><td colspan="6"></td></tr>
<tr><td colspan="7">Solutions at National and Sectoral Level:</td></tr>
<tr><td>Existing Solution Specifications</td><td colspan="3"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td><u>Common Services</u></td></tr>
<tr><td>Existing Solution Instances</td><td colspan="3"><u>Common Frameworks</u>
- Document on establishment of PEPPOL Core Community
- PEPPOL Transport Infrastructure Agreement
- CCN/CSI integration (DG TAXUD)
- Terms of collaboration document (DG TAXUD)</td><td colspan="2"><u>Generic Tools</u>
- Open Atrium</td><td><u>Common Services</u></td></tr>
<tr><td colspan="7">Solutions at European Level (cross-border and cross-sectoral):</td></tr>
<tr><td>Existing Common Solutions</td><td colspan="3"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u>
- osor.eu platform</td><td><u>Common Services</u></td></tr>
</table>

Possible Common Solutions	Common Frameworks - Template agreement document on establishment of European communities (including roles & responsibilities, governance) - Definition of European communities	Generic Tools - Reference implementation of a collaboration platform for European communities	Common Services - Web portal for collaboration of European communities

<table>
<tr><td>Title of Interoperability Agreement</td><td colspan="6">3. Agreement on a documentation language (grammar, syntax, vocabulary) for the documentation of cross-border public services (A1)</td></tr>
<tr><td>Rationale of Interoperability Agreement</td><td colspan="6">Select specific documentation languages to be used for the documentation of cross-border public services, in order to ensure the same understanding by the different public administrations.</td></tr>
<tr><td rowspan="2">Interoperability Level</td><td>Legal</td><td></td><td rowspan="2"></td><td>Semantic</td><td></td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td>X</td><td>Technical</td><td></td></tr>
<tr><td>Relations to Other IOP Agreements</td><td colspan="6">7, 18, 22</td></tr>
<tr><td colspan="7">Solutions at National and Sectoral Level:</td></tr>
<tr><td>Existing Solution Specifications</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td>Existing Solution Instances</td><td colspan="2"><u>Common Frameworks</u>
- Message definitions that are part of the SPM&Req and related document for Trans-European system (DG TAXUD)
- DDNTA – Design Document for National Transit Applications (DG TAXUD)</td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td colspan="7">Solutions at European Level (cross-border and cross-sectoral):</td></tr>
<tr><td>Existing Common Solutions</td><td colspan="2"><u>Common Frameworks</u>
- EUROVOC database</td><td colspan="2"><u>Generic Tools</u>
- VocBench (developed by FAO)</td><td colspan="2"><u>Common Services</u>
- eurovoc.europa.eu</td></tr>
<tr><td>Possible Common Solutions</td><td colspan="2"><u>Common Frameworks</u>
- Document on (recommended) documentation language for cross-border public services (e.g. English)
- Syntax definition of</td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u>
- Web portal to share European vocabulary</td></tr>
</table>

	documentation language for cross-border public services (e.g. UK vs. US English) - List of recommended European vocabulary		

<table>
<tr><td>Title of Interoperability Agreement</td><td colspan="6">4. Agreement on list of documents to be standardised for cross-border collaboration (B2)</td></tr>
<tr><td>Rationale of Interoperability Agreement</td><td colspan="6">A document is a package of information, bundled together in a paper or electronic format. During cross-border collaboration, interoperability could be improved by using a standardised set of documents across public administrations.</td></tr>
<tr><td rowspan="2">Interoperability Level</td><td>Legal</td><td>X</td><td rowspan="2"></td><td>Semantic</td><td>X</td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td></td><td>Technical</td><td></td></tr>
<tr><td>Relations to Other IOP Agreements</td><td colspan="6">13</td></tr>
<tr><td colspan="7">Solutions at National and Sectoral Level:</td></tr>
<tr><td>Existing Solution Specifications</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td>Existing Solution Instances</td><td colspan="2"><u>Common Frameworks</u>
- Standard forms to start EESSI procedure, such as P5000 for Pension Claim
- Standard articles of association or forms to register a company
- CEN ISSS WS/BII Profile List</td><td colspan="2"><u>Generic Tools</u>
- PEPPOL BIS List (using CEN ISSS WS/BII Profile List)</td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td colspan="7">Solutions at European Level (cross-border and cross-sectoral):</td></tr>
<tr><td>Existing Common Solutions</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td>Possible Common Solutions</td><td colspan="2"><u>Common Frameworks</u>
- Definition of a document
- Template agreement document on standardisation of</td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u>
- Web portal to publish list of standardised documents
- European Document Storage service for</td></tr>
</table>

	documents - List of possible types of documents used across sectors and across borders - List of EU business processes in which these documents are needed		document life cycle

<table>
<tr><td>Title of Interoperability Agreement</td><td colspan="6">5. Agreement on establishment of catalogue of datasets available in public administrations (D2)</td></tr>
<tr><td>Rationale of Interoperability Agreement</td><td colspan="6">Datasets used in public administrations could be of value to other public administrations, which could lead to improved data exchange between these public administrations.</td></tr>
<tr><td rowspan="2">Interoperability Level</td><td>Legal</td><td></td><td rowspan="2"></td><td>Semantic</td><td>X</td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td></td><td>Technical</td><td>X</td></tr>
<tr><td>Relations to Other IOP Agreements</td><td colspan="6">6</td></tr>
<tr><td colspan="7">Solutions at National and Sectoral Level:</td></tr>
<tr><td>Existing Solution Specifications</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td>Existing Solution Instances</td><td colspan="2"><u>Common Frameworks</u>
- UK’s Design guidance for Public Sector URIs
- European Business Registry
- DCAT
- CS/RD for all reference data, TARIC for customs tariffs both published via DDS on Europe, SMS for specimens, ECICS (DG TAXUD)</td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u>
- CKAN
- EUROPEANA
- INSPIRE geoportal</td></tr>
<tr><td colspan="7">Solutions at European Level (cross-border and cross-sectoral):</td></tr>
<tr><td>Existing Common Solutions</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
</table>

Possible Common Solutions	Common Frameworks - A European Open Data framework - Metadata for datasets (e.g. types, owner, etc.) - Design guidance for Public Sector URIs - A list of services offered free of charge on the public internet using open data formats	Generic Tools - Reusable Open Data platforms	Common Services - European catalogue service to request metadata information on Member State base registry information

Title of Interoperability Agreement	6. Agreement on how to provide access to data in base registries from public administrations (D3)					
Rationale of Interoperability Agreement	Define a standardised way to communicate with the base registers on an EU level, for accessing the different registers in all the Member States.					
Interoperability Level	Legal	X		Semantic	X	
	Organisational			Technical	X	
Relations to Other IOP Agreements	5					
Solutions at National and Sectoral Level:						

Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services
Existing Solution Instances	Common Frameworks - INSPIRE discovery service Implementing Rules and Technical Guidance	Generic Tools - eFP7 (DG DIGIT) - Target Data Storage (TDS) of CVD (DG ESTAT) - SDMX Tools (DG ESTAT) - INSPIRE geo-portal (DG JRC) - Metadata Handler (MH) of CVD (DG ESTAT) - epSOS Master Value Catalogue	Common Services - European Land Information Service (EULIS.EU) - European e-Justice portal - Accessing diploma information from Member State diploma registries, in order to initiate and check a student application, and securely exchange diploma information.
Solutions at European Level (cross-border and cross-sectoral):			
Existing Common Solutions	Common Frameworks	Generic Tools	Common Services

Possible Common Solutions	Common Frameworks - List of common European base registries for shared data at EU level (including type, owner, etc.) - Common definition of a base registry - List of types of base registries - Definition of interface and procedure to access base registries from public administrations	Generic Tools - Structured data storage component	Common Services - European base registries for shared data - Web portal to publish interfaces to base registries

Title of Interoperability Agreement	7. Agreement on level of provision of electronic public services to users (B8)
Rationale of Interoperability Agreement	The provision of electronic public services can be organised in different ways, such as a single point of contact or different points of contacts. The agreement aims to define the level of electronic services to provide, and what the service will be in the end. The definition of *how* public services should be provided is to be determined per member state. Establishment of a trusted services lists (or repositories) on EU level in order to provide correct information on services provided. Establishment of directories of services includes the management and maintenance.

Interoperability Level	Legal			Semantic	
	Organisational			Technical	X

Relations to Other IOP Agreements	3, 18, 22

Solutions at National and Sectoral Level:			
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services
Existing Solution Instances	Common Frameworks - OASIS BDX TC BusDox SML - OASIS BDX TC BusDox SMP	Generic Tools - epSOS Central Reference Terminology Server - SPOCS eService Directory - SPOCS Service Catalogue - PEPPOL SMP Registry - PEPPOL SML Registry - NemHandel (Member State Denmark) - DVDV (Member State Germany) - Federal Service Bus	Common Services - SFC2007 web service - SFC2007 web portal - latvija.lv services list

		(Member State Belgium) - X-ROAD (Member State Estonia) - INSPIRE network and spatial data services listed in the INSPIRE geoportal	
Solutions at European Level (cross-border and cross-sectoral):			
Existing Common Solutions	Common Frameworks	Generic Tools	Common Services
Possible Common Solutions	Common Frameworks - List of current and possible future web portals for public administrations - Maintenance procedure of current portals - Priorities to establish possible future web portals - Template document for European public service definition - Central EU registry of diploma registries that consolidates trusted information from all Member State diploma registries. - A trusted list of commercial registries from all the Member States.	Generic Tools - Service Registry components - Cloud-enabled application platforms - Software as a service tools	Common Services - Web services to offer the electronic public service - Web portal to offer the electronic public service - Catalogue of European public services

<table>
<tr><td>Title of Interoperability Agreement</td><td colspan="6">8. Agreements on the standardisation of the application specifications for business services (A2)</td></tr>
<tr><td>Rationale of Interoperability Agreement</td><td colspan="6">When software packages in different member states are implementing the same functionality for the exchange of information, the application specifications should be standardised across member states. (including error messages)</td></tr>
<tr><td rowspan="2">Interoperability Level</td><td>Legal</td><td></td><td rowspan="2"></td><td>Semantic</td><td></td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td></td><td>Technical</td><td>X</td></tr>
<tr><td>Relations to Other IOP Agreements</td><td colspan="6">10, 21</td></tr>
<tr><td colspan="7">Solutions at National and Sectoral Level:</td></tr>
<tr><td>Existing Solution Specifications</td><td colspan="3"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td><u>Common Services</u></td></tr>
<tr><td>Existing Solution Instances</td><td colspan="3"><u>Common Frameworks</u>
- Common Assessment Method for Standards and Specifications (CAMSS)
- TEMPO as a framework and related documents (DG TAXUD)
- DDNTA – Design Document for National Transit Applications (for NCTS) exist an Annex (namely Q2) that refers to the Technical Message Structure) (DG TAXUD)
- DDNXA – Design Document for National Export Applications (for ECS) exist an Annex (namely Q2) that refers to the Technical Message Structure (DG TAXUD)
- DDNIA – Design Document for National Import Applications (for ICS) exist an Annex (namely Q2) that refers to the Technical Message Structure) (DG TAXUD)
- SPM & Req (DG TAXUD)</td><td colspan="2"><u>Generic Tools</u>
- Common specifications and APIs in the development of the STORK platform</td><td><u>Common Services</u></td></tr>
</table>

Solutions at European Level (cross-border and cross-sectoral):			
Existing Common Solutions	Common Frameworks	Generic Tools	Common Services
Possible Common Solutions	Common Frameworks - Agreement document on standardisation of application specifications using UML - Recommendation to use Volere template - Recommendation to use IEEE Recommended Practice for Software Requirements Specifications (IEEE Std 830-1998)	Generic Tools - Automatic API generating tool - Service-Oriented Architecture platforms	Common Services

Title of Interoperability Agreement	9. Agreement on maintenance processes and lifecycle management of the technical components or services (A3)			
Rationale of Interoperability Agreement	The maintenance process recommends how shared or reusable components should be maintained. By sharing the same lifecycle management, the expectation is that conflicts between different yet connected components are minimised.			
Interoperability Level	Legal		Semantic	
	Organisational	X	Technical	
Relations to Other IOP Agreements				
Solutions at National and Sectoral Level:				
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services	
Existing Solution Instances	Common Frameworks - PEPPOL EIA Life Cycle Management dimension - INSPIRE maintenance - Terms of Collaboration document (DG TAXUD)	Generic Tools - @firma (Spain) - Data Verification System or DVS (Spain) - Federal Service Bus or FSB (Belgium) - jCore Logging (DG AGRI) - PEPPOL ICT eProcurement LCM - PEPPOL Transport Infrastructure LCM	Common Services	
Solutions at European Level (cross-border and cross-sectoral):				
Existing Common Solutions	Common Frameworks	Generic Tools	Common Services	

Possible Common Solutions	Common Frameworks - Document on maintenance processes and lifecycle management of technical components and/or services	Generic Tools - Technical components management and maintenance tool (e.g. Audit Trail & Log) - Cloud components	Common Services - Web portal to publish availability and maintenance periods for technical components or services

<table>
<tr><td>Title of Interoperability Agreement</td><td colspan="6">10. Agreement on the technical connection aspects for electronic data exchange (T1)</td></tr>
<tr><td>Rationale of Interoperability Agreement</td><td colspan="6">A harmonisation of technical networks within the different sectors and business administrations could reduce the number of technologies, interfaces, protocols, etc. In order to reduce the different technologies used for the front-end and back-end connections to customers and suppliers, a definition of connection standards or protocols could be developed including the technical security requirements.</td></tr>
<tr><td rowspan="2">Interoperability Level</td><td>Legal</td><td></td><td rowspan="2"></td><td>Semantic</td><td></td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td></td><td>Technical</td><td>X</td></tr>
<tr><td>Relations to Other IOP Agreements</td><td colspan="6">8, 21
(Note that this agreement excludes the security requirements on the technical level, which are considered in interoperability agreement 21).</td></tr>
<tr><td colspan="7">Solutions at National and Sectoral Level:</td></tr>
<tr><td>Existing Solution Specifications</td><td colspan="2"><u>Common Frameworks</u>
- (technical) NIFO websites</td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td>Existing Solution Instances</td><td colspan="2"><u>Common Frameworks</u>
- OASIS BDX TC BusDox
- SPOCS eDelivery system
- List of standards and protocols used in Estonia[8]
- INSPIRE technical guidance for network services
- CCN/CSI as protocol (DG TAXUD)
- Message type specification and transport of messages in CCN/CSI are defined in the DDCOM (Design</td><td colspan="2"><u>Generic Tools</u>
- X-Road infrastructure in Estonia
- EESSI Messaging System
- IPCIS and e-PRIOR services (DG DIGIT)
- CCN/CSI (DG TAXUD)
- Eucaris II (Consortium)
- Spring integration in Open e-PRIOR (DG DIGIT)
- epSOS XML, WSDL SOAP as technical standard</td><td colspan="2"><u>Common Services</u>
- CCN/CSI</td></tr>
</table>

