An introduction to the European Interoperability Reference Architecture (EIRA©) v3.0.0

EIRA

EUROPEAN
INTEROPERABILITY
REFERENCE
ARCHITECTURE

Change Control

Modification	Details
Version 3.0.0	
ABBs definition update	All the ABBs definitions have been reviewed and a section referring to the interoperability saliency have been introduced, in order to highlight the ABB's interoperability relevance for EU integrated public services. EIF is the framework against which interoperability saliency has been assessed, per each ABB.
EIRA viewpoints introduction and update	New viewpoints have been added in order to align the model to the New European Interoperability Framework. Existing viewpoints have been reviewed.
Examples	ABB examples have been reviewed. In particular, obsolete examples have been replaced with up-to-date ones.
Version 2.1.0	
Introduction of a new viewpoint: Conceptual Model for Integrated Service Provisioning	A new viewpoint has been added to match the "Conceptual Model for Integrated Service Provisioning" as it is provided in the New European Interoperability Framework.
Examples	Architecture Building Blocks have received examples to guide the user in the type of implementation that can be imagined for these building blocks.
Synonyms	Added synonyms to selected Architecture Building Blocks
Version 2.0.0	
ArchiMate® 3 upgrade	EIRA© v1.2.2 was aligned with ArchiMate® 2.1, EIRA© v2.0.0 is aligned with ArchiMate® 3.0

Modification	Details
Alignment with the new version of the EIF (the New European Interoperability Framework)	Introduction of new viewpoints to align with the cross-cutting concerns that are introduced in the new version of the "European Interoperability Framework (EIF): "Interoperability Governance viewpoint" "Integrated Public Service Governance" "Security and Privacy viewpoint" Introduction of a new view: "EIF Underlying Principles" Introduction of new Architecture Building Blocks (ABBs), specialising "Organisational Interoperability Enablers" on the "Organisational View": "Security Policy" "Security Framework" (as specialisation of "Security Policy") Introduction of new Architecture Building Blocks (ABBs), specialising "Data" on the "Semantic View": - Open Data - Base Registry (as specialisation of "Master Data")
Better use of in Interoperability Specifications	- Each view has a grouping to which Interoperability Specifications have been attached, indicating that any Architecture Building Block can be associated with any Interoperability Specification. - The "Data standards" ABB on the "Semantics view" has been removed as parent ABB, the implementing ABBs have been recognised as ABBs specialising the Semantic Interoperability Specifications ABB. - The "Interoperability Specification Underpinning view" has become a viewpoint with some adaptations to support these changes. - The "Technical Interoperability Specification" is no longer attached to the "Service Registry Component" in the "Technical view – infrastructure", but associated to the entire "Digital Service Infrastructure", via its more generic parent class "Interoperability Specification".
Simplification of the Legal View	Simplification of the "Public Policy Cycle", the internals have been removed in order remove the process restrictions that were implicitly present. The "Public Policy Development Enabler" has been removed.
Descriptions of all the ABBs have been revised.	References have been verified and updated where possible
Minor changes	Change of the ArchiMate® icon of representation.

Modification	Details
	• The High-level overview has become a viewpoint.
	• The "Hosting and Networking Infrastructure" has been implemented as grouping for the different attached services.
	• Introduction of a "Service Discovery Component" on the "Technical view – application".
Version 1.1.0	
Readability improvements	Improvement of the readability in the Overview document by introducing minor phrasing changes throughout all sections in the document.
Improvement of EIRA© background section 2.1	Refined the text of the requirements of interoperability coordination across borders and sectors.
Improvement of EIRA©'s expected benefits section 2.4	Stronger link to the advantages of Enterprise Architecture principles and further elaboration of the EIRA©'s specific benefits. Highlighted how the development of more interoperable eGovernment solutions requires consideration of interoperability on multiple levels and the transition to digital service delivery (Section 2.4.1). Provided more information on how cost-savings on portfolios can be made due to better assessment of solution portfolios by highlighting the importance of Interoperability Specifications (Section 2.4.2) Provided more information on how cost-savings can be increased through the reusability assessment of solutions (Section 2.4.3).
Additional section (Section 2.6) on the application of the EIRA©.	
Additional section (3.3.2) introducing the Cartography Tool.	
Improvement of the Key Concepts of the EIRA© (Section 3.1)	Provided more information to define what a reference architecture is in the context of the EIRA© with a link to Enterprise Architecture.
Updated EIRA© meta model	EIRA© meta model updated in Key Concepts in EIRA© (Section 3.1)
Version 1.0.0	
Initial version	

Disclaimer:

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1 INTRODUCTION

With the growing amount of information exchanges between public services (across borders and sectors), the need for interoperability in Europe is higher than ever. Interoperability can be defined in many ways. The simplest way could be: "The ability to exchange information". To address interoperability issues at national, regional or local level, many public administrations already have, or are in the process of developing, interoperability frameworks. The scope of these frameworks is restricted to the jurisdictions within which they have been developed. However, European public administrations must be ready to work together to deliver cross-border public services to meet the needs of businesses and citizens. The ISA² Action 2.1 (EIA) introduced the European Interoperability Reference Architecture (EIRA) to guide public administrations in their work to provide interoperable European public services to businesses and citizens.

This document provides an introduction to the European Interoperability Reference Architecture (EIRA©), which has been developed in the context of Action 2016.32 of the Interoperability Solutions for European Public Administrations (ISA²) Programme. The EIRA© is a reference architecture focused on the interoperability of digital public services. It is composed of the most salient Architecture Building Blocks (ABBs) needed to promote cross-border and cross-sector interactions between public administrations. The latest release of the EIRA© is available on Joinup[1].

1.1 Purpose of this document

This document introduces the reader to the benefits of EIRA© and to the basic concepts needed to understand it. It is not the purpose of this document to provide guidelines on how to use EIRA©.

1.2 Structure of this document

This document consists of the following sections:

- **Chapter 1** (this section) elaborates on the purpose and structure of this document;

- **Chapter 2** provides an overview of the EIRA©. It includes background information and elaborates on its objectives, target users and use cases, expected benefits, user community and continuous improvement;

- **Chapter 3** provides further insight in a number of key concepts related to the EIRA©. It also provides insight on how to use EIRA© in combination with the ArchiMate® (1) notation and Archi®; and

- **Chapter 4** provides an overview of the EIRA© views, viewpoints and its Architecture Building Blocks.

- **Chapter 5** contains a glossary;

- **Chapter 6** contains references;

- **Chapter 7** provides the acknowledgement; and

- **Appendix 8** contains the EIRA© views, viewpoints and the definitions of the EIRA© ABBs.

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[1] https://joinup.ec.europa.eu/solution/eira

2 OVERVIEW OF THE EIRA©

This section gives an overview of the European Interoperability Reference Architecture (EIRA©).

2.1 Background

The **Digital Single Market** (DSM) strategy[2], meant to ensure the free movement of goods, persons, services and capital is built on three pillars: (1) improved access for consumers and businesses to digital goods and services across Europe; (2) creating the right conditions and a level playing field for digital networks and innovative services to flourish; (3) maximising the growth potential of the digital economy.

Interoperability is doubtlessly one of the means to achieve this[3], improving the cooperation between public administrations and removing barriers for administrations, businesses, and citizens.

Given the rapidly growing amount of information exchanges, driven by modernisation of public administrations, the **need for interoperability** in Europe is higher than ever. Solution developers in all domains of the public sector recognise interoperability and reusability as being essential to a solution design.

The New European Interoperability Framework (EIF) (2) defines interoperability as follows:

"The ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business processes they support, by means of the exchange of data between their ICT systems".

Attaining interoperability calls for coordination across borders and sectors when developing digital solutions. Key players in this process experience the following requirements:

- o **A *common terminology* to design, assess, and communicate about eGovernment solutions**: Public administrations can benefit largely from a common terminology to communicate efficiently and unambiguously – across language barriers and domain-specific jargon – when designing, assessing, documenting and discovering Solution Building Blocks (frameworks, tools, services) used to deliver interoperable digital public services;

- o **Stable and standardised interfaces for digital public services:** IT architects and developers are tasked with defining stable interfaces between digital public services, according to open standards and interoperability specifications, so that partners can rely on them to build new, aggregated digital public services and avoid vendor lock-in;

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[2] http://ec.europa.eu/priorities/digital-single-market_en

[3] The DSM roadmap features in 2017 under the third pillar a Priority ICT standards plan as key to competitiveness.