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[8] http://www.riso.ee/et/koosvoime/RITA1_01.pdf

	Document for Common Operations and Methods). Deviations for the ICS, ECS and NCTS, are pointed out in the DDNIA, DDNXA and DDNTA respectively (DG TAXUD)	- e-PRIOR - e-TrustEx - PEPPOL BusDox protocol	
Solutions at European Level (cross-border and cross-sectoral):			
Existing Common Solutions	Common Frameworks	Generic Tools	Common Services - sTESTA - Internet
Possible Common Solutions	Common Frameworks - List of available network infrastructures - List of recommended standards and technologies for gateway networks (e.g. Synchronous vs. Asynchronous) - Template agreement document on technical interfaces for cross-border applications and systems - Recommendations and guidelines on standard interfaces (e.g. WSDL) - List of technical standards and protocols (e.g. SOAP) - Recommendations on technical principles (e.g. SOA, message queues) - a pan-European Testing Framework	Generic Tools - Data Transport components - Open-source Enterprise Service Bus - Cloud-enabled application platforms - Cloud-enabled integration platforms	Common Services - Common network infrastructure between network gateways - Web portal to publish technical interfaces of cross-border systems - Web portal to publish list of technical standards and protocols

<table>
<tr><td>Title of Interoperability Agreement</td><td colspan="6">11. Agreement on financial conditions for accessing a cross-border public service (A4)</td></tr>
<tr><td>Rationale of Interoperability Agreement</td><td colspan="6">For accessing services by citizens, businesses and other administrations, the financial conditions could include a payment scheme per request based on the type of requester. Note that this agreement assumes that the public service has been created, and does not deal with the cost of the <i>establishment</i> of a cross-border public service.</td></tr>
<tr><td rowspan="2">Interoperability Level</td><td>Legal</td><td></td><td rowspan="2"></td><td>Semantic</td><td></td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td>X</td><td>Technical</td><td></td></tr>
<tr><td>Relations to Other IOP Agreements</td><td colspan="6">17</td></tr>
<tr><td colspan="7">Solutions at National and Sectoral Level:</td></tr>
<tr><td>Existing Solution Specifications</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td>Existing Solution Instances</td><td colspan="2"><u>Common Frameworks</u>
- EULA
- RISER Payment Schema (The consumer of the RISER service pays per request to the service, and the RISER service pays for the access to the population registers of public administrations)</td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td colspan="7">Solutions at European Level (cross-border and cross-sectoral):</td></tr>
<tr><td>Existing Common Solutions</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td>Possible Common Solutions</td><td colspan="2"><u>Common Frameworks</u>
- Template agreement document on access to cross-border public</td><td colspan="2"><u>Generic Tools</u>
- Service-Oriented Architecture performance management tools</td><td colspan="2"><u>Common Services</u>
- Web portal to publish pricing and agreements for accessing public</td></tr>
</table>

	services - Pricing schema for access to cross-border public services		services

<table>
<tr><td>Title of Interoperability Agreement</td><td colspan="6">12. Agreement on certification of third-parties that provide electronic cross-border services (A5)</td></tr>
<tr><td>Rationale of Interoperability Agreement</td><td colspan="6">An independent entity or organisation ensures and certifies the services provided and checks the security, trust, liability and privacy of the data processed.</td></tr>
<tr><td rowspan="2">Interoperability Level</td><td>Legal</td><td></td><td rowspan="2"></td><td>Semantic</td><td></td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td>X</td><td>Technical</td><td></td></tr>
<tr><td>Relations to Other IOP Agreements</td><td colspan="6"></td></tr>
<tr><td colspan="7">Solutions at National and Sectoral Level:</td></tr>
<tr><td>Existing Solution Specifications</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td>Existing Solution Instances</td><td colspan="2"><u>Common Frameworks</u>
- RISER Certification (the RISER service is certified with a data protection certification, a European Privacy Seal, provided by the European agency EuroPriSe)</td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td colspan="7">Solutions at European Level (cross-border and cross-sectoral):</td></tr>
<tr><td>Existing Common Solutions</td><td colspan="2"><u>Common Frameworks</u>
- European Privacy Seal (EuroPriSe)</td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td>Possible Common Solutions</td><td colspan="2"><u>Common Frameworks</u>
- List of certification authorities
- Documentation of certification requirements & procedures
- Certification checklists and evaluation templates</td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u>
- Web portal to publish certified organisations and provided electronic cross-border services</td></tr>
</table>

<table>
<tr><td>**Title of Interoperability Agreement**</td><td colspan="6">13. Agreement on list of foreign documents to be legally accepted in other Member States (i.e. in other languages) (B3)</td></tr>
<tr><td>**Rationale of Interoperability Agreement**</td><td colspan="6">The different languages in the EU might block interoperability on technical, semantic and organisational level. Currently, the national regulations are yet not fully aligned with the EU regulations.</td></tr>
<tr><td rowspan="2">**Interoperability Level**</td><td>Legal</td><td>X</td><td rowspan="2"></td><td>Semantic</td><td>X</td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td></td><td>Technical</td><td>X</td></tr>
<tr><td>**Relations to Other IOP Agreements**</td><td colspan="6">4</td></tr>
<tr><td colspan="7">**Solutions at National and Sectoral Level:**</td></tr>
<tr><td>**Existing Solution Specifications**</td><td colspan="2">Common Frameworks</td><td colspan="2">Generic Tools</td><td colspan="2">Common Services</td></tr>
<tr><td>**Existing Solution Instances**</td><td colspan="2">Common Frameworks
- Acceptance of a French diploma document (in French language) by a German university.
- SMS – specimens (certificates, stamps, signatures, forms) (DG TAXUD)
- Authorized Economic Operators (AEO) certificates (DG TAXUD)</td><td colspan="2">Generic Tools
CIRCABC (DG DIGIT)
jCore Document Storage or JDS (DG AGRI)
Hermes Repository Services (DG DIGIT)
CEH (Slovenia)
INSPIRE geo-portal (DG JRC)
SPOCS eSafe</td><td colspan="2">Common Services</td></tr>
<tr><td colspan="7">**Solutions at European Level (cross-border and cross-sectoral):**</td></tr>
<tr><td>**Existing Common Solutions**</td><td colspan="2">Common Frameworks</td><td colspan="2">Generic Tools</td><td colspan="2">Common Services</td></tr>
</table>

Possible Common Solutions	Common Frameworks - Documentation of legal requirements to accept documents per Member State - List of documents per Member State that meet these legal requirements, and do not meet these legal requirements per Member State	Generic Tools - Document Storage component	Common Services - Web portal to publish list of legally accepted / not accepted foreign documents

Title of Interoperability Agreement	14. Agreement on guidelines to harmonise the legal requirements for interoperability between public administrations (B4)			
Rationale of Interoperability Agreement	Member states should acknowledge the legal aspects of information exchange, as national legislations might contradict each other during the information exchange. It is not always clear how one should proceed in drafting cross-border legislations, so clear and practical guidelines are needed. These guidelines should promote the use of common elements in drafting legal instruments, in order to avoid silos being produced by different legal instruments.			
Interoperability Level	Legal	X	Semantic	
	Organisational		Technical	
Relations to Other IOP Agreements	20			
Solutions at National and Sectoral Level:				
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services	
Existing Solution Instances	Common Frameworks - Akoma Ntoso XML framework - Harmonisation of the customs procedure - The common legal agreement on privacy and data protection, such as the European Data Protection Directive, enables RISER to handle personal data on behalf of a third party.	Generic Tools - CEN MetaLex - Bungeni (open source XML editor) - xmLeges (open source XML editor)	Common Services	
Solutions at European Level (cross-border and cross-sectoral):				
Existing Common Solutions	Common Frameworks - The common legal agreement on privacy and data protection, such as the European Data Protection Directive	Generic Tools	Common Services	

Possible Common Solutions	Common Frameworks - Guidelines document on harmonisation of legal requirements for data exchange between public administrations - Guidelines document on establishment of legal trust relationships between Member States and/or other entities (such as private businesses)	Generic Tools	Common Services - Video broadcast of step by step explication to harmonise legal requirements

<table>
<tr><td>Title of Interoperability Agreement</td><td colspan="6">15. Agreement on the establishment of a list of contact points of Member State public administrations (B5)</td></tr>
<tr><td>Rationale of Interoperability Agreement</td><td colspan="6">A list of contact data could be consolidated at EU level of all the contact points for Member State public administrations, which could be contacted for establishing cross-border information exchange.</td></tr>
<tr><td rowspan="2">Interoperability Level</td><td>Legal</td><td></td><td rowspan="2"></td><td>Semantic</td><td></td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td>X</td><td>Technical</td><td>X</td></tr>
<tr><td>Relations to Other IOP Agreements</td><td colspan="6">23</td></tr>
<tr><td colspan="7">Solutions at National and Sectoral Level:</td></tr>
<tr><td>Existing Solution Specifications</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="3"><u>Generic Tools</u></td><td><u>Common Services</u></td></tr>
<tr><td>Existing Solution Instances</td><td colspan="2"><u>Common Frameworks</u>
- CCN Local Administrator (DG TAXUD)
- Terms of Collaboration document (DG TAXUD)</td><td colspan="3"><u>Generic Tools</u></td><td><u>Common Services</u></td></tr>
<tr><td colspan="7">Solutions at European Level (cross-border and cross-sectoral):</td></tr>
<tr><td>Existing Common Solutions</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="3"><u>Generic Tools</u></td><td><u>Common Services</u></td></tr>
<tr><td>Possible Common Solutions</td><td colspan="2"><u>Common Frameworks</u>
- List of all public administrations in Member States
- Contact data of concerned civil servants of these public administrations</td><td colspan="3"><u>Generic Tools</u>
- Business capability modelling tools</td><td><u>Common Services</u>
- Web portal to publish list of contact points of Member State public administrations</td></tr>
</table>

<table>
<tr><td>Title of Interoperability Agreement</td><td colspan="6">16. Agreement on the establishment of catalogue of reference data at European level (D4)</td></tr>
<tr><td>Rationale of Interoperability Agreement</td><td colspan="6">Reference data (codelists) are a predefined, closed set of values that is used by different stakeholders. When different public administrations use the same set of reference data, the expectation is that the exchange of data will be facilitated.</td></tr>
<tr><td rowspan="2">Interoperability Level</td><td>Legal</td><td></td><td rowspan="2"></td><td>Semantic</td><td>X</td><td rowspan="2"></td></tr>
<tr><td>Organisational</td><td></td><td>Technical</td><td>X</td></tr>
<tr><td>Relations to Other IOP Agreements</td><td colspan="6">1</td></tr>
<tr><td colspan="7">Solutions at National and Sectoral Level:</td></tr>
<tr><td>Existing Solution Specifications</td><td colspan="2"><u>Common Frameworks</u></td><td colspan="2"><u>Generic Tools</u></td><td colspan="2"><u>Common Services</u></td></tr>
<tr><td>Existing Solution Instances</td><td colspan="2"><u>Common Frameworks</u>
- epSOS ePrescription code lists (provided in the epSOS Master Value Catalogue)
- Customs data
- INSPIRE standardised code lists/vocabularies
- - CS/RD for all reference data (DG TAXUD)
- TARIC for customs tariffs both published via DDS on Europe (DG TAXUD)
- SMS for specimens (DG TAXUD)
- EOS (DG TAXUD)
- ECICS (DG TAXUD)</td><td colspan="2"><u>Generic Tools</u>
- eFP7 (DG DIGIT)
- Target Data Storage (TDS) of CVD (DG ESTAT)
- SDMX Tools (DG ESTAT)
- INSPIRE geo-portal (DG JRC)
- Metadata Handler (MH) of CVD (DG ESTAT)
- epSOS Master Value Catalogue</td><td colspan="2"><u>Common Services</u>
- INSPIRE geoportal</td></tr>
<tr><td colspan="7">Solutions at European Level (cross-border and cross-sectoral):</td></tr>
</table>

Existing Common Solutions	Common Frameworks - ISO country codes	Generic Tools	Common Services - SEMIC.eu
Possible Common Solutions	Common Frameworks - EU codelists	Generic Tools - Structured Data Storage component	Common Services - European Catalogue of reference data - Visual tablet applications representing the reference data in a graphical way

Title of Interoperability Agreement	17. Agreement on common understanding of Service Level Agreements (SLAs) for electronic cross-border services (A7)			
Rationale of Interoperability Agreement	SLAs define the service levels for public services, ensuring certain characteristics of the service, such as availability, longevity and reliability. When different parties use the same guidelines to define SLAs, the expectation is that the resulting SLAs are more interoperable.			
Interoperability Level	Legal		Semantic	
	Organisational	X	Technical	X
Relations to Other IOP Agreements	11			
Solutions at National and Sectoral Level:				
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services	
Existing Solution Instances	Common Frameworks	Generic Tools @firma (Spain) Data Verification System or DVS (Spain) Federal Service Bus or FSB (Belgium) jCore Logging (DG AGRI)	Common Services	
Solutions at European Level (cross-border and cross-sectoral):				
Existing Common Solutions	Common Frameworks	Generic Tools	Common Services	
Possible Common Solutions	Common Frameworks - List of service level classes (e.g. gold or platinum support) - Template agreement document on SLA for	Generic Tools - Audit Trail & Log components - Service-Oriented Architecture performance	Common Services - Shared Monitoring & Logging service for cross-border public services	

	electronic cross-border services - Definition of target KPIs for cross-border services	management tools - Business Activity Monitoring tools	

Title of Interoperability Agreement	18. Agreement on common business services (B6)			
Rationale of Interoperability Agreement	By sharing these different business processes, public administrations can choose to reuse the best practices in other administrations. Furthermore, the interface of business processes may be standardised to make sure that the inputs and outputs of different business processes are aligned. Typically, common business services are found in reporting systems, warning systems, data gathering and redistribution systems, biltateral interactions, etc.			
Interoperability Level	Legal	X	Semantic	
	Organisational	X	Technical	X
Relations to Other IOP Agreements	3, 7, 22			
Solutions at National and Sectoral Level:				
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services	
Existing Solution Instances	Common Frameworks - Estonia's business process to register a new company (the company registration can be completed within 2 hours) - Alignment of processes between Member State administrations for collaboration in customs procedures (i.e. Transit procedure) - CEN ISSS WS/BII Profiles - Processes for Public Procurement - Functional specifications for major part of Modernised Customs Code (DG TAXUD)	Generic Tools - IPCIS (DG DIGIT) - FIDES (DG MARE) - NOTIS(DG DIGIT) - e-PRIOR - PEPPOL BIS (Using CEN ISSS WS/BII Profile)	Common Services	
Solutions at European Level (cross-border and cross-sectoral):				