- ○ **An *overview of already existing Solution Building Blocks (SBBs)***: Decision makers, public procurers and architects in public administrations gain value from being able to find already existing (reusable) Solution Building Blocks that have been developed in-house or by others, to unlock the potential of shared development effort and to be able to find best-in-class reusable components and services.

2.2 Characteristics and Tools

The ISA² Programme is providing concrete interoperability solutions that contribute to making the modernisation of public administrations a success story. It, among others, developed the **European Interoperability Reference Architecture (EIRA©)** (3) to guide public administrations in their work to provide interoperable European public services to other public administrations, businesses and citizens.

The EIRA© is a four-view reference architecture for delivering interoperable digital public services across borders and sectors. It defines the required capabilities for promoting interoperability as a set of Architecture Building Blocks (ABBs). The EIRA© has four main characteristics:

1. **Common terminology to achieve coordination:** It provides a common understanding of the most salient Architecture Building Blocks needed to build interoperable public services.

2. **Reference architecture for delivering digital public services:** It offers a framework to categorise (re)usable Solution Building Blocks (SBBs) of an eGovernment solution. It allows portfolio managers to rationalise, manage and document their portfolio of solutions.

3. **Technology- and product-neutral and a service-oriented architecture (SOA) style**: The EIRA© adopts a service-oriented architecture style and promotes ArchiMate® as a modelling notation. In fact, the EIRA© ABBs can be seen as an extension of the model concepts in ArchiMate®, as explained in Section 3.1.

4. **Alignment with EIF and TOGAF:** The EIRA© is aligned with the New European Interoperability Framework (EIF) (2) and complies with the context given in the European Interoperability Framework – Implementation Strategy (EIF-IS) (4). The views of the EIRA© correspond to the interoperability levels in the EIF: legal, organisational, semantic and technical interoperability which are already anchored in the National Interoperability Frameworks (NIFs) of the Member States. The EIRA© provides an additional view that lists the principles that are outlined in the new EIF. Within TOGAF® and the Enterprise Architecture Continuum, EIRA© focuses on the architecture continuum. It re-uses terminology and paradigms from TOGAF® such as architecture patterns, building blocks and views. This not only assures a high level of quality but also allows architects to easily understand EIRA© and relate it to existing work.

To support both architects and portfolio managers in their use of the reference architecture, a set of tools are provided (see section 3.3):

- o an ArchiMate® file that can be used with common Architecture software

- o the "Cartography tool" in the form of an open-source plugin to the Archi®[4] modelling tool, which allows documenting Solution Building Blocks according to the EIRA© (by means of stereotyping and adding attributes) and discovering reusable solutions from a documented cartography, such as the TES (Trans-European Solutions) in case of the European Commission, or a national cartography for Member States.

2.3 Target users and use cases

The EIRA© has the objective to respond to the above needs by supporting users in the following scenarios:

1. **Designing:** accelerate the design of eGovernment solutions that support the delivery of interoperable digital public services (across borders and sectors);

2. **Assessing:** provide a reference model for comparing existing architectures in different policy domains and thematic areas, to identify focal points for convergence and reuse;

3. **Communicating and sharing:** help documenting the most salient interoperability elements of complex solutions and facilitate the sharing of (re)usable solutions.

4. **Discovering and reusing:** ease the discovery and reuse of interoperability solutions.

More specifically, the reference architecture targets the following users within public administrations of Member States or EU institutions:

- **Architects,** Enterprise Architects as well as Solution Architects, that are responsible for the design of solution architectures;

- **Business analysts** responsible for assessing and to study the impact of changes in the (external) environment on IT systems;

- **Portfolio managers** responsible for maintaining the catalogue of assets related to the design and implementation of eGovernment solutions and for making investment decisions on these assets.

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[4] http://archimatetool.com/
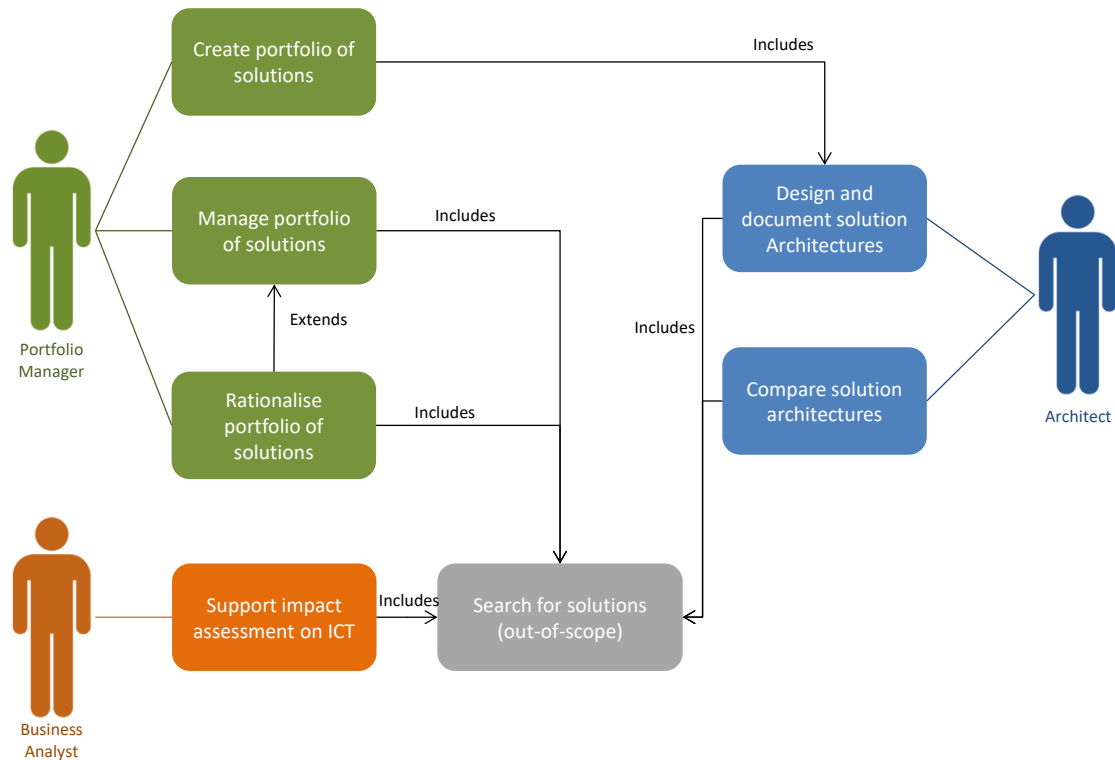
Figure 1 - Target users and their use cases within the EIRA©

Figure 1 above depicts the target users and use cases. Each use case has the following motivation and outcome:

- Design and document solution architecture use case

    - **Motivation:** the user needs to design the solution architecture of a new solution that must support interoperability with Member States and/or EU institutions and document existing Solution Building Blocks.

    - **Outcome:** a solution architecture is created, as a collection of interoperable SBBs (optionally) mapped to a solution architecture template.

- Compare solution architectures use case

    - **Motivation:** the user has already a solution architecture in place (SBBs of the architecture are already operational in his/her organisation) and needs to assess and increase the interoperability maturity level.

    - **Outcome:** the interoperability maturity of the solution architecture is assessed (per SBB). The solution architecture is updated by including new solutions discovered by using the TES (Trans-European Solutions) Cartography or by upgrading the existing solutions to be compliant with the interoperability requirements.

- Create portfolio of solutions use case

  - **Motivation:** the user wants to create a portfolio of the applications/solutions of his/her organisation, and needs a structured model that can facilitate the sharing and reuse of these solutions with other European partners.

  - Outcome:

    1. A new portfolio of solutions is created, mapped to the EIRA© ABBs.

    2. "Interoperable" solutions are identified, and (optionally) shared with other partners.

- Manage portfolio of solutions use case

  - **Motivation:** due to new circumstances (e.g. budget constraints, new interoperability needs etc.), the existing IT portfolio of the user's organisation needs to be managed by adding, updating or phasing out solutions.

  - Outcome:

    1. The existing IT portfolio is mapped to the EIRA©.

    2. New re-usable interoperability solutions are added to the portfolio.

    3. The solutions in the existing portfolio to be updated, merged or phased out are identified.

- Rationalise portfolio of solutions use case

  - **Motivation:** Multiple SBBs in the portfolio of the organisation are mapped to the same ABB of the EIRA©. The user wants to reduce the number of solutions in the portfolio while increasing the average interoperability maturity level of the portfolio.

  - Outcome:

    1. The IT portfolio in the organisation is rationalised; "superfluous" and "to be merged" solutions are identified in the portfolio.

    2. The most interoperable solutions are kept in the IT portfolio.

- Structure impact assessment on ICT use case

  - **Motivation:** the user wants to describe the architecture and interoperability implications of a new or existing policy or thematic domain.

  - **Outcome:** the architecture and interoperability implications of a policy or thematic domain are structured according to the EIRA©. The ABBs and relationships that are impacted whenever a change occurs are identified.

2.4 Expected benefits

A common use of the EIRA© when developing, assessing, and communicating about eGovernment solutions will result in **network effects**, enhancing the coordination between public administrations at EU level and within the Member States.

The use of the EIRA© leverages the advantages coming from the application of Enterprise Architecture principles, including:

- A more efficient business operation
- A more efficient IT operation
- Better return on existing investment, reduced risk for future investment
- Faster, simpler, and cheaper procurement

The EIRA© will contribute to an increased awareness and usage of EIF principles and recommendations.

Note that interoperability implies but is not limited to reusability (according to the EIF, reusability is just one of the aspects of interoperability). Therefore, the scope of EIRA© is much broader than just facilitating reuse.

Also, interoperability applies at different organisational and geographical levels: where inside an organisation the main benefit may lie in the composition of generic building blocks which are interoperable with others, across organisations interoperability is indispensable for the efficient execution of business processes. For customer- (or citizen-) facing components, user-centric interoperability aspects enable the transition from traditional channels to digital service delivery. When it comes to cross-border interoperability, organisational and legal aspects are of special importance and become crucial to maximise the potential of the Digital Single Market.

A common use of the EIRA© will provide the following high-level benefits, which are explained in the subsequent sections:

- Proving a controlled vocabulary

- Decoupling functionalities in Architectural Building Blocks

- Facilitating the identification of Interoperability Specifications

- Providing the key interoperability enabler Architectural Building Blocks

- Accelerating the development cycle

- Enabling cartographies

- Promoting discovery and reusability of existing solutions

- Supporting portfolio management decision making

- Supporting public policy formulation

2.4.1 Proving a controlled vocabulary

Being a controlled vocabulary, the EIRA© provides a **common language** of Architecture Building Blocks for the design and comparison of the solution architectures of eGovernment solutions. Architects are thus enabled to easily understand the functionality of other using solutions that are based on the EIRA© as well as the interfaces to other solutions where those are documented in the same language.

2.4.2 Decoupling functionalities in Architectural Building Blocks

Each Architecture Building Block in the EIRA© provides decoupled functionality meaning that the ABBs are autonomous and unaware of the other Architecture Building Blocks within the same context. The autonomous nature of the ABBs is an absolute necessity for reusability, provided that the interfaces are clearly defined. The decoupling also helps in rationalisation exercises where one Solution Building Block can be exchanged with another Solution Building Block, provided that they both "realise" the same Architecture Building Block.

2.4.3 Facilitating the identification of Interoperability Specifications

The EIRA© allows stakeholders to effectively communicate with their peers when systems across organisational and national borders have to interoperate. The EIRA© facilitates the identification of interoperability specifications and promotes the use of **common interoperability specifications based on open standards referenced in the European Interoperability Cartography**,

- Architects and system owners can then rely on these interoperability specifications to ensure

  - o stable interfaces between their systems/services and others inside and outside their own organisations, and

  - o interfaces towards users that take into account non-technical interoperability aspects like usability, inclusiveness and multilingualism.

- Public procurers benefit from an easy way to discover relevant specifications for specific types of solutions, and avoid vendor lock-in.

2.4.4 Providing the key interoperability enabler Architectural Building Blocks

Decision (EU) 2015/2240 of the European Parliament[5] clearly mentions that interoperable solutions and standards in ICT are key enablers for the partnering of industries at Union level. 'Key interoperability enablers' means interoperability solutions that are necessary to enable the efficient and effective delivery of public services across administrations.

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[5] DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector.

The EIRA© provides key interoperability enablers in the following areas:

- Key Sharing and Reuse Enablers Architecture Building Blocks. These ABBs are key interoperability enablers for sharing/provisioning and reusing/consuming. The EIRA© identifies the following key sharing and reuse enablers ABBs:

    o Legislation catalogue; an inventory of legal documents. This ABB is a key interoperability enabler for sharing/provisioning and reusing/consuming legal documents.

    o Public service catalogue; a collection of descriptions of active public services that are provided by public administrations at any administrative level (i.e. local, regional, national or pan-European). All public service descriptions published in a catalogue of public services conform to a common data model for representing public services. This ABB is a key interoperability enabler for sharing/provisioning and reusing/consuming of front-office public services.

    o Data Set catalogue; a curated collection of datasets. This ABB is a key interoperability enabler for sharing/provisioning and reusing/consuming Data.

    o Service registry Component; Implements the functionality of registering the system service within a catalogue to be discovered by other services. This ABB is a key interoperability enabler for sharing/provisioning and reusing/consuming back-office services.

- Key Information Exchange Enablers Architecture Building Blocks. These ABBs are key interoperability enablers for assessing compatibility. The EIRA© identifies the following Key Information Exchange Enablers ABBs:

    o Public Policy Implementation Approach: The specific rules and processes finalised at implementing a policy through organisations, persons, objects or events. A [Public Policy Implementation Approach] is influenced by a Regulatory State and a Delegation of Powers, which determine the role of the organisations, persons, objects or events involved in the implementation of the policy. This ABB is a key interoperability enabler for assessing compatibility cross legal/juridical certainties

    o Service Delivery Model: The way of delivering to public service consumers, or otherwise interacting with them, for the purpose of supplying specific public services. This involves a number of management practices to ensure that the public services are provided as agreed between the public service provider and the consumer. This ABB is a key interoperability enabler for assessing compatibility between business interfaces

    o Representation; The description of the perceptible configuration of business information or a Legal act. Representations can be classified in various ways; for example, in terms of medium (e.g. electronic or paper documents, audio, etc.) or format (HTML, ASCII, PDF, RTF, etc.). This ABB is a key interoperability enabler for assessing compatibility between interpretations of business information.

    o Machine to Machine Interface; a boundary set of means enabling the exchange of data between a service and other services. This ABB is a

key interoperability enabler for assessing compatibility between technical interfaces.

- o Human Interface; a boundary set of means enabling the exchange of data between an individual and a service. This ABB is a key interoperability enabler for assessing compatibility between technical interfaces.

- Key Interoperability Agreement Enablers ABBs. These ABBs are key interoperability enablers for assessing agreements. The EIRA© identifies the following Key Interoperability Agreement Enablers ABBs:

  - o Legal Interoperability Agreement; concrete and binding documents which set out the precise legal obligations of two legal authorities cooperating across an 'interface' to achieve interoperability. This ABB is a key interoperability enabler for assessing the legal terms/conditions for 'sharing & reusing' and exchanging information.

  - o Organisational Interoperability Agreement; concrete and binding documents which set out the precise obligations of two parties cooperating across an 'interface' to achieve interoperability. An Interoperability Agreement is the means through which organisations (public administrations, or businesses) formalise the cooperation with one another. These agreements aim at the development of interoperability solutions, which meets the functional / technical requirements and needs of one another (European Interoperability Framework). This ABB is a key interoperability enabler for assessing the organizational terms/conditions for sharing & reusing and exchanging information.