Existing Common Solutions	Common Frameworks	Generic Tools	Common Services
Possible Common Solutions	Common Frameworks - Guidelines document to regulate and to harmonise the legal and organisational aspects of procuring ICT services or goods by the Commission and Member States for interoperability solutions - Template agreement document on cross-border and cross-sector business process - List of business processes to standardise - List of available business processes (to reuse) - Gateway points (at Member State or administration level) for cross-border and cross-sectoral business processes	Generic Tools - Workflow Management components - Open-source Business Process Management suites - Cloud-enabled Business Process Management suites	Common Services - Web portal to publish list of reusable and standardised business processes - Services to simulate possible process optimisations

Title of Interoperability Agreement	19. Agreement on list of solution components to be reused (A6)			
Rationale of Interoperability Agreement	Inventorise standard software components which could be reused or shared by multiple public administrations for the building of solutions which operate cross-border. Reusing components by different parties improves interoperability by harmonizing the differences between components, resulting in a more similar IT Architecture			
Interoperability Level	Legal		Semantic	
	Organisational		Technical	X
Relations to Other IOP Agreements				
Solutions at National and Sectoral Level:				
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services	
Existing Solution Instances	Common Frameworks - All CSI stack (DG TAXUD) - MCC (Minimal Common Core) in past (DG TAXUD) - SSTA (testing application) (DG TAXUD)	Generic Tools For instance: - ECAS (DIGIT) - IMI's self-registration component (DG Markt) - eID STORK (DIGIT) - jCore Logging (DG AGRI) - e-PRIOR - e-TrustEx - PEPPOL BusDox Sample Implementation - PEPPOL Transformation Software - PEPPOL Validation Software	Common Services	

Solutions at European Level (cross-border and cross-sectoral):			
Existing Common Solutions	Common Frameworks	Generic Tools	Common Services - OSOR.eu
Possible Common Solutions	Common Frameworks - List of current solution components from EC and Member State projects - Guidelines on developing open software with strong emphasis on software reuse and proper documentation - Vision document, architecture and guidelines for reusable common solutions - List of reusable components, together with a minimum set of information to implement the reusable components (e.g. deliverables, service levels, contact points)	Generic Tools - All EIIS categories - Software-as-a-Service / Cloud tools - Platform-as-a-Service tools	Common Services - Web portal to provide reusable solution components

Title of Interoperability Agreement	20. Agreement on guidelines for the creation of interoperability agreements (G1)			
Rationale of Interoperability Agreement	In order to reduce the time for the development of agreements and avoid discussions on responsibilities, solutions, concepts, ownership of data, etc., guidelines, methods and structures for the establishment of frameworks or agreements could be developed.			
Interoperability Level	Legal		Semantic	
	Organisational	X	Technical	
Relations to Other IOP Agreements	All other agreements			
Solutions at National and Sectoral Level:				
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services	
Existing Solution Instances	Common Frameworks - INSPIRE Generic Conceptual Model and data specification methdology	Generic Tools	Common Services	
Solutions at European Level (cross-border and cross-sectoral):				
Existing Common Solutions	Common Frameworks	Generic Tools	Common Services	
Possible Common Solutions	Common Frameworks - Definition of interoperability agreement - Lifecycle definition of an interoperability agreement - Documentation of guidelines and procedure to set up an interoperability	Generic Tools	Common Services - Have a simplification commission to deal with conflicting legal aspects - Video broadcast of step by step explication on how to create interoperability agreements	

	agreement		

Title of Interoperability Agreement	21. Agreement on security requirements for the exchange of information across-border (T2)			
Rationale of Interoperability Agreement	Providing a definition of the required implementation of security aspects to support the trusted exchange of information between public administrations. In order to exchange information, the security aspects (such as identification, authentication and authorisation) should be aligned between EC and Member State administrations.			
Interoperability Level	Legal	X	Semantic	X
	Organisational	X	Technical	X
Relations to Other IOP Agreements	8, 10 (Note that the technical aspects of data exchange, not related to security, are described in interoperability agreement 10)			
Solutions at National and Sectoral Level:				
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services	
Existing Solution Instances	Common Frameworks CCN security policy agreement (DG TAXUD)	Generic Tools - ECAS (DIGIT) - PEPPOL Security Tools	Common Services	
Solutions at European Level (cross-border and cross-sectoral):				
Existing Common Solutions	Common Frameworks	Generic Tools - eID STORK	Common Services	
Possible Common Solutions	Common Frameworks - Document on security requirements for exchange of information across-border (including authentication, identification, authorisation, encryption, integrity, eSignature, etc.) - List of selected security standards and	Generic Tools - Shared Authentication components - Shared Identification components - Shared Certificate validation components - Identify & Access	Common Services	

	methodologies - Guidelines for security of Contact Points (e.g. the contact point should always deliver trustworthy data) - Framework to establish trust, including security standards, security methods (e.g. ISO27000), and security environments - Establishment of a European security certification authority	Management components - Data Certification components - Cloud-enabled integration platform	

Title of Interoperability Agreement	22. Agreement on how to represent and model architectures (semantics, syntax, standards) for cross-border information exchange (G2)			
Rationale of Interoperability Agreement	Architecture modelling guidelines define a standard way for expressing architectures and could be used for developing cross-border information exchange.			
Interoperability Level	Legal		Semantic	
	Organisational	X	Technical	
Relations to Other IOP Agreements	All other agreements			
Solutions at National and Sectoral Level:				
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services	
Existing Solution Instances	Common Frameworks - Recommendation to use UML for software modelling - Recommendation to use BPMN for business process modelling - INSPIRE Generic Conceptual Model and data specification methdology - TIP (DG TAXUD)	Generic Tools - MS Visio Stencils for UML and BPMN - CEN ISSS WS/BII Profile (Process) and Transaction (eDocument) Architecture	Common Services	
Solutions at European Level (cross-border and cross-sectoral):				
Existing Common Solutions	Common Frameworks	Generic Tools	Common Services	

Possible Common Solutions	Common Frameworks - Guidelines document on architecture modelling for cross-border information exchange - List of selected modelling languages - Quality control template documents for architecture modelling	Generic Tools - Modelling tools with European modelling conventions	Common Services - Web portal to publish guidelines, selected languages and quality control template documents

Title of Interoperability Agreement	23. Agreement on the establishment of contact points to govern the technical access (B7)
Rationale of Interoperability Agreement	Contact Points (CP) are organisations delegated by public administrations in participating countries, acting as a bidirectional way of interfacing between the existing different national functions provided by the national IT infrastructures and those provided by the common European infrastructure. Note that also sectorial contacts are needed, as technical and sectorial go in tandem. The CP acts as a kind of mediator as far as the legal and regulatory aspects are concerned. The CP creates the conditions (by supporting trust, data protection and privacy) for a trusted relationship with other countries' CPs.

Interoperability Level	Legal	X		Semantic		
	Organisational	X		Technical		

Relations to Other IOP Agreements	15

Solutions at National and Sectoral Level:			
Existing Solution Specifications	Common Frameworks	Generic Tools	Common Services
Existing Solution Instances	Common Frameworks - Establishment of PEPPOL contact points - Establishment of epSOS contact points - CCN Local administrators	Generic Tools	Common Services
Solutions at European Level (cross-border and cross-sectoral):			
Existing Common Solutions	Common Frameworks	Generic Tools	Common Services

Possible Common Solutions	Common Frameworks	Generic Tools	Common Services
	- Definition of a contact point - Open-ended list of contact points per country or per service, preferably linked to the organisational structure of the contact points - Guidelines document on establishment of contact points - Guidelines to align different kinds of CPs or different kinds of stakeholders (e.g. Tax and Toll, business and IT)		- Web portal to publish list of available contact points - Video broadcast of step by step explication on how to set up contact points

ANNEX 3: DETAILS OF RESEARCH APPROACHES

The three approaches are described in more detail in Figure 28. In the following sections, the details are provided for the different steps that were taken to conduct each approach.

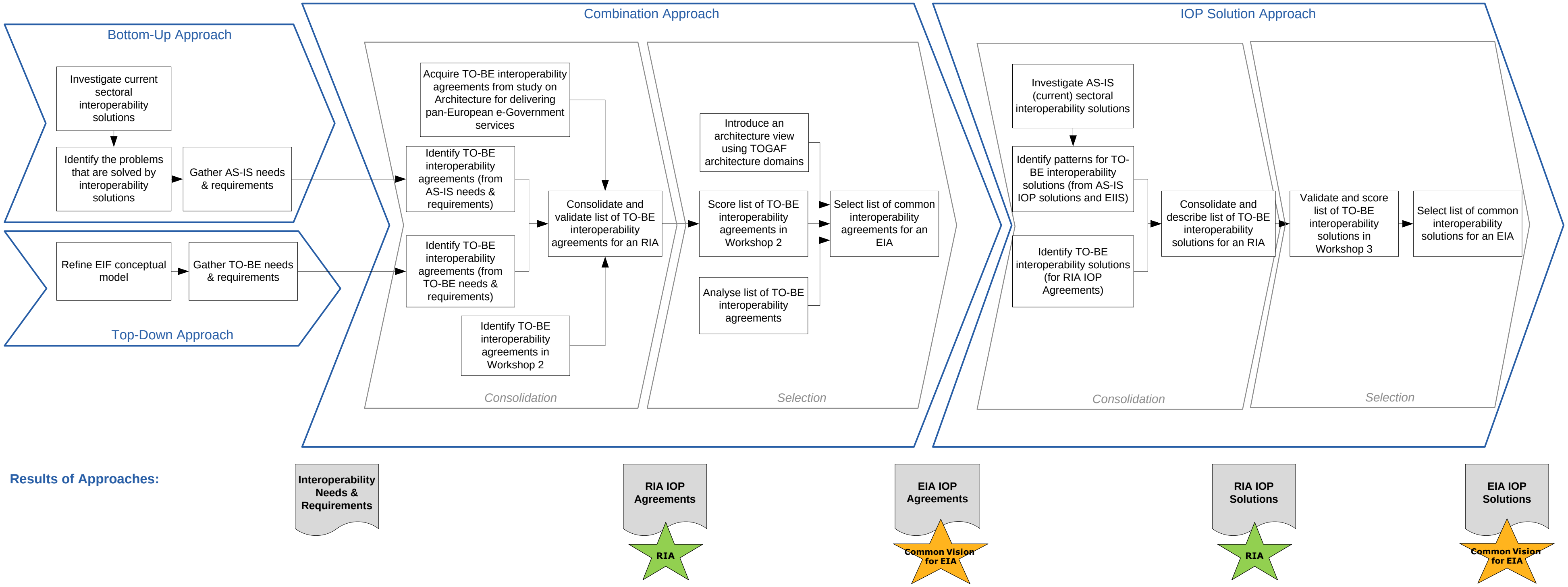
Bottom-Up Approach
Investigate current sectoral interoperability solutions
Identify the problems that are solved by interoperability solutions
Gather AS-IS needs & requirements
Refine EIF conceptual model
Gather TO-BE needs & requirements
Top-Down Approach
Combination Approach
Acquire TO-BE interoperability agreements from study on Architecture for delivering pan-European e-Government services
Identify TO-BE interoperability agreements (from AS-IS needs & requirements)
Identify TO-BE interoperability agreements (from TO-BE needs & requirements)
Identify TO-BE interoperability agreements in Workshop 2
Consolidate and validate list of TO-BE interoperability agreements for an RIA
Consolidation
Introduce an architecture view using TOGAF architecture domains
Score list of TO-BE interoperability agreements in Workshop 2
Analyse list of TO-BE interoperability agreements
Select list of common interoperability agreements for an EIA
Selection
IOP Solution Approach
Investigate AS-IS (current) sectoral interoperability solutions
Identify patterns for TO-BE interoperability solutions (from AS-IS IOP solutions and EIIS)
Identify TO-BE interoperability solutions (for RIA IOP Agreements)
Consolidate and describe list of TO-BE interoperability solutions for an RIA
Consolidation
Validate and score list of TO-BE interoperability solutions in Workshop 3
Select list of common interoperability solutions for an EIA
Selection
Results of Approaches:
Interoperability Needs & Requirements
RIA IOP Agreements
RIA
EIA IOP Agreements
Common Vision for EIA
RIA IOP Solutions
RIA
EIA IOP Solutions
Common Vision for EIA

Figure 28 - Detailed Process Model for Development of Common Vision for EIA

Research Protocol for Bottom-Up Approach

- **Investigate current sectoral interoperability solutions**

  In this step of the bottom-up approach, an understanding of the AS-IS situation of cross-border interoperability was reached in the EC projects and Member States. The expected outcome of this step included one use case for each selected EC project and Member State administration to represent the common understanding of cross-border interoperability solutions.
- **Identify the problems that are solved by interoperability solutions**

  Based on the use case documentation, interviews were used to identify and to discuss cross-border interoperability problems that are solved by the current interoperability solutions.
- **Gather AS-IS needs & requirements**

  During the interview, the interoperability problems and current solutions were discussed and the AS-IS needs and requirements for cross-border interoperability were identified for the EC projects and Member States. After conducting the interview, the interview findings were structured in a table which outlined the AS-IS needs and requirements on the different interoperability levels as defined by EIF (being Legal, Organisational, Semantic and Technical).

Research Protocol for Top-Down Approach

- **Refine EIF conceptual model**

  In this step of the top-down approach, the EIF conceptual model was theoretically refined in a top-down fashion into concrete and practical building blocks to provide public services. In order to refine the EIF conceptual model, TOGAF was used as a reference to identify architectural elements such as architectural models, guidelines, building blocks, and interconnections between building blocks.
- **Gather TO-BE needs & requirements**

  The expected outcome of the top-down approach included the refined EIF conceptual model for public services, and the TO-BE needs and requirements for cross-border interoperability coming from the refined EIF conceptual model in order to ensure completeness. These TO-BE needs and requirements were identified by using the conceptual model in a dynamic way with theoretical examples of information exchanges between public administrations related to life events.

Research Protocol for Combination Approach

- **Identify TO-BE interoperability agreements (from AS-IS needs & requirements)**

  In this step of the combination approach, a list of TO-BE interoperability agreements was identified that provides an answer to the AS-IS needs and requirements from the bottom-up approach. For each AS-IS need and requirement, a potential TO-BE interoperability agreement is selected taking into account the existing interoperability solutions from EC projects and Member States.
- **Identify TO-BE interoperability agreements (from TO-BE needs & requirements)**

  A list of TO-BE interoperability agreements was identified that provides an answer to the TO-BE needs and requirements from the top-down approach. For each TO-BE need and requirement, a potential TO-BE interoperability agreement is selected taking into account the concrete and practical building blocks for the refined EIF conceptual model.
- **Acquire TO-BE interoperability agreements from study on Architecture for delivering pan-European e-Government services**

  In 2004, a study was performed on the possible architectures for delivering pan-European e-Government services, which contained a list of interoperability agreements. The list was compared with our list of TO-BE interoperability agreements, and new candidates were added.