  - o Semantic Interoperability Agreement; Semantic Interoperability Agreement is the consensus among a group of co-operation partners on the model and data entities that support common services. Apart from the typology of the data entities, the consensus also covers the characteristics of the data entities as expressed in metadata and the use of common controlled vocabularies. This ABB is a key interoperability enabler for assessing the semantic terms/conditions for sharing & reusing and exchanging information.

  - o Technical Interoperability Agreement; Technical Interoperability Agreement is the means through which Technical Authorities mandate specific Technical Interoperability Specifications, ensuring organisations (operating under different technical frameworks, policies and strategies) are able to work together. This ABB is a key interoperability enabler for assessing the technical terms/conditions for sharing & reusing and exchanging information.

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2.4.5 Accelerating the development cycle

The development cycle is accelerated by the increased application of the principles of service-oriented architecture (SOA). Architects are guided naturally towards service-oriented architecture when using EIRA©. This then enables consumption of the system's services by other systems and vice versa without additional investments. Development time of new services is often much higher that integration costs of existing services. In addition, reuse at service level helps avoiding costs typically

associated with the reuse of applications or components and accelerates the development cycle of new solutions.

2.4.6 Enabling cartographies

The EIRA© and CarTool© help enabling cartographies by providing a way of assembling modelled solutions in a cartography where reusability and interoperability attributes of Solution Building Blocks can be queried using complex queries.

- Using queries, an architect can query the existing solutions in the cartography for discovery and reusability of existing solutions.

- The cartography can help portfolio managers by providing query functionality that results in different solutions that provide similar functionality. This list can be used for decisions on rationalisation of solutions.

- Using the query functionality of the CarTool©, the cartography can be used for impact assessment and as such supports public policy formulation decisions.

2.4.7 Promoting discovery and reusability of existing solutions

The EIRA© and the embedded cartography provide a consistent way to document and classify reusable Solution Building Blocks, allowing reusable and interoperable Solution Building Blocks to be found and understood more easily.

- By creating a cartography, the different solutions in this cartography become searchable and identifiable for reuse. The EIRA© and CarTool© can be used to promote discovery and reusability. Architects and public procurers are thus supported in making decisions for which functionalities there are already existing Solution Building Blocks available and which need to be developed or procured.
- Architects can use the CarTool© to support public policy formulation by helping policy makers by assessing ICT implications of policy changes by searching related solutions.

Reuse of existing Solution Building Blocks is a key point in achieving the aforementioned cost savings. This notion is supported by other activities of the ISA programme (Sharing and Reuse (5), Assessment of trans-European systems supporting EU policies (6)) To assess when reuse is really the most cost-efficient option, a detailed analysis of the reusability of the Solution Building Block in question is required. A set of criteria for this purpose are under development by the ISA programme[6].

2.4.8 Supporting portfolio management decision making

The EIRA© supports portfolio management decisions by realising cost-savings related to rationalisation of the portfolio of solutions and Solution Building Blocks.

- Portfolio managers are, through the common language, provided with a classification schema that allows
  - discovery of systems with identical or overlapping functionalities inside the organisation which might be phased out and

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[6] https://ec.europa.eu/isa2/sites/isa/files/assessment_of_trans-european_systems__0.pdf

- o identification of Solution Building Blocks that could be made more generic
- Architects can learn how making Solution Building Blocks more generic can be achieved: Firstly EIRA© identifies the ones with high interoperability relevance, that should be implemented as modular services, and by respecting the corresponding interoperability specifications the Solution Building Blocks realising them are enabled to interface with other SBBs and thus become reusable in different contexts. This in turn ensures that central functionalities need to be developed and maintained only once, and competing solutions providing the same functionalities can be replaced by more generic ones.

2.4.9 Supporting public policy formulation
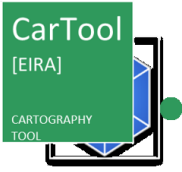
The EIRA© supports public policy formulation in the form of impact assessments[7] where possible impacts to available solutions are examined during the public policy preparation phase. This is done before the commission finalises a proposal for a new law. Impact assessment can be performed using the CarTool© by examining solutions that are linked to specific public policies. The assessments are carried out on initiatives expected to have significant economic, social or environmental impacts. These can be:

- Legislative proposals

- Non-legislative proposals such as financial programmes and recommendations for the negotiations of international agreements)

- Implementing and delegating acts

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[7] https://ec.europa.eu/info/law-making-process/planning-and-proposing-law/impact-assessments_en

2.5 How the EIRA© and CarTool© support interoperability in eGovernment?

The table below shows how the EIRA© and CarTool support interoperability in eGovernment by providing a mapping between the areas of benefits (designing, assessing, communicating and sharing and discovering and reusing) to the different values and key areas and of support that are listed in the first column.

EIRA / CarTool	Designing	Assessing	Communicating and Sharing	Discovering and Reusing
Providing a controlled vocabulary	● ●	● ●	● ●	● ●
Decoupling functionalities in Architectural Building Blocks	● ●	● ●	● ●	● ●
Facilitating the identification of IoP specifications	● ●	● ●	● ●	● ●
Providing the key Interoperability enablers ABBs	● ●	● ●	● ●	● ●
Accelerating development cycle	● ●	○ ○	○ ○	● ●
Enabling cartographies	○ ●	○ ●	○ ●	○ ●
Promoting discovery/reusability	● ●	● ●	● ●	● ●
Supporting Portfolio Mgmt Decision Making	○ ●	○ ●	○ ●	○ ●
Supporting Public Policy formulation	○ ●	○ ●	○ ●	○ ●

2.6 User community on Joinup

The ISA Programme created a user community for the EIRA© on Joinup, the online collaborative platform of the ISA Programme. This EIRA© user community is accessible via the following link: https://joinup.ec.europa.eu/solution/eira/about

Figure 2 – Screenshot of the EIRA community on Joinup

The community supports the use of the EIRA©. It allows visitors to do the following:

- **Background material:** find background material and general introductory material on how to use the EIRA©;

- **EIRA© releases:** find and download the latest release of the EIRA©;

- **CarTool©:** download the latest release of the CarTool©;

- **Comments and issues:** discuss the EIRA© and submit and track EIRA issues; and

- **Peers:** identify other users of the EIRA©.

2.7 Application

The EIRA© has been successfully piloted in a number of Member States, European projects and services of the European Commission. Information on previous and ongoing piloting activities can also be found in the project's Joinup space.

2.8 Continuous improvement

As the EIRA© is being applied, new challenges and ideas for the EIRA© arise and need to be managed. Therefore the ISA² Programme welcomes feedback, additional thoughts, and open dialog on the idea of advancing the EIRA©. To facilitate this, the ISA² Programme set up an open change and release management process for the EIRA©. Stakeholders working for public administrations in the field of architecture and interoperability can provide their comments on the EIRA© release page on Joinup (registration and/or login is required). More information about this process can be found in the EIRA© community on Joinup. The EIRA© community on Joinup also contains the latest releases of the EIRA© and change logs.

3 KEY CONCEPTS AND ARCHIMATE® NOTATION

This section elaborates on the key concepts behind EIRA©. It also explains how the ArchiMate® language is used by the EIRA© and how ArchiMate® modelling tools can be used to design solution architectures and document solutions.

3.1 Key concepts in EIRA©
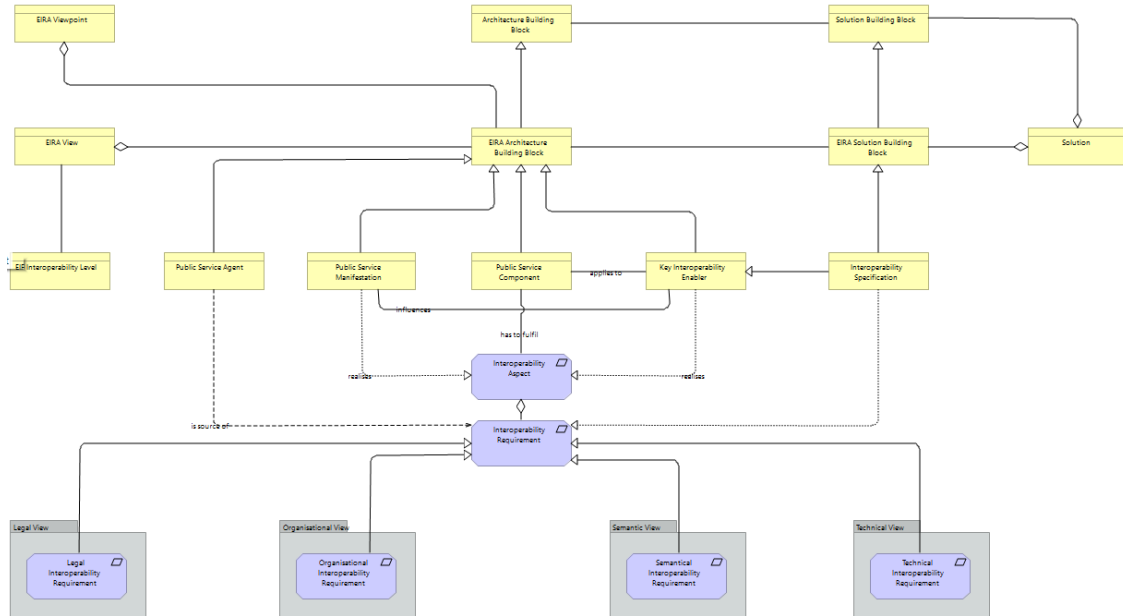
Figure 3 illustrates the key concepts of the EIRA© and their relationships. The terminology is based on TOGAF® (7).
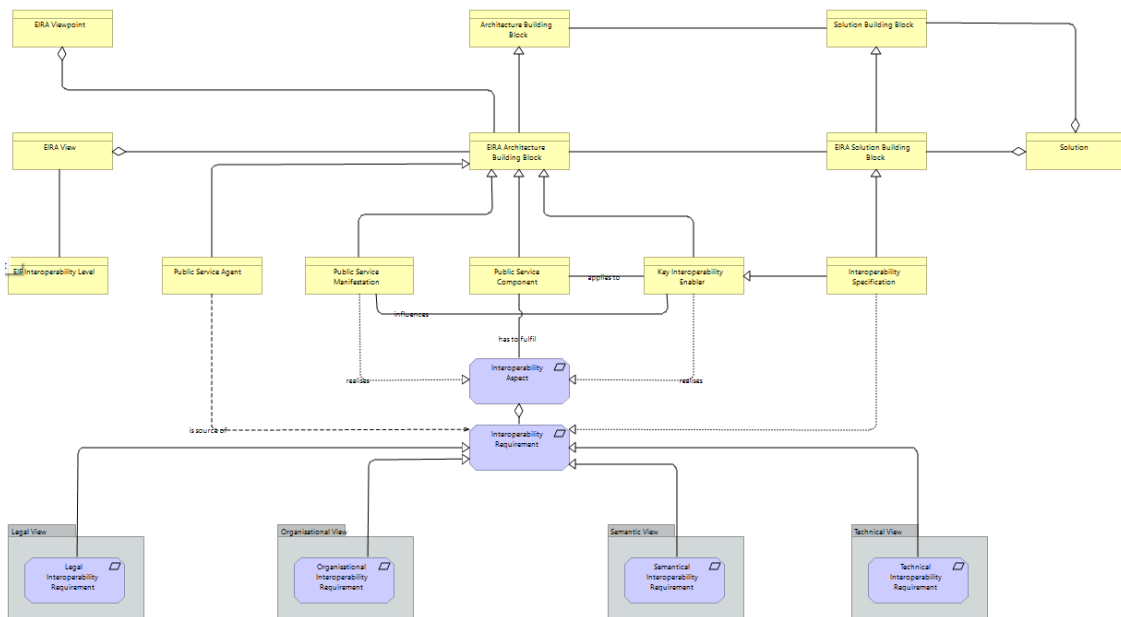
Figure 3 – Key concepts in EIRA©

The following list explains the different relationships depicted in
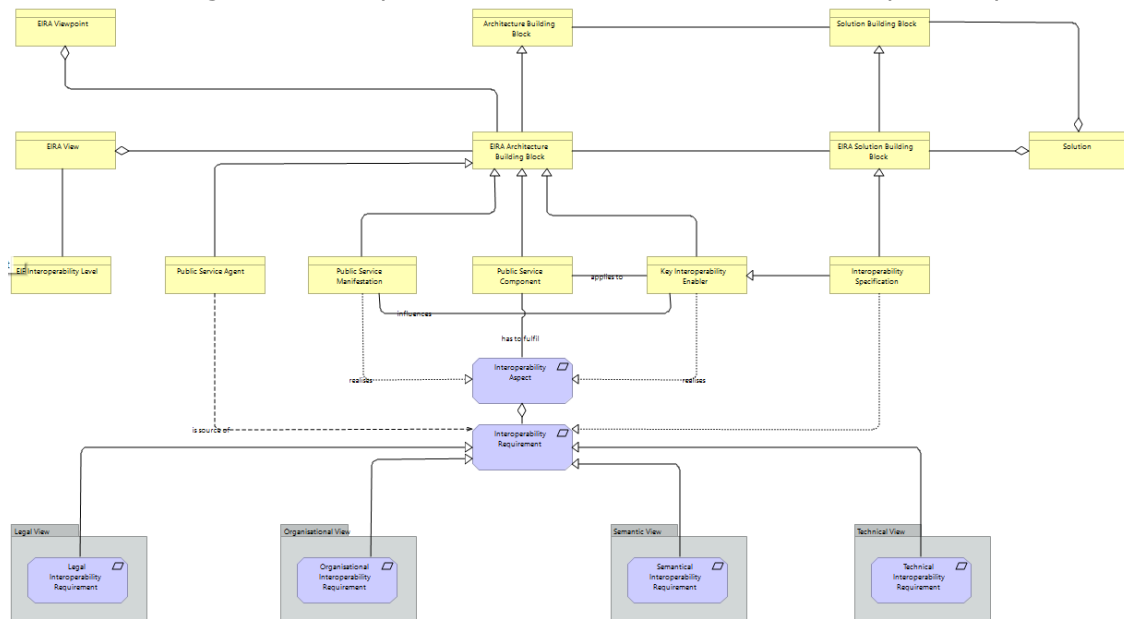
Figure 3:

- The EIRA© has EIRA© Views, each EIRA© view aligns with one or more EIF Interoperability Levels

- Each EIRA© view has EIRA© Architecture Building Blocks

- The EIRA© has EIRA© Viewpoints that conform to EIRA© Views

- An EIRA© Architecture Building Block is modelled as a specialisation of a TOGAF® Architecture Building Block

- A Public Service Agent is an EIRA Architecture Building Block that represents a participant involved in the delivery or consumption of a public service. Public Service Agents are citizens, businesses, organisations, or systems.

- A Public Service Component is a structural EIRA© Architecture Building Block, i.e. an entity which can perform behaviour (active structure) or on which behaviour is performed (passive structure)

- A Public Service Manifestation is a behaviour EIRA© Architecture Building Block, i.e. a unit of activity performed by one or more Public Service Components;

- A Key Interoperability Enabler is an EIRA© Architecture Building Block, which is necessary to enable the efficient and effective delivery of public services across administrations;

- An EIRA© Architecture Building Block has interoperability requirements. An Interoperability Requirement is a statement of an interoperable need that must be realised by a system. Interoperability Requirements can be formulated for all the EIF interoperability levels: Legal Interoperability Requirements, Organisational Interoperability Requirements, Semantic Interoperability Requirements, and Technical Interoperability Requirements.

- Interoperability requirements are grouped in Interoperability Aspects. An Interoperability Aspect is an externally observable characteristic or a set of

characteristics to be provided/supported by the solution that fulfils partially or internally a stakeholder interoperability need.

- An Interoperability Specification is a document containing agreed normative statements for solution building blocks used in an information exchange context. It can refer to existing standards or specifications. An Interoperability Specification realises an Interoperability Requirement.

- An EIRA© Solution Building Block is a realisation of an EIRA© Architecture Building Block and a specialization of a TOGAF® Solution Building Block

- A Solution consists of EIRA© Solution Building Blocks and TOGAF® Solution Building Blocks

The key concepts of the EIRA© are defined as follows:

1. **EIF interoperability level:** The New European Interoperability Framework (EIF) (2) is a set of guidelines for developing public services. Figure 4 depicts the interoperability levels of the EIF. They cover legal, organisational, semantic and technical interoperability. Each level deserves special attention when a new European public service is established.