- **Identify TO-BE interoperability agreements in Workshop 2**

  In a creative exercise during workshop 2, the participants were asked to think of interoperability agreements or solutions that are required for the development of new public services. This exercise resulted in a complementary list of identified TO-BE interoperability agreements.

- **Consolidate and validate list of TO-BE interoperability agreements for an RIA**

  During workshop 2, the different lists of TO-BE interoperability agreements were consolidated in one consistent list of TO-BE interoperability agreements, which is defined as the Reference Interoperability Agreements (RIA). This RIA contains agreements that are needed at European level for the setup of a sectoral cross-border eGovernment service. The consolidated list of RIA interoperability agreements was reviewed, discussed and validated by the participants of workshop 2.

- **Score list of TO-BE interoperability agreements in Workshop 2**

  After the validation, the resulting list of TO-BE interoperability agreement was scored in different groups on the following two criteria:

  - Added Value**:** to have an interoperability agreement at EU level instead of having a specific one for each sectoral project
  - Feasibility**:** realistic, time, human resources, costs, risks, etc. to develop a common interoperability agreement at EU level

- **Analyse list of TO-BE interoperability agreements**

  The resulting list of TO-BE interoperability agreements was analysed in order to select potential candidate agreements at European level which should be included in the common vision for an EIA. In the analysis, the degree of commonality at European level of each sectoral interoperability agreement was evaluated. As potential candidate agreements at European level, the interoperability agreements with the highest degree of commonality at European level are selected.

- **Introduce an architecture view using TOGAF architecture domains**

  For the representation of the interoperability agreements of the common vision for an EIA, an architecture view is proposed using the architecture domains supported by The Open Group Architecture Framework (TOGAF). The resulting interoperability agreements are positioned on the architecture view within one of the four architecture domains (being Business, Data, Application and Technology Architecture), based on the specific theme they address.

- **Selected list of TO-BE interoperability agreements**

  Based on the scoring and the analysis of the TO-BE interoperability agreements, the candidate agreements for the common vision for an EIA are selected and positioned on the architecture view.

Research Protocol for Interoperability Solution Approach

- **Investigate AS-IS (current) sectoral interoperability solutions**

  In this step of the solution implementation approach, AS-IS interoperability solutions were identified that provide solutions at European sectoral level or Member State level, based on the AS-IS interoperability agreements described during the interviews with EC projects and Member States in the bottom-up approach. Each AS-IS interoperability solution was described and positioned on the refined EIF conceptual model.

- **Identify patterns for TO-BE interoperability solutions (from AS-IS interoperability agreements and EIIS)**

  In this step, patterns for TO-BE interoperability solutions were identified that provide solutions at European sectoral level or Member State level, based on a consolidation and generalisation of the AS-IS interoperability solutions from the interviews with EC projects and Member States in the bottom-up approach. Furthermore, a study was performed in 2009 on the possible European interoperability infrastructure services (EIIS) to support European

Public Services. During the EIIS study, nine common European Interoperability Infrastructure Services have been defined and a large number of systems have been evaluated in order to discover potential system components that could provide generic interoperability infrastructure services. These European interoperability infrastructure services were taken into account for defining the patterns for TO-BE interoperability solutions. Each pattern for TO-BE interoperability solution was described and positioned on the refined EIF conceptual model.

- **Identify TO-BE interoperability solutions (for RIA)**

  In an initial step, potential TO-BE interoperability solutions were theoretically identified that provide an answer to the interoperability agreements of the RIA. For each reference interoperability agreement, potential TO-BE interoperability solutions were identified that provide solutions at European sectoral level for the different interoperability levels impacted by the interoperability agreement. From the ISA programme, the possible interoperability solutions to be provided at European level include Common Frameworks (i.e. specifications, methodologies), Common Services (i.e. operational applications) or Generic Tools (i.e. reference platforms, common components). Each TO-BE interoperability solution was described and positioned on the refined EIF conceptual model.

- **Consolidate and describe list of TO-BE interoperability solutions for an RIA**

  Based on the patterns for TO-BE interoperability solutions and taking into account the theoretical identified TO-BE interoperability solutions for an RIA, TO-BE interoperability solutions for an RIA were described that are needed at European level for the setup of sectoral cross-border public services. These TO-BE interoperability solutions for an RIA potentially include Common Frameworks, Common Services or Generic Tools provided at European level according to the ISA programme. The TO-BE interoperability solutions for an RIA were positioned on the refined EIF conceptual model.

- **Validate and score list of TO-BE interoperability solutions in Workshop 3**

  During Workshop 3, the list of RIA interoperability solutions was reviewed, discussed and validated by the participants of the workshop. After the validation, the resulting list of TO-BE interoperability solutions was scored in different groups on the following two criteria:

  - Added Value**:** to have an interoperability solution at EU level instead of having a specific one for each sectoral project
  - Feasibility**:** realistic, time, human resources, costs, risks, etc. to develop a common interoperability solution at EU level

- **Select list of common interoperability solutions for an EIA**

  Based on the scoring and the analysis of the TO-BE interoperability solutions, the candidate solutions for an EIA are prioritised and selected. These selected interoperability solutions for an EIA are taken further into account for the development of an implementation plan and for demonstrating the value of an EIA.

ANNEX 4: REFINED EIF CONCEPTUAL MODEL AND MAPPING OF SOLUTION SPECIFICATIONS AND INSTANCES

In this annex, the resulting refined EIF conceptual model is provided in Figure 29 and an enlarged version of the link between RIA and Solution Specifications and Instances (both mapped on the refined EIF conceptual model) is provided in Figure 30.

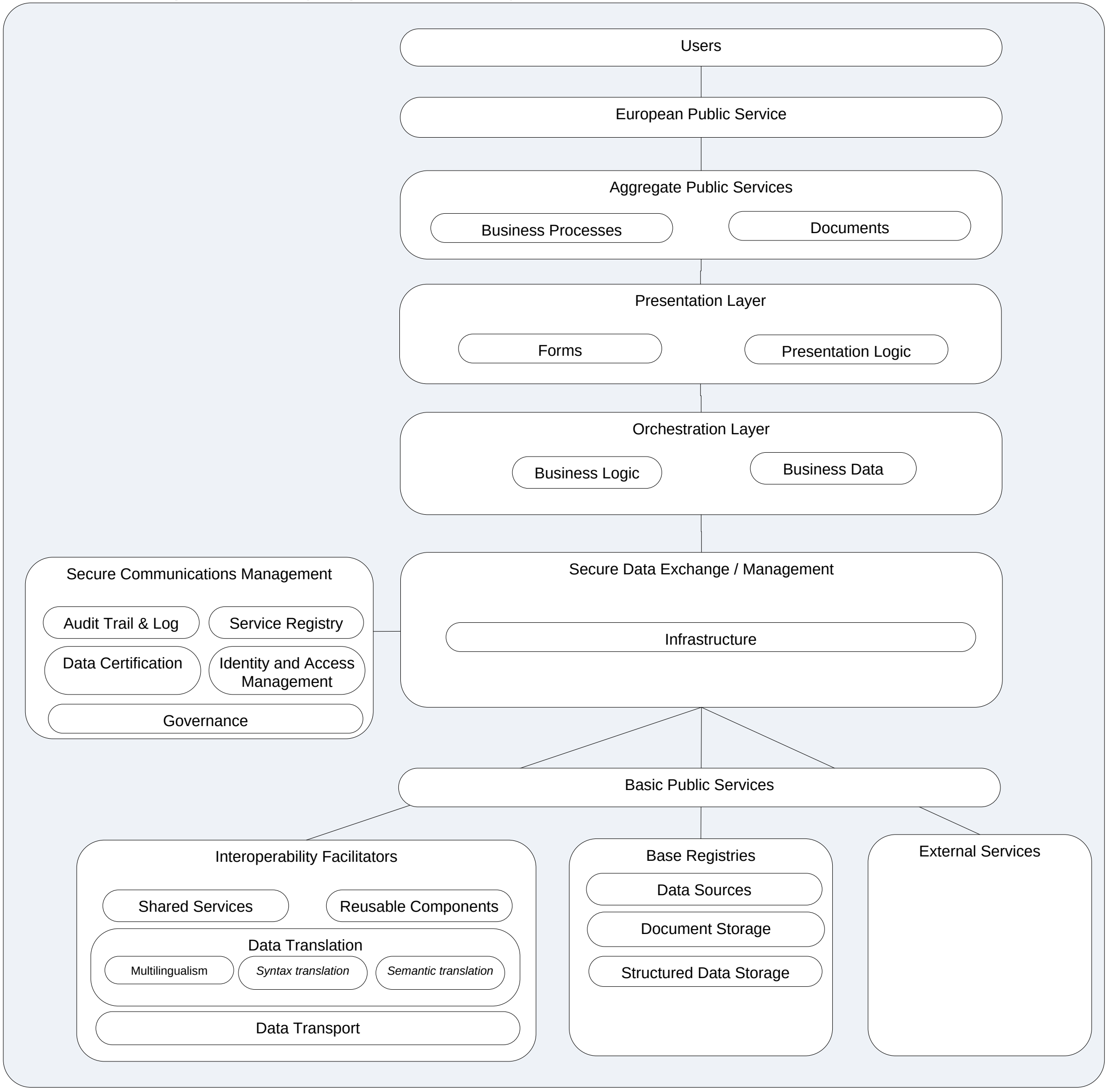
Users
European Public Service
Aggregate Public Services
Business Processes
Documents
Presentation Layer
Forms
Presentation Logic
Orchestration Layer
Business Logic
Business Data
Secure Communications Management
Audit Trail & Log
Service Registry
Data Certification
Identity and Access Management
Governance
Secure Data Exchange / Management
Infrastructure
Basic Public Services
Interoperability Facilitators
Shared Services
Reusable Components
Data Translation
Multilingualism
Syntax translation
Semantic translation
Data Transport
Base Registries
Data Sources
Document Storage
Structured Data Storage
External Services

Figure 29 - Resulting Refined EIF Conceptual Model

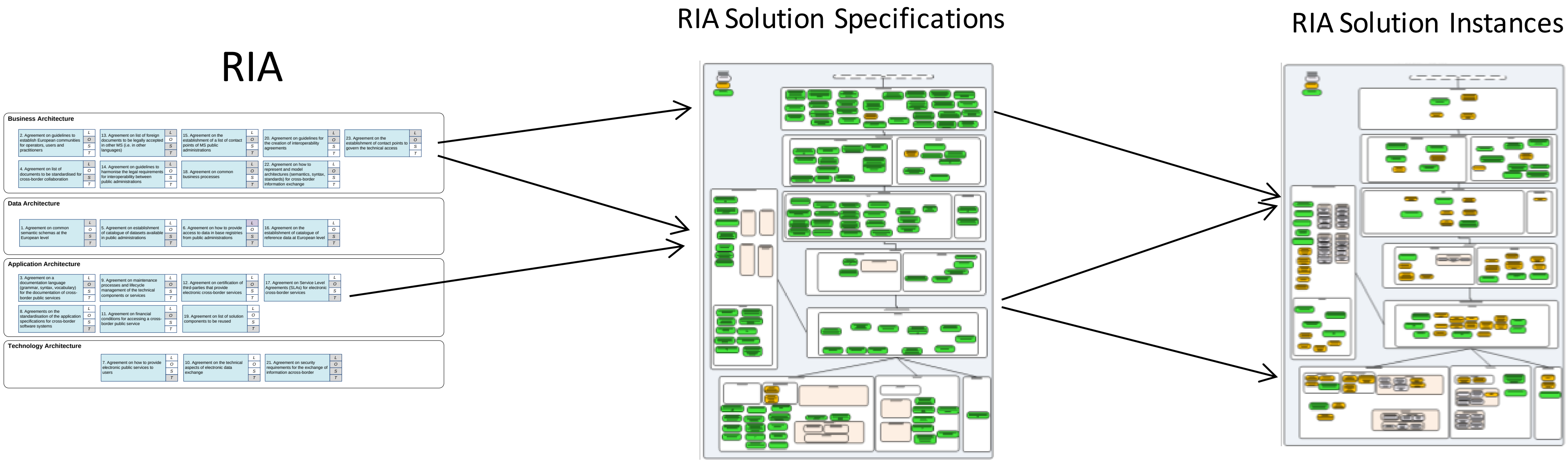
RIA
RIA Solution Specifications
RIA Solution Instances
Business Architecture
2. Agreement on guidelines to establish European communities for operators, users and practitioners
L O S T
13. Agreement on list of foreign documents to be legally accepted in other MS (i.e. in other languages)
L O S T
15. Agreement on the establishment of a list of contact points of MS public administrations
L O S T
20. Agreement on guidelines for the creation of interoperability agreements
L O S T
23. Agreement on the establishment of contact points to govern the technical access
L O S T
4. Agreement on list of documents to be standardised for cross-border collaboration
L O S T
14. Agreement on guidelines to harmonise the legal requirements for interoperability between public administrations
L O S T
18. Agreement on common business processes
L O S T
22. Agreement on how to represent and model architectures (semantics, syntax, standards) for cross-border information exchange
L O S T
Data Architecture
1. Agreement on common semantic schemas at the European level
L O S T
5. Agreement on establishment of catalogue of datasets available in public administrations
L O S T
6. Agreement on how to provide access to data in base registries from public administrations
L O S T
16. Agreement on the establishment of catalogue of reference data at European level
L O S T
Application Architecture
3. Agreement on a documentation language (grammar, syntax, vocabulary) for the documentation of cross-border public services
L O S T
9. Agreement on maintenance processes and lifecycle management of the technical components or services
L O S T
12. Agreement on certification of third-parties that provide electronic cross-border services
L O S T
17. Agreement on Service Level Agreements (SLAs) for electronic cross-border services
L O S T
8. Agreements on the standardisation of the application specifications for cross-border software systems
L O S T
11. Agreement on financial conditions for accessing a cross-border public service
L O S T
19. Agreement on list of solution components to be reused
L O S T
Technology Architecture
7. Agreement on how to provide electronic public services to users
L O S T
10. Agreement on the technical aspects of electronic data exchange
L O S T
21. Agreement on security requirements for the exchange of information across-border
L O S T

Figure 30 - Link between RIA, Solution Specification and Solution Instances

ANNEX 5: DIFFERENT TYPES OF COMMON INFRASTRUCTURE SERVICES

- **Audit trail and log** chronologically records information about the usage of European Public Services. It collects data to examine how and when events occurred, who accessed a system and what actions he or she performed during a given period of time. The logged information can be the exchanged information between the system and the users of the system (incoming and outgoing messages), the log-on data, the transaction content and properties-time, checks and other actions performed by the users as well as actions performed by system administrators, or automated actions initiated by the system. Audit trail and log records data generated by system processes and which do not correspond to specific user actions, and actions taken by identifiable and authenticated users.
- **Service registries** are central registries that provide a description of available services. The registry presents, for each service how to use them, their current status, and their physical locations. A service registry maintains the catalogue of available services in a service-oriented context. Service producers publish services and register them into the registry such that consumers are able to find them. An enterprise may have one or more service registries that can be merged to one enterprise service registry, which is called a federated service registry.
- **Identity and access management** encapsulates all the processes, policies, and technology solutions that manage digital identities and specifies how digital identities are used to access resources. This infrastructure service includes entity authentication (the mechanism needed to manage controlled access of entities to applications) and authorisation (the mechanism to define what access privileges an entity has within the application by defining roles and groups). Note that data authentication, which verifies origin and integrity of data, is not part of this "identity and access management" infrastructure service, as this is treated in the "data certification" infrastructure service.
- **Data certification** is defined as the process of signing an electronic information (which could also be an e-mail, a file or a data source), and of verifying whether the origin and integrity of information are what they are expected to be based on certificates issued by different Certification Authorities (CA). This infrastructure service includes the creation, validation, and extension of advanced electronic signatures as *front-end services* in conformity with the requirements of the EC Directive. Validation of certificates and time stamping are *back-end* services to provide these front-end services, and may optionally offer also a direct client interface.
- **Data transport** is the exchange of data in a reliable way by providing standardised transport capabilities. This service facilitates communication between systems for collecting and delivering data, and does not store the data centrally. Each system independently handles its own data and, when required, draws data from the database and sends it to another system.