Figure 4 - Interoperability levels of the EIF (2)

2. **EIF principle:** The New European Interoperability Framework outlines 12 underlying principles of European public services. These general principles of good administration are relevant to the process of establishing European public services. They describe the context in which European public services are decided and implemented. They complement one another regardless of their different natures, e.g. legal or technical. More information on the EIF interoperability levels and principles can be found in the European Interoperability Framework (EIF) (2).

3. **EIRA© view:** The EIRA© consists of several views, including one view for each of the EIF interoperability levels. The EIRA© views contain a graphical notation of the EIRA© ontology.

4. **EIRA© viewpoint:** The EIRA© provides several viewpoints that conform to EIRA© views, the viewpoints provide a perspective with specific stakeholders concern in mind.

5. **Architecture Building Block:** Based on the TOGAF® definition (7), an Architecture Building Block is an abstract component that captures architecture requirements and that directs and guides the development of Solution Building Blocks. An ABB represents a (potentially re-usable) component of legal, organisational, semantic or technical capability that can be combined with other Architecture Building Blocks. An Architecture Building Block describes generic characteristics and functionalities. Architecture Building Blocks are used to describe reference architectures, solution architecture templates or solution architectures of a specific solutions.

6. **Solution Building Block:** Based on the TOGAF® definition (7), a Solution Building Block is a concrete element that defines the implementation and

fulfils the required business requirements of one or more Architecture Building Blocks. On the technical view, a Solution Building Block is a specific product or software component and may be either procured or developed.

7. **Solution Architecture Template (SAT):** A solution architecture template (SAT) is a specification containing including a *sub-set* of Architecture Building Blocks of the EIRA© and some optional Solution Building Blocks. It focuses on the most salient building blocks needed to build an interoperable solution addressing a particular business capability involving business information exchange.

A solution architecture template can include additional interoperability specifications. It is usually applied within a community. Acting as a template for solutions (and their specific architectures), it guides the development of a certain kind of solutions (and their specific architectures). A solution architecture template can exist on different levels of details. For example, it can be used to describe a template for national portals offering e-services to its citizens. It can also be used to describe a template on how to securely exchange files among public administrations.

A solution architecture template consists of the following:

- A goal and a description of the particular supported business capabilities and the involved business information exchanges;

- A sub-set of EIRA© core Architecture Building Blocks covering all EIRA© views;

- A set of specific Architecture Building Blocks extending EIRA©'s views enabling specific functionalities to be provided by implementations derived from the SAT;

- A set of interoperability specifications for Architecture Building Blocks in the SAT;

- A narrative for each EIRA© view.

8. **Reference Architecture:** Architecture is the structure of components, their interrelationships, and the principles and guidelines governing their design and evolution over time (8). A reference architecture is a generalized architecture of a solution, based on best-practices, domain neutral and, occasionally, with a focus on a particular aspect. The goal of a reference architecture is reusability; it reduces the amount of work, reduces errors and accelerates the development of solutions. A reference architecture should be based in a [reference] model and in a style. The model covers the ontology of the components and their interrelationships and in the case of EIRA© it is ArchiMate®. The architecture style covers the architecture design principles and patterns and in the case of the EIRA© it is "Service Oriented Architecture" (SOA). The focus of the EIRA© is interoperability in public administrations. This definition of "reference architecture" needs to be complemented with the notion of **Enterprise Architecture,** which is an end-to-end generic domain neutral approach to design the architecture of an enterprise or a **solution.** The goal of an enterprise architecture is to align IT-related activities with the overall goal of the enterprise.

In several countries inside and outside Europe (Germany, Canada, Denmark, USA, Norway), large-scale Enterprise Architecture projects have in the past successfully been executed (9), and national or sectorial reference architectures are in place notably in the Netherlands (NORA (10)) and in Denmark (eHealth Reference Architectures (11)).

The particular context of the EIRA© and its mission is interoperability, and architectural patterns are typically captured in the form of solution architecture templates (see above).

Similar to how the EIF serves as blueprint and inspiration for the National Interoperability Frameworks, the EIRA© can serve as the basis for reference architectures at other levels[8] (European national, regional, local or even inside an organisation), taking the specificities of the respective level into account (e.g. national law) while remaining compatible.

Where the EIRA© itself is domain-neutral, it can be extended to create domain-specific architectures.

Viewed as an architecture content metamodel, the EIRA© provides for coordination and alignment between derived reference architectures.

The EIRA© consists of the following components:

- A set of EIRA© architecture core Architecture Building Blocks to meet interoperability needs;

- A set of interoperability specifications;

- A narrative for each view.

9. **Solution Architecture:** Based on TOGAF®, a solution architecture is "a description of a discrete and focused business operation or activity and how information systems / technical infrastructure supports that operation. A Solution Architecture typically applies to a single project or project release, assisting in the translation of requirements into a solution vision, high-level business and/or IT system specifications, and a portfolio of implementation tasks". Within the context of the EIRA©, the solution architecture describes the specific architecture of a solution. It can be derived from a solution architecture template.

10. **Solution.** A solution consists of one or more Solution Building Blocks to meet a certain stakeholder need. Within the context of the EIRA©, a solution is usually an Interoperable European Solution developed by public administrations that facilitate the delivery of electronic Public Services and cross-border exchange of information between public administrations or Citizens in support to the implementation and advancement of EU, national or local public policies.

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[8] See also the definition of an enterprise in (7): "TOGAF defines 'enterprise' as any collection of organizations that has a common set of goals. For example, an enterprise could be a government agency, a whole corporation, a division of a corporation, a single department, or a chain of geographically distant organizations linked together by common ownership".
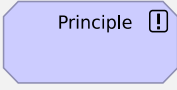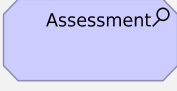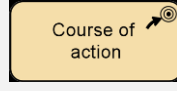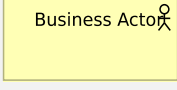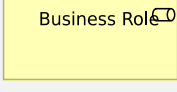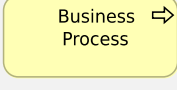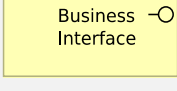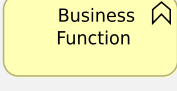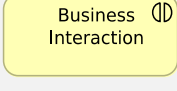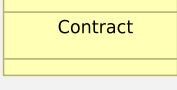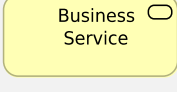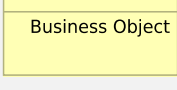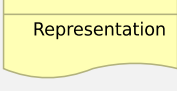
3.2 ArchiMate® notation
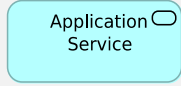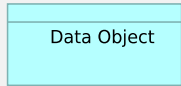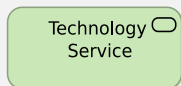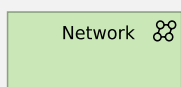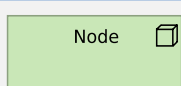
The EIRA© uses the ArchiMate® language as a notation. In fact, the EIRA© can be considered as an *extension* of the ArchiMate® language, using two of the extension mechanisms foreseen by ArchiMate® (1): specialisation (stereotyping) and attributes. This section first provides an overview of the ArchiMate® model concepts that are used by the EIRA©. It then elaborates on how EIRA© ABBs can be seen as a specialisation of ArchiMate® model concepts. Finally, it elaborates on the attributes on model concepts that are predefined by the EIRA©.