- **Data translation** facilitates data transfers between systems (using their own data format, data model and data encoding) and includes semantic translation, syntax translation and multilingualism capabilities.
- **Workflow management** orchestrates interactions between workflow participants (human and systems) and provides each participant with the information that is necessary to complete his or her task.
- **Document storage** is used to store and to manage documents, providing features at each stage of the document life cycle: creation, retrieving, reviewing, versioning, distribution, publishing, archiving and eventual destruction. This service facilitates collaboration between different contributors to the document life cycle.
- **Structured data storage** facilitates the exchange of data by providing a simple and structured interface to access data stored in large and complex databases. This service acts as an abstraction layer between the technical data structure of a database and the functional point of view of a standard user. The structured data service removes the need to maintain a schema, while your attributes are automatically indexed to provide fast real-time lookup and querying capabilities. This flexibility minimises the performance tuning required as the demands for your data increase.

ANNEX 6: TRACEABILITY OF RIA INTEROPERABILITY AGREEMENTS

In this annex the traceability from the interview findings to the RIA is described. For each reference interoperability agreement, a table is provided with the specific interview findings from EC projects and Member States that served as a basis for the creation of the interoperability agreement.

1. Agreement on common semantic schemas at the European level (D1)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
EESSI	The message content at each member state can differ. For instance, some Member States require data about sexual orientation while other Member State made it illegal to ask about sexual orientation.	Need for semantic XML standards of a case and defined XSD schemas (next to national specific forms). The national specifics should be analysed and uniform sets could be selected, such that a super set (or minimal set) should be defined and agreed between Member States (by the Central Business Model).	SED types (e.g. Pension Claim SED, Pension Decision SED)
epSOS	ePrescription is understood in different ways by Member States, problems for extension of epSOS use cases, assuming common practices, but specialities of Member States in terms of ePrescription	Define minimum data sets, possibility for optional Member States requirements and define a maximum data set.	ePrescription data set and schema (central data structure)
epSOS	It is challenging to ensure sustainability in semantic standards	Use standards provided by standardisation organisations, to manage the evolution of the standard and the maintenance and sustainability of a standard. Standards should be used as much as possible for semantic solutions.	eProfile, IG Profile
PEPPOL	Transportation, Insurance, Health and Service Records are different. Different local data formats exist in the Member	Need for European semantic standard of PEPPOL information. Need for conformance checks when document transformation took place (PEPPOL BIS vs	- PEPPOL Business Interoperability Specification (BIS) for standardisation of eInvoice format, (or CEN/BII standard for semantics) - Validation Service and

	State for eInvoices.	Local format).	Transformation Service
DG TAXUD	Problem of semantic interoperability for the common domain, being the cross-border domain between customs administrations.	For the common domain, centralised specifications should be defined which are mandatory for all Member States. A common, cross-domain data model could be defined which can be used within the Customs domain (i.e. persons, addresses, etc). Standards should be used as much as possible, if available (i.e. ISO list of country codes) or built upon customs organisations (i.e. World Customs Organisation).	Standards in data models and code lists for common domain
Member State Latvia	Lack of data structures for the exchange of information between administrations.	Need for data models for the exchange of information. Need for defined XML schemas, which are used in e-services (i.e. personal, vehicle, enterprises, document, etc.)	Standardised data model, XML schema catalogue
Member State Latvia	Lack of identification of objects or information elements that need to be shared between different administrations or are common.	Need for the identification of all objects of distributed systems or data elements that are shared between administrations, possibly using Uniform Resource Identifiers (URI).	Common Identification schema
Member State Latvia	Lack of common data formats and structures.	Need for the definition of data types to be used in the exchange of information.	Data type dictionary
Member State Spain	Lack of common understanding of the information provided by services of different administrations in different Member State.	Need for common data structures and formats for specific domains (such as electronic signatures). Define data formats for elements such as eIdentifier, givenName, Surname, gender, nationalityCode, etc. The compliance to the defined semantical standards could be defined for all levels of government, for example in legal agreements or European Directives. Define minimal part of semantic standard formats as compulsory, and additional elements could be added next to the basic	Standardised semantic formats

		requirements.	
Member State Greece	Lack of technical standard to describe semantics	Need for a technical standard to describe the semantics	XML Schema
Member State Denmark	Lack of shared understanding on EU level of the different semantics used within each Member State.	Need for the European mapping of grade scales and diplomas from the different Member States. It should be possible to accept and understand the documents provided by other Member States, including the semantics, structure and contents. Enhance more the sharing of semantics than defining common (standardised) semantics.	Mapping of Member State semantics
Member State Germany	Difficult to connect to the national registers in a consistent manner for the different Member States, because of different data requirements.	RISER offers its customers a uniform and easy-to-use access to the service in many different languages. Need for a defined standard data format for requesting the information and a data format for the answers. Defining mandatory and optional data elements, in order to facilitate the flexibility of Member States (i.e. Finland requires the use of a unique person identifier for requesting.	Transformation between different data formats
Member State Germany	Every Member State can have a different semantic or technical structure for address, name, country, birth date, etc.	Need for central semantic data model or defined data types for exchange of information. Possible defined data models using XML.	Data models and types
Member State France	Difficult to provide consistent information, guidelines and documentation to users or employees of public administrations on specific public service domains.	Need to develop a common understanding of specific domains cross-borders, for example within the taxation domain.	Common domain semantics

2. Agreement on guidelines to establish European communities for operators, users and practitioners (B1)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
PEPPOL	Lack of management and governance organisation for the exchange of information in the eProcurement community	Need for a central organisation to manage and govern the connection between all Access Points. This function should include conformance & testing, life-cycle management, governance, trust, maintenance and ownership (investigate the feasibility to centralise this function at DIGIT).	PEPPOL Core Community
Member State Greece	Lack of organisation that coordinates the internal working of the municipalities	Need for organisation that governs the internal working of the municipalities	Union of Municipalities
Member State Denmark	Lack of collaboration and communication between Member States on cross-border solutions being developed.	Need for disparate groups and organisations to develop standardisation within specific domains, including the providers, consumers and other key stakeholders. Develop cost effective solutions, with positive return on investment or business case, for example large automation is only required if number of cross border applicants is larger. Taking also into account the switching costs for implementing and changing towards defined standards.	Communities of practice

3. Agreement on a documentation language (grammar, syntax, vocabulary) for the documentation of cross-border public services (A1)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
Member State Denmark	Difficulty to understand and accept information from Member States	Need to supply a consistent description in a selected pivot language, for example English, in order to define	Pivot language

	in all the different national languages.	and exchange the diplomas in a consistent way. Universities are responsible for their own descriptions and exact wordings on the diplomas.	

4. Agreement on list of documents to be standardised for cross-border collaboration (B2)

EC Project or Member State	**Problems of cross-border interoperability**	**Solution Requirements of cross-border interoperability**	**Solution Interoperability Agreements**
EESSI	Every member state can have different forms to handle procedures	Need for standard forms to start EESSI procedure (next to national specific forms)	- Standard EESSI client forms (e.g. P5000 for Pension Claim) - National specific forms
SPOCS	Difficult to understand and translate documents in foreign languages.	Facilitate the exchange of documents in different languages by adding specific information to the documents exchanged, because translation of specific documents could be difficult.	eDocument metadata (European role for the metadata structure)
DG TAXUD	Multitude of messages for communication between Member State administrations	Harmonise data requirements, message structures and information exchange in the Customs procedures (i.e. Transit procedure). Use XML formats and XSD schema definitions for custom documents such as the transit declaration, Single Administrative Document (SAD).	Standardised Transit Documents
Member State Greece	Lack of correspondence with law on internal organisation of municipalities	Need for standardised documents that follow the law on Law on internal organisation of municipalities	Standardised documents
Member State Estonia	A notary has to deal with different memorandums of association and different articles of association in order to register a company.	Need for standard articles of association or forms to register a company. Such standard forms also ease the translations in different languages.	Standard forms for registration or request of information

5. Agreement on establishment of catalogue of datasets available in public administrations (D2)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
Member State Denmark	Lack of coordination on an EU level of Member State initiatives and solutions for cross-border exchanges.	Need for trust and ensure cross-border acceptance of diplomas. Provide a solution at EU level, which could include a central EU registry that provides information on all the Member State registries, such as diploma registries. Possible need for a central EU registry of diploma registries.	Central EU registry of registries (for diploma registries)
Member State Estonia	Lack of information on the commercial registries available from the different Member States, and information on how to connect to the services provided for commercial registries.	Need for accessibility of registries from different Member States within EC context. Provide trusted list of commercial registries from all the Member States on a European level.	EU registry of commercial registries
Member State France	Lack of identified and trusted list of public services provided by Member State public administrations.	Need for the establishment of trusted services lists (or repositories) on EU level in order to provide correct information on services provided.	EU registry of national registries and services

6. Agreement on how to provide access to data in base registries from public administrations (D3)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
Member State Denmark	Lack of data repositories or information sources from Member States that are accessible cross-border.	Need for a diploma registry in order to initiate and check your application, and securely exchange diploma information. This should work against fraud of diploma's and applications from universities in other Member States. Possibility to provide central registries of diplomas in each Member State, and a registry of diploma registries on EU	Diploma registry for Member State institutions

		level.	
Member State Estonia	Lack of structure and clear usage (by citizens, businesses or other public administrations) of information provided by public administrations.	Need for an organisational structure for the access to information from public administrations. Possibility to develop payment plans for the use of certain information, based on the specific purposes or the type of requester. For example, information is free for all Member State public administrations, but is charged for when requested by citizens or businesses.	Organisational agreements on how different stakeholders access and use data from base registries (e.g. payment schemes).
Member State Estonia	Different ways to communicate with the commercial registers in different Member States.	Need for a standardised way to communicate with the commercial registers on a European level, for accessing the different commercial registers in all the Member States.	Standardised XML-structure for inquiries on the commercial registers
Member State Germany	For each country RISER has to deal with national law and data protection rules to access the base registries in their public administrations. The differing national legal regulations make it problematic to combine the national offers in a single trans-European service. The different legal and organisational requirements of each state make it intricate and costly (or sometimes impossible) for potential customers to request such information.	In line with the Lisbon Agenda of the European Union and considering the Services Directory, contribute to decreasing the significance of national diversity in the common EU market. Before RISER users can send requests to a national population register, a framework on technical, legal and organisational issues has to be established. This raises legal questions from population registration and data protection laws, which can differ between Member States (i.e. Denmark and Spain who do not allow foreigners to access their registers; and Greece who have no register at all).	Legal framework on access to population registers
Member State Germany	For three countries (Austria, Hungary and Sweden) customers themselves have to register with the national authorities before they can use RISER as a service. Non-regulated area for	Achieving interoperability is getting difficult when RISER has to make sure that national law, rules and guidelines will be followed when accessing their specific population registries. RISER will enforce specific Member	Standardised procedures for accessing population registers

	accessing population registration data in national administrations, ranging from paper requests/answers to different sets of electronic web services (i.e. all different local administrations in Italy have a different procedure for accessing their population registry).	State legal and organisational aspects against the RISER customer. Harmonised organisational procedures have to be established first before the technical integration can start, for example to access population registers from all the different national or local administrations.	
Member State Germany	Lack of possible connections to population registries from specific countries. No possibility to request information from public administrations.	Need to provide access to base registries with information from public administrations.	Population registry services

7. Agreement on level of provision of electronic public services to users (B8)

EC Project or Member State	**Problems of cross-border interoperability**	**Solution Requirements of cross-border interoperability**	**Solution Interoperability Agreements**
EESSI	Every member state offers different social security services, so the procedures of the social security administrations differ.	Need for an EESSI ambassador, a point of centrality, that every Member State has to bridge to (but not necessarily has to align with)	Default Web Interface for Clerks (WEBIC) (The Access Point Component is the "ambassador". The Access Point institution is the embassy. Webic is a ready-made interaction tool with the Access Point component)
PEPPOL	Difficult to find the right capabilities of a service	Need to find the decentralised location	Service Metadata Publisher (SMP) which provides the information of the specific party or receiving end-point (i.e. service consumer)
SPOCS	Difficult to manage access to and conditions of electronic services (eServices). This information is used for configuring and executing electronic	Need for additional information that refers to non-technical characteristics of eServices. These characteristics are due to the context an eService is operated in, set by the organisational and legal framework and the national e-government strategy.	eService Directory (distributed deployment in each Member State)

	procedures.	A national directory should be provided for the mapping and syndication of information on eServices.	
SPOCS	Each Member State already provides eServices and eDocuments for the national domain, and information about these eServices should be searchable on EU level.	Store information on Member State level about e.g. public services, competent authorities (CA), areas, responsibilities, document types and fees. This information is searchable by the eService Directory in order to inform the Service Provider (SP) about the offers and conditions of the eServices in the public administrations.	Service Catalogue
Member State Latvia	Lack of information on e-services provided.	Need for list of e-services provided, public accessible database with information from institutions about available e-services in latvija.lv in a standardised manner.	e-services catalogue
Member State Spain	Lack of technical interfaces for the secure exchange of information.	Need for protocol standards to be used for the exchange of information between national certification authorities. Possibility to use open and existing standards applicable to network and web service technologies. Need for flexibility because other organisations (i.e. private businesses) can use different protocols.	Web Service technology, OCSP protocol
Member State Greece	Lack of common API to interact with the OTA system	Need for a single API that allows applications to interact with via the OTA system	Common OTA Services API
Member State Denmark	Difficult to connect different applications and systems in a systematic way for cross-border information exchange.	Need for the sharing of specifications for exchanging information between applications. Need to provide the interface definitions for the systems involved in cross-border interoperability.	Interface specifications for cross-border system interoperability

8. Agreements on the standardisation of the application specifications for business services (A2)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
DG TAXUD	Complex proprietary specifications and complex proprietary interfaces	Need for mandatory specifications for Customs Applications at EC level.	Standardised specifications for National Customs Applications
Member State Spain	Development of the applications in the STORK platform require each administration in the different Member States or the participants (such as universities) to develop their own systems.	Need for common specifications in the development of the STORK platform, and providing development of components in a shared software library to the different participants. In terms of national infrastructures, the implementation of the STORK platform in the new Member States will require for a new phase of testing, integration and, most importantly, cross-border testing.	Common Specifications, Shared software libraries

9. Agreement on maintenance processes and lifecycle management of the technical components or services (A3)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
Member State Latvia	Lack of alignment between administrations, and no drivers for the use of common platform.	Need for conformance and compliance with the e-services platform. Institutions need to be motivated to use the platform in order to be interoperable in providing public services. Need for change management procedures and governance of the platform.	Governance organisation
Member State Spain	Lack of control over the services provided to citizens and businesses by public administrations in different Member States.	Need for an organisational structure to govern, assess, audit and maintain the service level agreements for the services provided. Create a circle of trust to ensure liability, in a federated or centralised structure. Define	Governance organisation

		governance processes, including possibly assessing and accrediting other Member States or government infrastructures or services. Define a framework for the (self) assessment of Member States, or development of Memorandum of Understanding.	
Member State France	Lack of structure and organisation in the development of public services, for defining the semantics, legal and technology aspects.	Need for a governance organisation to define and ensure the necessary semantics, technology and legal aspects for exchange of information between public administrations.	Governance organisation for interoperability

10. Agreement on the technical connection aspects for electronic data exchange (T1)

EC Project or Member State	**Problems of cross-border interoperability**	**Solution Requirements of cross-border interoperability**	**Solution Interoperability Agreements**
EESSI	Lack of technical infrastructure to connect different administrations within a Member State and across borders	Need for a star network, with a central hub (hosted in EC data centre) for statistics but not for passing the message through centre. If the "Embassy" is there in the country (i.e. the Action Point), and if it is fostering a single communication standard (one for all, as not to allow specific bilateral forms of electronic communication), further EESSI does not care of how the messages are exchanged.	Access point technical infrastructure
PEPPOL	The eProcurement communities in the different Member States cannot directly communicate to the other communities in the other Member States	Need for standard to communicate between all access points, in order to exchange eProcurement information. Use an envelope structure and web services standards for the exchange of information.	BusDox standard
PEPPOL	Heterogeneous technical infrastructures exist within the Member States, for connecting government	Need for points of contact (being legal organisations) within the different Member States for providing access to the PEPPOL community, as a mandatory technical	Access Point technical infrastructure

	administrations and private businesses.	connection using web services technology. Performs the validation and transformation of eInvoice messages from internal Member State format to the PEPPOL format. Possible to evolve into a Signature and Certificate authority for ensuring trust between parties within PEPPOL community.	
SPOCS	Mapping of different message formats and transport protocols	Within the sender's domain the delivery content is converted into the SPOCS eDelivery protocol. This gateway is required to perform conversions on all layers: technical, semantic and procedural. The eDocument structure should be flexible enough to transport any type of document.	SPOCS eDelivery protocol, eDocument
SPOCS	No electronic access to public services in other Member States, through the use of Points of Single Contact.	Need for electronic access to Point of Single Contact in order to provide information on the eServices necessary for the public service. Provide a technical infrastructure with web services technology and internet.	Web portal solution for access to Point of Single Contact
DG TAXUD	Outdated custom made middleware solution	Scalability to ensure volumes can grow, and cope with the trade growth and globalisation. Need for more integration between national and Commission infrastructures.	Platform for common domain with EC as message broker, including standardised connection interfaces
Member State Latvia	High cost for the maintenance of proprietary networks.	Need to move away from proprietary networks and move to open network infrastructures using modern technologies. Eliminate specific sectoral solutions and change to a common infrastructure and platform.	Internet technology, web services
Member State Spain	Lack of common and secured technical infrastructure to exchange information.	In order to access the services it is necessary to have access to the central Points of Single Contacts or the broker/gateways through a dedicated network system.	Dedicated network (sTESTA - European Commission)

		A dedicated network system will provide additional security and ensures availability. from the information systems of the Organism at issue through the network SARA (AS and Networks for the Administrations), who offers services of Intranet between the Public Administrations. Examples include the SARA network (private Administrative network of Spanish Administrations) for the interconnection of all public administrations in Spain, or the sTESTA network provided by the European Commission to interconnect national administrations.	
Member State Denmark	Lack of common transport infrastructures for the connection between Member State systems and applications.	Need for agreed transport infrastructure, which can include different solutions for connections. Not supporting much the proprietary solutions but it could be relevant in some cases.	Open transport infrastructures
Member State Germany	Lack of a trustworthy interface to request registry information	Provide a uniform and multilingual access to the customers via a secure internet infrastructure based on open standards, ensuring the encryption of data. Also provide the governance of the infrastructure and interface in order to comply with procedures and requirements from Member States or certification authorities.	Secure communication using internet
Member State France	Multiple (and proprietary) connections exist between Member State systems for the exchange of information.	Need for secure connection to ensure the correct exchange of information, for example over the Internet or sTESTA.	Secure data connection

11. Agreement on financial conditions for accessing a cross-border public service (A4)

EC Project or Member	Problems of cross-border	Solution Requirements of cross-border	Solution Interoperability Agreements

State	interoperability	interoperability	
Member State Estonia	Lack of structure and clear usage (by citizens, businesses or other public administrations) of information provided by public administrations.	Need for an organisational structure for the access to information from public administrations. Possibility to develop payment plans for the use of certain information, based on the specific purposes or the type of requester. For example, information is free for all Member State public administrations, but is charged for when requested by citizens or businesses.	Organisational agreements on how different stakeholders access and use data from base registries (e.g. payment schemes).

12. Agreement on certification of third-parties that provide electronic cross-border services (A5)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
Member State Germany	Need for trust relationship between the public administrations and the private company RISER, ensuring the correct handling of data.	Need for independent entity which ensures and certifies the security, trust, liability and privacy of data processed in the services of RISER. Data protection certification provided by European agency in an EU Privacy Seal.	Certification of services provided

13. Agreement on list of foreign documents to be legally accepted in other Member States (i.e. in other languages) (B3)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
SPOCS	The EU service directive states that member states should accept documentation in foreign languages, but sometimes this contradicts with the national legislations (requiring documents written in local language). As a result, the legal recognition of documents in other Member States can be	Trust establishment between Member States. Align the national legal requirements at EU level in the future, in further imposing Member States to accept the Services Directive.	- Legal basis for recognition of documents (from foreign Member States and in foreign languages) - Bilateral agreements to accept the documents in foreign language (as temporary solution for the SPOCS pilots)

	problematic.		

14. Agreement on guidelines to harmonise the legal requirements for interoperability between public administrations (B4)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
epSOS	Some regulations affect the use of technology within Member States and this causes different solutions to be developed. Difference in legal requirements for security by Member States, such as end-to-end encryption, authentication.	Harmonise the different EU legal frameworks, and implementation by Member States, for security measures, standards selection, data formats, information exchange, etc. The legal elements should ensure the secure exchange of information cross-border, and where it is assumed that one Member State cannot look inside other Member States.	Multiple EU Directives, including for example: EU Directive on data protection, EU Directive on Privacy, EU Directive on cross-border interoperability of electronic records, EU Medical Device Directive, Mutual Recognition of Doctors/Pharmacists by Member States
DG TAXUD	Differences in national legislations, languages and specifics have led to a diversified application landscape	Harmonise legal requirements for Customs procedures.	Customs Legal framework
Member State Latvia	Legal requirements are different between Member States.	Harmonisation of legal frameworks. Consider the consequences of legislative acts, for example for the personal data protection legislation could limit the sharing of data. No need for complex legal agreements, and legal agreements should be simple understandable. Avoid having too much bilateral agreements.	Legal agreements
Member State Latvia	Lack of legal regulations, regulatory rules and principles for the exchange of information between administrations. Difficult to make agreements between multiple administrations and often only bilateral agreements exist	Need for clear principles of activities and rules. Legal regulations and policies have to be implemented much faster, possibly before the start of the project. A legal framework should not be too detailed, some common things can be flexible. Agreements on EU level are not preferred, merely directives (i.e. the	Legal framework for interoperability

	(which results in a lot of different agreements).	eSignature Directive is a good example) for which detailed agreements can be made afterwards. Possibility to develop a general Data Interchange Directive to facilitate interoperability on EU level.	
Member State Spain	Lack of legal assurance for the use and exchange of identity information on citizens between different Member States, which results in large uncertainty for solutions to be provided.	Develop legal framework on European level in order to provide the legal assurance or basis for cross-border interoperability, which could be detailed in national legal agreements. @firma requires a signed agreement with a CA before installing the CA in the production environment, in addition to be recognised as a qualified CA by the Supervisory Authority in Spain (Ministry of Industry) according to the eSignature Directive 1999/93/EC. Establishment of trust relationships and recognition of legal entities between Member States.	Legal framework
Member State Spain	Lack of consistency between the legal agreements within different Member States.	Use guidelines and legal frameworks on a European level in order to harmonise the legal agreements on other levels of governments.	Harmonisation of legal agreements
Member State Denmark	Lack of common legislation in Member States that focuses on cross-border information exchange.	Need for cross-border orientation of national legislations and the use of more common legislation. Need to focus more on legal issues because these provide often the solutions for cross-border interoperability. Example on legal guidelines on cloud usage within Danish communalities. Need for legal alignment between school systems, such as the legal EU directives on ECTS credits.	Common EU directives on cross-border interoperability
Member State Estonia	Lack of legal basis for the exchange between public administrations of all known citizen and business	Need for legal framework to allow the information exchange between administrations, in order to reduce the requests of	National legal framework for exchange of known information ('Tell us once')

	information.	'known' information from citizens or businesses. Take the principle of 'Tell us once' which defines that government agencies should exchange all information they received from citizens or business.	
Member State France	Many bilateral agreements between Member States in order to exchange information within specific domains.	Need for European directives and a legal basis on EU level in order to establish the interoperability between Member States. Avoid the creation of multiple bilateral agreements, for example with the Double Taxation Convention between France and UK.	EU legal framework for information exchange

15. Agreement on the establishment of a list of contact points of Member State public administrations (B5)

EC Project or Member State	**Problems of cross-border interoperability**	**Solution Requirements of cross-border interoperability**	**Solution Interoperability Agreements**
PEPPOL	Difficult to find the right publisher.	Need for a central component to find the right publisher	Federated structure of access points, with a central Service Metadata Locator (SML) for service locator (in order to discover the SMP).

16. Agreement on the establishment of catalogue of reference data at European level (D4)

EC Project or Member State	**Problems of cross-border interoperability**	**Solution Requirements of cross-border interoperability**	**Solution Interoperability Agreements**
epSOS	Most Member States define semantics (i.e. XML standards) for Patient or Person, but problem exists for definitions of medicines, physician roles, etc. Main problems are the codes to be used for all cross-border communications, (i.e. lists of medicines per country, physician roles, etc). Problem of mapping	Standardise local semantics at national level, and agree on the set of codes for use in ePrescription. Taking the semantic catalogues from the different Member States and input these codes into the master catalogue. Provide mapping tables from/to this master value catalogue, including the mapping of codes and between different languages. Providing the complete	epSOS Master Value Catalogue (central building block)

	and translation of differences in languages, (i.e. transformation between British English and American English). These problems also exist within Member States, when medical information should be exchanged for example between doctors and hospitals.	semantic catalogue as central element within federated structure.	
Member State Latvia	Lack of common understanding of semantics and codes on a European level.	Need for shared codes and definition of common codes, including the semantics, on European level.	(European) Classifications

17. Agreement on common understanding of Service Level Agreements (SLAs) for electronic cross-border services (A7)

EC Project or Member State	**Problems of cross-border interoperability**	**Solution Requirements of cross-border interoperability**	**Solution Interoperability Agreements**
Member State Latvia	Lack of reliability and liability of the services provided through the eServices platform.	Need for the definition of service levels, including the availability, security, etc. of the services provided through the eServices platform.	Service Level Agreements
Member State Spain	Lack of liability, trust and confidence in the services provided by other public administrations or from other Member States.	Need for services that are available for all Public Organisations in the different Public Administrations whatever their scope: General Administrations of the State, Autonomous Communities or Cities (Regional level) or Local Entities (i.e. municipalities, country councils, etc.). Ensure the liability, availability, performance and confidentiality of the services provided.	Service Level Agreements
Member State Denmark	Lack of defined service levels for public services provided to citizens and businesses.	Need for the maintenance of the SLAs, ensuring the availability, longevity and reliability of the services provided. Provide the SLA as unilateral declaration for	Service Level Agreements (SLA) for services provided

		specific (reusable) services, and publish and declare certain characteristics for the service.	