3.2.1 ArchiMate® model concepts

The EIRA© uses the following ArchiMate® 3.0.1 model concepts (1):
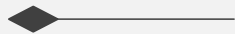
Table 3-1 – ArchiMate® model concepts used in EIRA© (1)

Model concept	Definition
Principle	A *principle* represents a qualitative statement of intent that should be met by the architecture.
Goal	A *goal* represents a high-level statement of intent, direction, or desired end state for an organization and its stakeholders
Assessment	An *assessment* is defined as the outcome of some analysis of some driver.
Course of action	A course of action is an approach or plan for configuring some capabilities and resources of the enterprise, undertaken to achieve a goal.
Business Actor	A *business actor* is a business entity that is capable of performing behavior.
Business Role	A *business role* is the responsibility for performing specific behavior, to which an actor can be assigned, or the part an actor plays in a particular action or event.
Business Process	A *business process* represents a sequence of business behaviors that achieves a specific outcome such as a defined set of products or business services.
Business Interface	A *business interface* is a point of access where a business service is made available to the environment.
Business Function	A *business function* is a collection of business behavior based on a chosen set of criteria (typically required business resources and/or competences), closely aligned to an organization, but not necessarily explicitly governed by the organization.
Business Interaction	A *business interaction* is a unit of collective business behavior performed by (a collaboration of) two or more business roles.
Contract	A *contract* represents a formal or informal specification of an agreement between a provider and a consumer that specifies the rights and obligations associated with a product and establishes functional and non-functional parameters for interaction.
Business Service	A *business service* represents an explicitly defined exposed business behavior.
Business Object	A *business object* represents a concept used within a particular business domain.
Representation	A *representation* represents a perceptible form of the information carried by a business object.

Model concept	Definition
Application Component	An *application component* represents an encapsulation of application functionality aligned to implementation structure, which is modular and replaceable. It encapsulates its behavior and data, exposes services, and makes them available through interfaces.
Application Interface	An *application interface* represents a point of access where application services are made available to a user, another application component, or a node.
Application Service	An *application service* represents an explicitly defined exposed application behavior.
Data Object	A *data object* represents data structured for automated processing.
Technology Service	A *technology service* represents an explicitly defined exposed technology behavior.
Network	A *communication network* represents a set of structures and behaviours that connects computer systems or other electronic devices for transmission, routing, and reception of data or data-based communications such as voice and video.
Node	A *node* represents a computational or physical resource that hosts, manipulates, or interacts with other computational or physical resources.

The EIRA© version 3.0 uses the following ArchiMate® 3.0.1 relationships:

Table 3-2 - EIRA© notation: relationships (1)

Relationship	Description	Relationship	Description
◆———————	Composition	— — — — — —>	Access
◇———————	Aggregation	——————▷	Specialisation
———————>	Used by	———————	Association
— — — — —▷	Realisation	——————→	Triggering
•——————•	Assignment	——————▷	Serving

3.2.2 Specialisation and stereotyping

The EIRA© ABBs can be seen as a *specialisation* of ArchiMate® model concepts. Specialisation is an extension mechanism for the ArchiMate® language that is foreseen by the ArchiMate® specification (1). For example, Figure 5 models that the ABB 'Public Service' in EIRA© is a specialisation of the ArchiMate® model concept 'Business Service'.
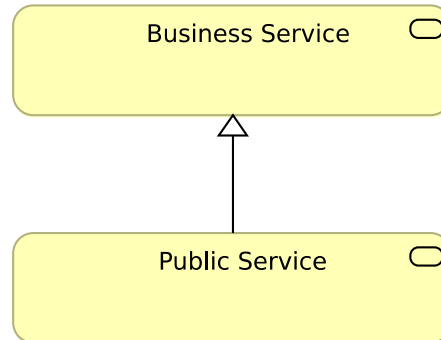
Figure 5 – Specialisation in the EIRA© metamodel

The EIRA© does not introduce a new graphical notation for a specialised ArchiMate® model concept.

3.2.2.1 Linking Solution Building Blocks (SBBs) to Architecture Building Blocks (ABBs)

When using EIRA© in combination with ArchiMate® to represent Solution Building Blocks, it is recommended to use **stereotypes**, as indicated by <<stereotype>>. The word stereotype is replaced by the name of the Architecture Building Blocks. For example, Figure 6 illustrates how a public service 'Declaration of birth' is represented as an EIRA© 'Public Service' using stereotyping. In Section 4 an overview is given of the focal Architecture Building Blocks in the EIRA©. A Solution Building Block can relate to multiple Architecture Building Blocks by delimiting the list as such : <<ABB_1, ABB_2, …, ABB_n>>.
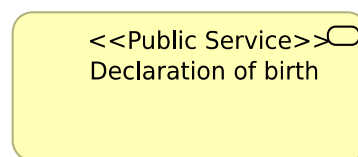
Figure 6 – Example: stereotyping of Solution Building Blocks

3.2.3 Attributes

The ArchiMate® language has another extension mechanism, which allows defining sets of types attributes (called profiles), which provide a means to express supplementary information (1). The EIRA© includes a set of attributes that stem from the following sources:

- **ADMS description metadata**: The Asset Description Metadata Schema (ADMS) (12) provides a standard way to *describe* Solution Building Blocks. The ADMS is itself based on metadata standards like the Dublin Core metadata elements. Some attributes include for example:

- o **Description** (**dct:description)**: a description of the Solution Building Block.

- o **Landing page (dcat:landingPage)**: A Web page that can be navigated to in a Web browser to gain access to the Solution Building Block.

- o **Status (adms:status)**: The status of a Solution Building Block. Suggested values[9] are 'completed', 'deprecated', 'underDevelopment', and 'withdrawn'.

Describing Solution Building Blocks using the ADMS attributes provides important descriptive metadata that can be used by others to better understand what a Solution Building Block is about. This contributes to the 'Document interoperability solution' use case described in Section 2.3.

The full set of attributes are included in the ArchiMate® model file (.xml) of the EIRA© release (3).

3.2.4 Use of colours

The default views of the EIRA© leverage the standard colours of ArchiMate® to depict the corresponding Architecture Building Blocks: business (yellow), application (blue) and infrastructure (green). However the EIRA© recognises the architects' needs to leverage colour codes for communication purposes. It therefore does not impose any colouring rules.

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[9]https://joinup.ec.europa.eu/svn/adms/ADMS_v1.00/ADMS_SKOS_v1.00.html#http://purl.org/adms/status/1.0

3.3 Tool support

This section illustrates how architects can use ArchiMate® modelling tools like Archi®[10] to model solution architectures or to document solutions.

3.3.1 EIRA© ArchiMate® file

The EIRA© release (3) contains an XML file which contains the ArchiMate® model of the EIRA©. This file which follows the "Open Group ArchiMate® Exchange File Format" can be opened with Archi®, a free and open source modelling tool to create ArchiMate® models as well as other tools that support this format.

The ArchiMate® file groups the different building blocks, relations and views into the following folders:

- Business

  - **Legal View Concepts:** Architecture Building Blocks from the legal view;

  - **Organisational View Concepts:** Architecture Building Blocks from the organisational view;

  - **Semantic View Concepts:** Architecture Building Blocks from the semantic view of ArchiMate® business concepts type.

  - **Technical View Concepts:** Architecture Building Blocks from the technical view of ArchiMate® business concepts type (the Technical Interoperability Specification).

- Application

  - **Semantic View Concepts:** Architecture Building Blocks from the semantic view of ArchiMate® application concepts type;

  - **Technical View – Application Concepts:** Architecture Building Blocks from the technical view application;

  - **Technical View – Infrastructure Concepts:** Architecture Building Blocks from the technical view infrastructure of ArchiMate® application concept type.

- Technology

  - **Technical View – Infrastructure Concepts:** Architecture Building Blocks from the technical view infrastructure.

- Motivation

  - **Interoperability principles Concepts:** concepts modelled using the ArchiMate® motivation extension.

- Relations

  - This folder contains all relations shown on the EIRA© views;

  - **Relations only in the model:** relations between concepts that are needed in the model but not in the view. For example, all application services are specialisations of the Application Service building block.

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[10] http://archimatetool.com/

- Views
    - This folder contains all default EIRA© views, which express the EIRA© architecture content metamodel.
    - **Viewpoints:** This folder contains the "High-level Viewpoint", the "Conceptual Model for Integrated Public Service Provisioning viewpoint", the "EIRA Metamodel viewpoint", the "Interoperability Privacy viewpoint", the "Interoperability Governance viewpoint", the "Interoperability Security viewpoint", the "Interoperability Specification viewpoint" and the "Key Interoperability Enablers viewpoint".