18. Agreement on common business services (B6)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
EESSI	Every member state can deal with social security in a different way.	Need for common business processes.	- Predefined workflows (e.g. Pension Claim involves sending an Insurance History Report and Summary Note, and receiving the Insurance Periods and Pension Decisions) and defined Message Patterns (e.g. Query SED & Reply SED). - Central Business Model (defines standardised flow definitions and standardised data definitions)
PEPPOL	Different stakeholders have different public eProcurement processes and different processes for the exchange of eInvoices.	Need for common PEPPOL business processes. Define the different processes and use cases that are possible for the exchange of eProcurement information (such as eInvoice) in agreed and standardised Profiles.	Standardised processes in CEN/Business Interoperability Interfaces (BII) or PEPPOL BIS, including Profiles
DG TAXUD	Large set of Customs Offices in Member States has to collaborate with other Member State Customs Offices.	Alignment of processes between Member State administrations for collaboration in customs procedures (i.e. Transit procedure). Customs offices are already harmonised to a high degree at EU level.	Standardisation in Customs Procedures
Member State Latvia	Lack of understanding of processes included in providing public services and large difference between processes in different Member States.	Need for common understanding of processes and procedures to be performed for public services, such as address registration or requesting social benefits.	Common business process models
Member State Spain	Lack of compliance between the processes and procedures in different	Enable foreign students to get access to on line administrative services offered by universities using	Standardised processes

	public administrations and Member States for the exchange of identity information.	their own national electronic credentials (identity cards, digital certificates,...) for authentication and transfer of identity attributes. Need for standardised processes for the validation of certificates and the exchange of identity information.	
Member State Greece	Lack of process documentation to provide public services	Need for business process models to deliver public services	Standardised business process documents
Member State Denmark	Lack of understanding of Member State specific processes applied for a specific public service request.	Need for the standardisation of application processes in Member States, but not necessary on whole EU level. Expose more the best practices in order to provide better solutions. But still have good reasons for each Member State to have own requirements, so no vision on all harmonisation of everything and provide learning and communication on possible solutions.	Standardisation and documentation of processes in Member States
Member State Estonia	Long waiting times to register a new company, up to 5 days using different administrations and notary.	Need for flexible and defined processes which are simplified and optimised based on a process analysis, for example entrepreneurs need a quicker process to register a company.	Standardised business process for company registration
Member State France	Lack of consistent and reusable processes and procedures for the exchange of data between Member States.	Need for defined processes and documents for the exchange of information between public administrations, such as the procedure to request the avoidance of double tax between France and UK.	Defined processes for interoperability

19. Agreement on list of solution components to be reused (A6)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
DG TAXUD	Application development is	Sharing as a solution to use resources more effectively	Shared development of software components (to

	duplicated in multiple Member States for National Customs Applications (30+ different implementations)	(in Do more with less) in the development of components and applications by Member States and Commission. Possibility to create an agency to manage the common domain, including the technical infrastructure, sharing of resources, providing specifications, etc.	ease the local development of software applications)
DG TAXUD	Little reuse of custom office applications across Member States, although these applications are largely the same for all Member States.	Member States will continue to develop their own systems as not everything is covered in the specifications, but it will be possible to provide certain components or services for Member States to reuse. The complete development and deployment of customs systems have not been proven successful.	Provide reusable components and services for National Customs Applications
Member State Latvia	Different administrations develop the same components for their systems and provide their own e-services.	Need for shared components and tools for state and municipal e-services development. Coordination of development of eGovernment services.	Shared components
Member State Greece	Lack of specific enterprise components	Need for enterprise service systems and components	- Identity Management System - Enterprise Content Management System - Business Process Management System
Member State Estonia	Lack of choosing and developing standard components for the building of solutions in different public administrations.	Need for standard components which could be reused or shared by multiple public administrations.	Reusable software components
Member State France	Each Member State has to develop their own components for the exchange of information between public administrations, based on the same specifications.	Need for shared development of components, in order to reduce the development of interfaces for interoperability in each Member State.	Shared interface components

20. Agreement on guidelines for the creation of interoperability agreements (G1)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
Member State Latvia	The development of a legal framework or agreements takes too much time and delays the development of solutions for interoperability.	Need for guidelines, methods and structures to develop a legal framework or agreements for interoperability problems, in order to avoid discussions on responsibilities, solutions, concepts, ownership of data, etc.	Guidelines to create legal basis
Member State Spain	Lack of consistency between the legal agreements within different Member States.	Use guidelines and legal frameworks on a European level in order to harmonise the legal agreements on other levels of governments.	Harmonisation of legal agreements

21. Agreement on security requirements for the exchange of information across-border (T2)

EC Project or Member State	Problems of cross-border interoperability	Solution Requirements of cross-border interoperability	Solution Interoperability Agreements
epSOS	Ensuring trust for the exchange of information, and ensuring the protection of personal data, privacy (including authentication) and confidentiality.	A set of common services are to be set up supporting and securing the cross-border communication of ePrescription. Ensure secure signing of ePrescriptions by NCP signatures (which are not end-to-end), but in the future should be done by the end-points (such as health professionals). Need for identification, authentication and authorisation of health care professionals (i.e. physicians) and patients for ePrescription systems.	Security is encapsulated by each NCP in set of services, such as Common Security Service, Common ID Service, Common Semantic Service, Common interface for interconnection. Patient identification system as part of epSOS solution. But physicians are identified within Member State systems.
PEPPOL	The European procurement directive obliges any public purchaser in the EU to effectively recognise, receive and process tenders submitted, if required, with a qualified signature and their accompanying certificates, regardless	Receiver must check eSignature, and trust sender's certification authority. eSignature is removed from current solution because of the barrier for acceptance, and because there should be no difference between paper and electronic invoices. Provide a solution for	eSignature Verification Service and Certification

	of their origin within the EU or their technical characteristics.	eSignature to be included in the future.	
SPOCS	Problem of trust (authorisation and authentication) between the different actors in providing information across borders.	Trust establishment between the actors, such as Competent Authorities, Point of Single Contact, etc.	eSafe and eDelivery legal framework + the SPOCS TSL (Trusted Service List)
Member State Latvia	Lack of secure access to e-services provided to citizens or business by government administrations.	Need for authentication of users to the e-services provided. Provide eSigning and authentication functionality in a secure context. Possibility to use different authentication service providers to realise customer authentication. Possibility to use qualified eSigning service provider to realise eSigning mechanisms.	Authentication services
Member State Latvia	Lack of standardisation of technical solutions in providing services.	Need for the use of defined standards for web services, such as web service security.	WS* Security standards
Member State Spain	Lack of consistency in the use of secure solutions and technologies.	Need for the definition of security requirements for the exchange of information between public administrations. Possibility to define the security requirements in legal agreements, SLAs or Directives.	Security requirements
Member State Denmark	Lack of trust for the exchange of official documents or diplomas cross border.	Need for a secure and trusted exchange of documents, such as diplomas between universities or Member State administrations.	Secure document exchange
Member State Estonia	Lack of trust in e-signatures from foreign member states and creates a difficulty to validate foreign e-signatures.	Need for cross-border digital signatures. Need for harmonisation of the format of these cross-border signatures.	Cross-border digital signatures
Member State	The disclosure of personal data from	Need for common legal agreement on privacy and	Harmonisation of privacy and data protection

Germany	public population registers is dependent on strict privacy protection requirements, and RISER only provides and handles information from such official data sources.	data protection, such as the European Data Protection Directive which enables RISER to handle personal data on behalf of a third party. Involvement of the Independent Centre for Privacy Protection ensures that RISER conforms to all national and European legal requirements regarding civil registration and data protection law. Need for minimum legal standard on EU level for access to national administration data.	requirements (European Data Protection Directive)

22. Agreement on how to represent and model architectures (semantics, syntax, standards) for cross-border information exchange (G2)

EC Project or Member State	**Problems of cross-border interoperability**	**Solution Requirements of cross-border interoperability**	**Solution Interoperability Agreements**
Member State Greece	Confusion about the way to produce different levels of process models	Need to describe the procedure to create three levels of business process models	Procedure to do business process modelling

23. Agreement on the establishment of contact points to govern the technical access (B7)

EC Project or Member State	**Problems of cross-border interoperability**	**Solution Requirements of cross-border interoperability**	**Solution Interoperability Agreements**
EESSI	Lack of adequate governance of the access point technical infrastructure	Need for an organisation to govern and to manage the technical infrastructure of the Access Point	Access point hosting institution (up to five access points could be hosted by such a hosting institution). There is one-to-one relationship between Access Point Institution and Access Point component (hence up to five Access Points means five Access Point institutions, each with its own Access Point component)
epSOS	Missing legal basis for the establishment of National Contact Points for the cross-border communication within Health domain.	Require a legal basis for the establishment of National Contact Points and establishment of trust relationships between NCPs in order to connect to the	Legal base for National Contact Point

		epSOS community.	
epSOS	Major differences between Member States in internal organisation and internal workflows. Different solutions based on assumed workflows for ePrescriptions (e.g. how to dispense an ePrescription). Difficulty for Member States to align the workflows which run cross-border. Differences of Member States in terms of practices for ePrescription.	Use a contact point to coordinate organisational aspects in a Member State, mostly single gateway and broker for all aspects of cross-border communication. Responsibility for translation of European into National legislation, semantics and technical aspects in order to manage complexity for cross-border interoperability. Central contact point operated by government agency (and not EC as central point), requirement for data exchange in Health sector where Member States as responsible and with a decentralised organisational structure. Reduce the time to connect a Member State to the epSOS network by providing an easy step-by-step guide and specifications.	National Contact Point, including a step-by-step connection guide and interface specifications for an NCP in a box.
epSOS	Major differences between technical infrastructures in Member States, and problem to ensure the different aspects of the communication between Member States. Difficult to integrate the large set of heterogeneous Health care systems.	Use technical infrastructure of the National Contact Point to coordinate the communication connection between health care systems in Member States. Use the NCP mainly as single gateway for integrating the heterogeneous IT systems by means of open, international standards (in compliance with relevant national and international standards and regulations).	National Contact Point provides technical infrastructure for connection between health care professionals and other NCPs. Standardisation of interfaces for cross-border interoperability between NCPs.
PEPPOL	Lack of trusted relationships and control of eInvoice or eProcurement communities in EU.	Develop legal agreement in order to build a trust relationship and enable the exchange of eInvoices between different parties in the EU, through the registration of Access Points and the connection of end-points (i.e. service providers) in a certain Member State to these Access Points.	Signed agreements with PEPPOL Core Community for establishment of Access Point

PEPPOL	Lack of an organisation to ensure the trust and security for the cross-border exchange of eInvoices	Define access points to the PEPPOL core community for the exchange of eInvoices. Possible to provide an access point to cover multiple Member States or even multiple access points within one Member State (i.e. Austria has 1 access point directly connected to the Ministry of Finance). Access point can be provided by government administrations or private service providers, but should be a legal organisation (i.e. government or private business).	Organisation in Member States to govern Access Point
SPOCS	Difficult to handle content syndication within Member States and cross-border exchange of information	Propose a solution for the second generation of PoSCs, which is enhancing interoperability features, facilitating the exchange of information and data in cross border scenarios in accordance to the European Services Directive. Multiple PoSC could be established for a certain Member State and on different levels of government (i.e. Austria has 1 national PoSC, Italy has PoSCs for each major city).	Point of Single Contact (one member state can have several of such PoSC)
Member State Latvia	Multiple institutions and administrations need to be contacted to request specific public services. Most services are still requested and provided in a physical manner.	Need for agency to facilitate the interoperability between administrations, on semantic, technical and maybe legal issues, and act as a point of single access for citizens and businesses. Need for Point of Single Access for citizens and businesses.	Point of Single Access, Latvija.lv e-Services portal
Member State Spain	Lack of accessibility of eGovernment services or data by citizens or applications of other Member States.	The recent law on eGOV billed in 2007 (Ley 11/2007) for the Electronic Access to Public Services by the citizens, establishes the obligation of the Ministry of Territorial Policy and Public Administration to put at disposal of all eGOV services in the country a set of common infrastructures and services, such as a	Points of Single Contact

		Central Validation Authority, as part of the national strategy for eGOV to make available to citizens all Public Services over the internet by the end of 2009, at least in the domain of the central government. Need for Point of Single Contact as derived from the Services Directive.	
Member State Greece	Lack of single point of contact to service the citizen	Need for single point of contact to offer the public services to citizen	OTA Service Portal
Member State Denmark	Lack of central point for accessing public services provided to citizens and businesses.	Need for collecting student applications in a single way (Single point of application) which is easily accessible, including eID verifications.	Portal for request public service (i.e. student admissions)
Member State Estonia	Lack of a framework or common infrastructure for the exchange of information between public administrations.	Need for a defined framework or common infrastructure for the connection between public administrations, such as the X-Road infrastructure in Estonia. Provide the method and information in order to connect to this common infrastructure. Need for a common infrastructure that connects the already existing common infrastructures in Member States.	Common infrastructure to connect the central Member State infrastructures
Member State Germany	Lack of single authorities providing the information on population registries.	Need for defined public administrations to access information from population registries. This authority provides the information based on defined processes taking into account legal requirements.	Points of Single Contact
Member State France	Difficult to find the correct administrations in other Member States to connect to or request information from.	Need to define the access points ('gares') for connecting to other Member State public administrations, but whilst attaining the necessary flexibility for the implementation of the back office by Member States.	National access points

ANNEX 7: LARGE VERSION - HIGH-LEVEL OVERVIEW OF APPROACHES

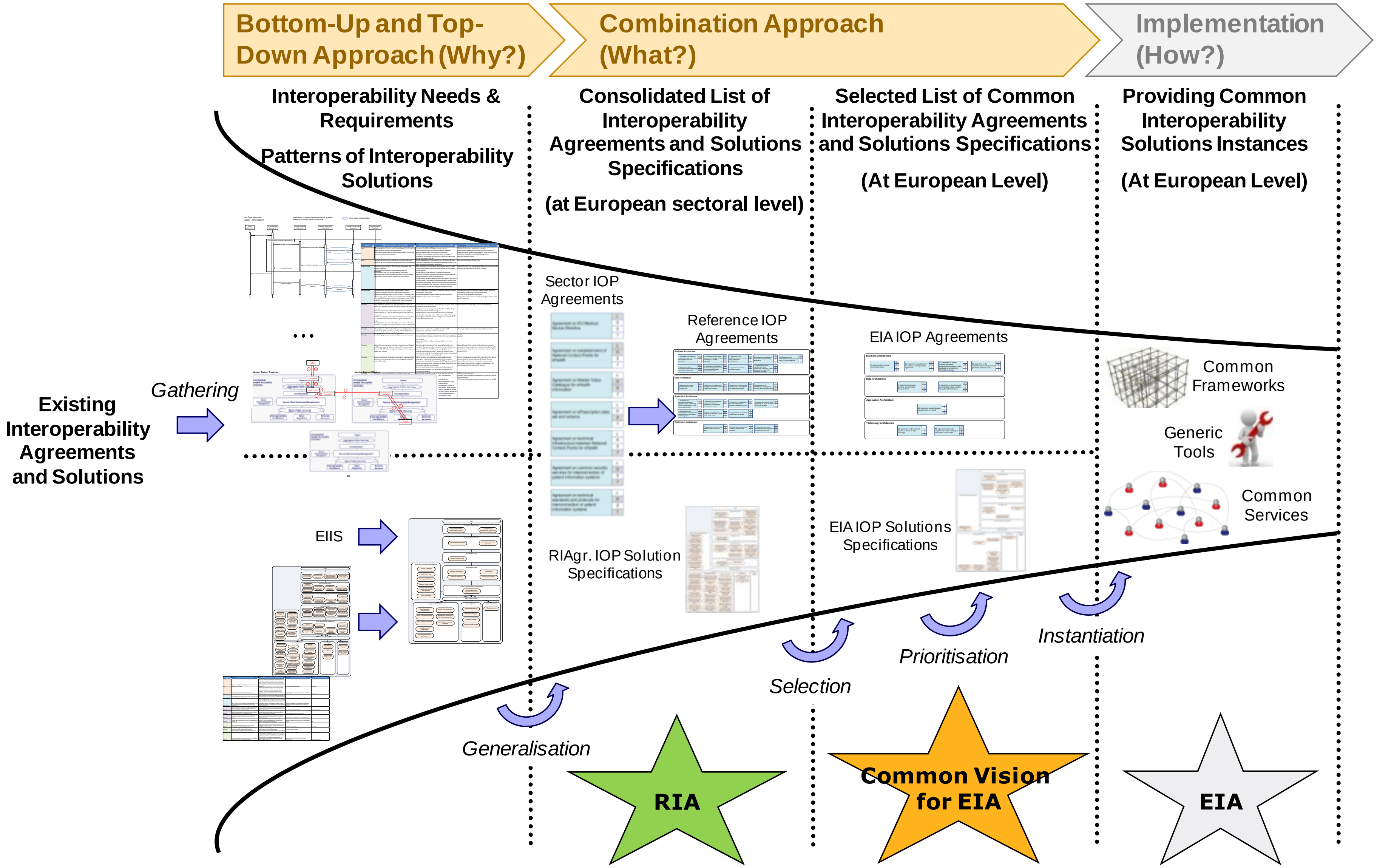
Bottom-Up and Top-Down Approach (Why?)
Combination Approach (What?)
Implementation (How?)
Interoperability Needs & Requirements
Patterns of Interoperability Solutions
Consolidated List of Interoperability Agreements and Solutions Specifications
(at European sectoral level)
Selected List of Common Interoperability Agreements and Solutions Specifications
(At European Level)
Providing Common Interoperability Solutions Instances
(At European Level)
Existing Interoperability Agreements and Solutions
Gathering
...
EIIS
Sector IOP Agreements
Reference IOP Agreements
RIAgr. IOP Solution Specifications
EIA IOP Agreements
EIA IOP Solutions Specifications
Common Frameworks
Generic Tools
Common Services
Generalisation
Selection
Prioritisation
Instantiation
RIA
Common Vision for EIA
EIA

Figure 31 - High-Level Overview of Approaches

ANNEX 8: DETAILS OF CHECKING THE ADDED VALUE OF RIA AND COMMON VISION FOR EIA

The EIA study intends to support a project officer at the European level by providing a set of reusable interoperability agreements that are needed to set up a new project. The RIA provides a first set of reusable agreements on national and sectoral level, which might be relevant to this new project. In contrast, the common vision for the EIA defines the set of agreements that represent shared values between projects at the European level, and should be applicable to all European projects.

In this annex, the added value for providing the RIA and the common vision for EIA is investigated by means of two specific cases. The first selected case relates to DG TAXUD, as they constructed a centrally-organised infrastructure across borders (CCN/CSI), and the second case deals with epSOS, as they are a representative example of a federally-organised approach.

Our approach to check the added value is based on the following reasoning. At this point in time, both DG TAXUD CCN2 project and epSOS project have interoperability solutions in place, for which implicit or explicit interoperability agreements exist. When these projects would have to be redone from scratch, which interoperability agreements (proposed by the RIA and the common vision for the EIA) could be reused to kick-start these projects? The expectation is that most agreements of the RIA could be reused (but not all, as the RIA should not be complete for all European projects), and that all agreements of the common vision for the EIA should be reused (indicating the completeness of the common vision for the EIA).

To answer this question, Table 15 lists the current solutions that were found in the context of DG TAXUD CCN2 project and epSOS project. Note that this table contains samples from both projects, extracted by Deloitte based on publically available information. Therefore, this view might not contain all elements at this point in time.

Table 15 - DG TAXUD CCN2 Project and epSOS ProjectSolutions per Interoperability Agreement

Reference Interoperability Agreement (RIA)	Common Vision for EIA?	Solutions Covered for DG TAXUD CCN2 Project	Solutions Covered for epSOS Project
1. Agreement on common semantic schemas at the European level (D1)	X	- WCO data schema and its implementation by DG TAXUD - Data Integration Harmonisation group for Customs (DIH) - Transit Declaration Sheet – DG TAXUD data model for	- Patient Summary data set and schema - Prescription/Dispensation data set and schema - Patient Identification data set (identifiers and demographics)

		declaration sheet	
2. Agreement on guidelines to establish European communities for operators, users and practitioners (B1)	X	- CCN/CSI integration - Terms of collaboration document. - Joint working committees govern together with sub-committees and working groups, e.g. dedicated to IT issues; working groups with Non-EU National Administrations	Manage NCP trusted service lists and trusted signature list as trust anchors for the epSOS community Cross-border trust brokerage through SAML (HCP Identity assertions and Treatment Relationship Confirmation assertions)
3. Agreement on a documentation language (grammar, syntax, vocabulary) for the documentation of cross-border public services (A1)		- Message definitions that are part of the SPM&Req and related document for Trans-European system - DDNTA – Design Document for National Transit Applications	- epSOS Master Translation/Transcoding Catalogue
4. Agreement on list of documents to be standardised for cross-border collaboration (B2)		- Standardised Transit Documents	- Clinical Document Architecture - Continuity of Care Document
5. Agreement on establishment of catalogue of datasets available in public administrations (D2)		- CS/RD for all reference data, TARIC for customs tariffs both published via DDS on Europe, SMS for specimens, ECICS	- HL7 Common Terminology Services - Emergency Data Set - Reference Information Model
6. Agreement on how to provide access to data in base registries from public administrations (D3)	X	CCN/CSI middleware connects to base registries in different Member States	- epSOS Services Functional Specification (e.g. Identification Service, Patient Service, Order Service, Dispensation Service, etc.) - epSOS Service Implementation
7. Agreement on level of provision of electronic public services to users (B8)	X	Organisational implementation in Terms of Collaboration between DG TAXUD and Member States	- Semantic Services Definition - Semantic Document Workflow (for document consumer)
8. Agreements on the standardisation of the application specifications for business services	X	- Standardised specifications for National Customs Applications, including TEMPO as a framework and related	Standardisation of interfaces for cross-border interoperability between National Contact Points

(A2)		documents. Examples include: - DDNTA – Design Document for National Transit Applications (for NCTS) exist an Annex (namely Q2) that refers to the Technical Message Structure) - DDNXA – Design Document for National Export Applications (for ECS) exist an Annex (namely Q2) that refers to the Technical Message Structure) - DDNIA – Design Document for National Import Applications (for ICS) exist an Annex (namely Q2) that refers to the Technical Message Structure) - SPM & Req	
9. Agreement on maintenance processes and lifecycle management of the technical components or services (A3)		- Terms of Collaboration document, that clarifies to whom responsibility for the implementation of each part of the trans-European system is allocated	- CCD team for development and support - Service contracts to Maintain the technical set up
10. Agreement on the technical connection aspects for electronic data exchange (T1)	X	- CSI as protocol - Message type specification and transport of messages in CCN/CSI are defined in the DDCOM (Design Document for Common Operations and Methods). Deviations for the ICS, ECS and NCTS, are pointed out in the DDNIA, DDNXA and DDNTA respectively. - CCN/CSI as platform for common domain with EC as message broker, including standardised connection interfaces	- National Contact Point provides technical infrastructure for connection between health care professionals and other NCPs - XML as technical standard, - WSDL and SOAP standards for web services, - IPSec VPN and TLS for secure connections - A step-by-step connection guide and interface specifications for a National Contact Point in a box.
11. Agreement on financial conditions for accessing a	X	Following the related legalisation DG TAXUD is not allowed to charge for its	At political level a separate project is responsible for establishing the financial

cross-border public service (A4)		services	conditions (EHTI)
12. Agreement on certification of third-parties that provide electronic cross-border services (A5)			
13. Agreement on list of foreign documents to be legally accepted in other Member States (i.e. in other languages) (B3)	X	- SMS – specimens (certificates, stamps, signatures, forms) - Authorized Economic Operators (AEO) certificates	- electronic prescriptions / electronic dispensation - Patient Summary
14. Agreement on guidelines to harmonise the legal requirements for interoperability between public administrations (B4)		- Customs Legal framework	- epSOS Security Policy - epSOS Framework Agreement - epSOS Baseline Security Profile
15. Agreement on the establishment of a list of contact points of Member State public administrations (B5)		- CCN Local Administrator - Terms of Collaboration document	- Trusted Service Lists as catalogues of epSOS Service Interfaces and responsible administrative parties
16. Agreement on the establishment of catalogue of reference data at European level (D4)		- Standards in data models and code lists for common domain - CS/RD for all reference data - TARIC for customs tariffs both published via DDS on Europe - SMS for specimens - EOS - ECICS	- epSOS Central Reference Terminology Server using CareCom HealthTerm - epSOS Master Value sets Catalogue - Controlled Medical Vocabulary
17. Agreement on common understanding of Service Level Agreements (SLAs) for electronic cross-	X	- ITIL practices adopted and adapted in TEMPO for all Common Domain components - Service Level Agreements put in place in National	- National Pilot Set Up and Deployment Guide - epSOS Service Level Agreements (SLA) for Systems

border services (A7)		Domain	and service desk
18. Agreement on common business services (B6)	X	- Standardisation in Customs Procedures, major part of Customs business processes (MCC) is standardized using BPMN notation	- epSOS Services Functional Specification - epSOS Core Processes
19. Agreement on list of solution components to be reused (A6)	X	- Provide reusable components and services for National Customs Applications - All CSI stack - MCC (Minimal Common Core) in past - SSTA (testing application)	- epSOS standards-based common services specification - Provision of components as open source for epSOS - Open software components of National Contact Points
20. Agreement on guidelines for the creation of interoperability agreements (G1)	X	- DG TAXUD seeks agreement on the terms of the collaboration, formalised in a written Terms of Collaboration (TOC)	- Forming local variations of the Framework Agreement (part of National Pilot Set Up and Deployment Guide)
21. Agreement on security requirements for the exchange of information across-border (T2)	X	- CCN security policy agreement - Security Management Committee - Security Reference Manuals	- Security is encapsulated by each national contact point in set of services, such as Common Security Service, Common ID Service, Common Semantic Service, Common interface for interconnection - Technical XML standards ensuring trust and security (SAML, WS Trust, WSS) - epSOS security policy
22. Agreement on how to represent and model architectures (semantics, syntax, standards) for cross-border information exchange (G2)	X	- TIP	- Pivot Documents Specifications (Style Sheets, Header Information, Body Specifications) - Conformance of CDA documents
23. Agreement on the establishment of contact points to govern the technical access (B7)	X	- CCN Local administrators	- Central contact point operated by government agency - Legal base for National Contact Point - Roles needed at a National

			Contact Point

Based on Table 15, occurrence graphs were made for DG TAXUD CCN2 project and epSOS project, in which value 1 was given when existing solutions were found for the corresponding interoperability agreement, and value 0 when no existing solutions were found. In Figure 32, the occurrences of solutions related to the RIA are visualised, while Figure 33 shows the occurrences of solutions related to the common vision for EIA.

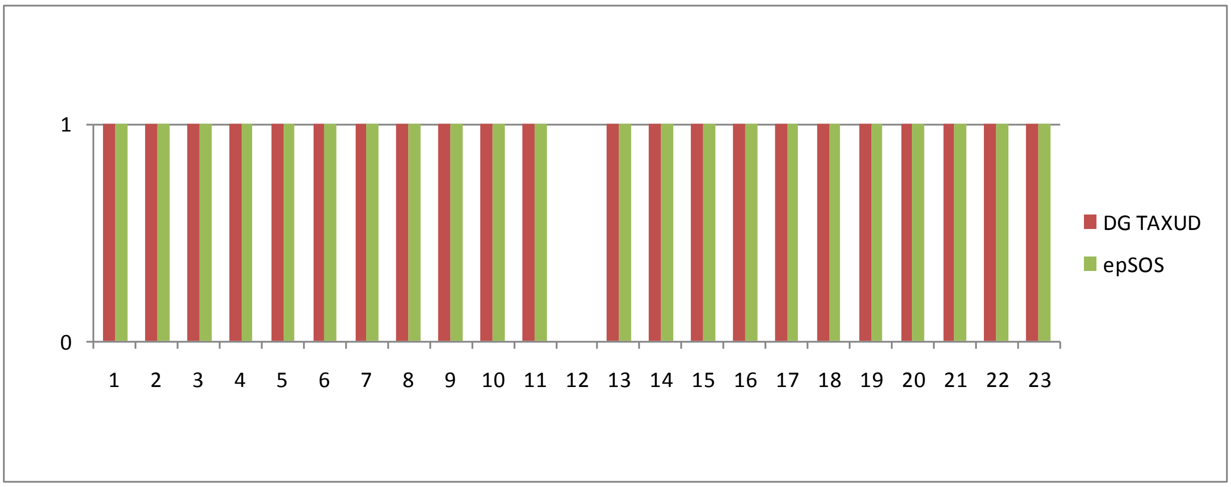

Figure 32 - Occurrences of Solutions Related to the RIA

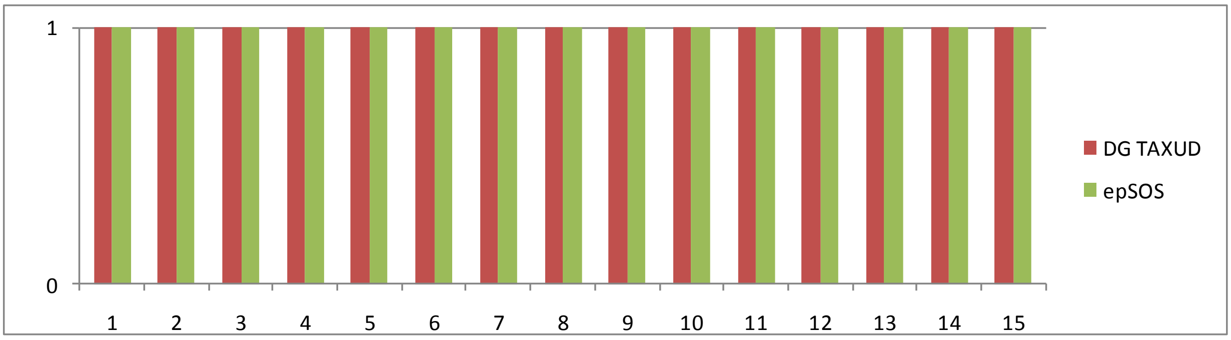

Figure 33 - Occurrences of Solutions Related to the Common Vision for EIA

Looking at Figure 32, both DG TAXUD CCN2 project and epSOS project have twenty-two solution occurrences (covering of twenty-three agreements), leading to an overall coverage of the RIA of 95% for DG TAXUD CCN2 project and epSOS project. Investigating Figure 33, both DG TAXUD CCN2 project and epSOS project have fifteen solution occurrences (covering fifteen agreements), leading to an overall coverage of the common vision for the EIA of 100%. As a result, no major gaps are expected to implement the common vision of an EIA in the context of DG TAXUD CCN2 project and epSOS project, illustrating the possibility for project officers to kick-start future EC project using the common vision for an EIA.