Note: It is possible to work directly within the standard EIRA© views. However, best practice is to create new views or viewpoints to keep the integrity of the standard EIRA© views. The standard EIRA© views can then still be consulted for reference purposes.

3.3.2 Cartography tool (CarTool©)

The Cartography tool[11] (CarTool©) is released as a separate tool in the form of an open-source[12] Archi® plugin. This tool serves a twofold purpose:

- on the one hand it facilitates the stereotyping (see section 3.2.3 above) and description of attributes when documenting solutions based on EIRA©, and

- on the other hand it also enable Architects to directly consult the "TES Cartography" or "National Cartographies" from within the modelling tool, to discover reusable Solution Building Blocks.

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[11] https://joinup.ec.europa.eu/asset/eia/description#CarTool

[12] https://webgate.ec.europa.eu/CITnet/stash/projects/CARTOOL/repos/cartoolplugin/browse

4 VIEWS, VIEWPOINTS AND ARCHITECTURE BUILDING BLOCKS

This section provides a description of the views, viewpoints and most salient (focal) Architecture Building Blocks in the EIRA©. Each architecture view and viewpoint has a visual diagram, a narrative, and a set of focal Architecture Building Blocks:

- The **visual diagram** depicts the Architecture Building Blocks in the EIRA©. It can be conceived as a part of the EIRA© architecture content metamodel, which extends the ArchiMate® model concepts, as explained in Section 3.2.2. It shows how the EIRA© Architecture Building Blocks are related to each other, and which ArchiMate® concepts are used to depict them.

- The **narrative** is a textual description of the view providing natural language statements.

- The **focal Architecture Building Blocks** are building blocks that create the interconnections with Architecture Building Blocks related to other views.

The remainder of this section introduces the Architecture Building Blocks in the EIRA© structured according to the following architectural models:

- The Legal view;

- The Organisational view;

- The Semantic view;

- The Technical view (composed of an application and infrastructure part);

- The European Interoperability Framework underlying principles view;

- Viewpoints:

  o The Conceptual Model for Integrated Public Service Provisioning viewpoint;

  o The EIRA Metamodel viewpoint;

  o The EIRA High-level viewpoint;

  o The Interoperability Privacy viewpoint;

  o The Interoperability Governance viewpoint;

  o The Interoperability Security viewpoint;

  o The Interoperability Specification viewpoint;

  o The Key Interoperability Enablers viewpoint.

When the direction of an ArchiMate® relation between two entities is unclear (this is the case when using the assignment relation only); the EIRA© uses the following convention: The relation between two entities is always modelled in a top-down, left to right fashion. The top entity refers to the subject of a sentence, the bottom entity refers to the object of a sentence. When the two entities are at the same level, it is the left entity that refers to the subject and the right entity that refers to the object.

Given the size of the models, the images in this section had to be scaled down. However, full width images are available in the annex of this document together with the list of Architecture Building Blocks.

4.1 EIRA© high-level viewpoint

The EIRA© high-level viewpoint, depicted in Figure 7, models an introductory overview of the focal Architecture Building Blocks of each view. It aligns the EIRA© with the service delivery model described within the Interoperability Maturity Model[13] (IMM), and the New European Interoperability Framework (EIF) conceptual model for public services, depicted in **Errore. L'origine riferimento non è stata trovata.**.

The ABBs included in the high-level viewpoint represent the points that link the EIRA©'s views enabling traceability between their different Architecture Building Blocks. They are not necessarily mandatory but should always be considered by a user of the EIRA© when executing one of its use cases.
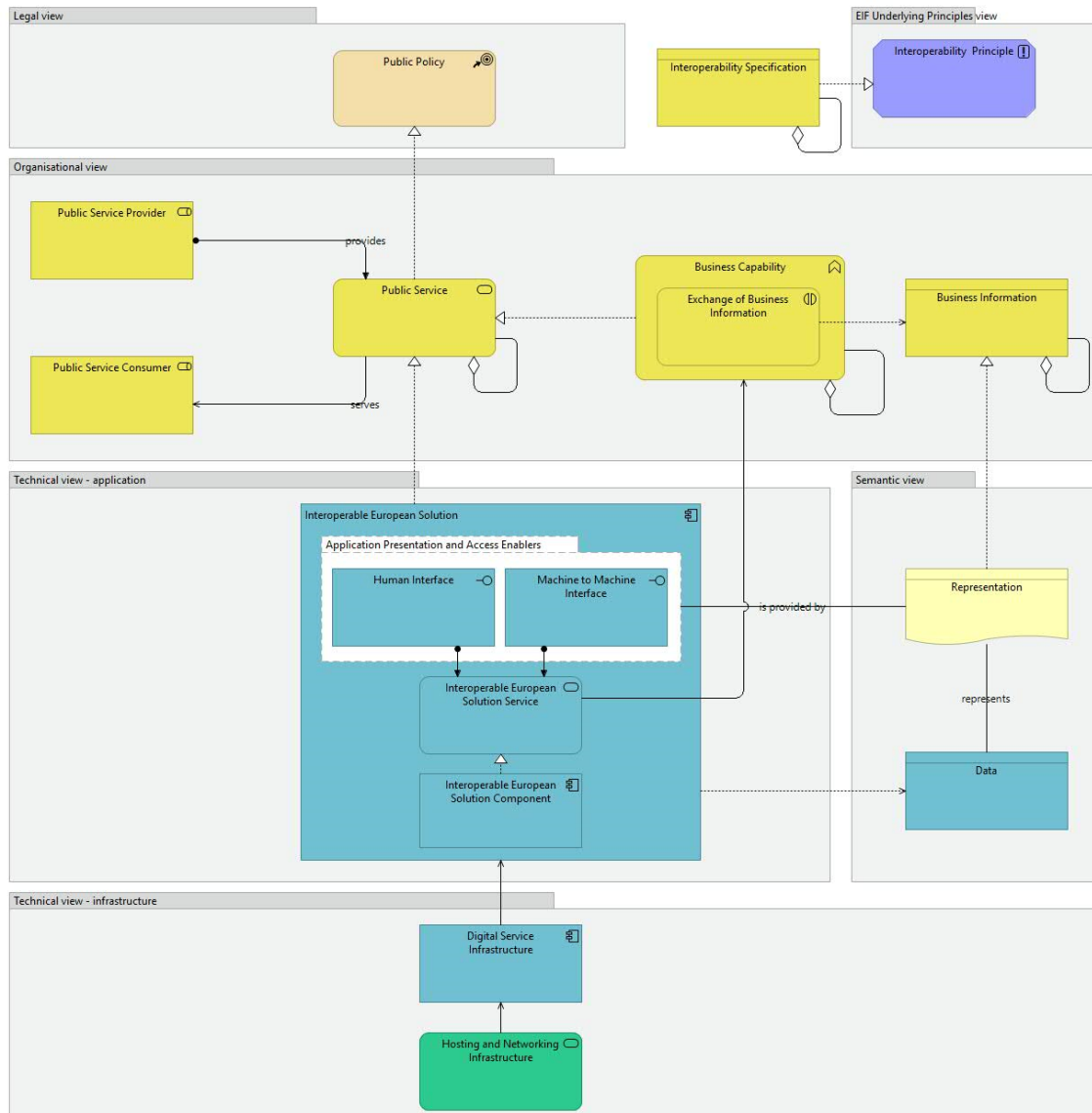
Figure 7 – EIRA© high-level viewpoint (3)

The EIRA© with its views provides a set of Architecture Building Blocks, important to facilitate interoperability. Each view, one for each interoperability level, is represented with the Focal Architecture Building Blocks needed to deliver an

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[13] https://ec.europa.eu/isa2/actions/assessing-progress-being-made-towards-interoperability_en

interoperable solution. These focal Architecture Building Blocks are indicated with an accented colour.

In the high-level are represented the ABBs that link the EIRA©'s views enabling navigation between the different views. As such they should be considered as critical components of any interoperable public service. They are not necessarily mandatory but should always be considered by a user of the EIRA© when executing one of its use cases.

Narrative: This viewpoint selects Architecture Building Blocks from the five different views highlighting the focal building blocks of the EIRA:

1. The selected Architecture Building Block of the legal view shows the [Public Policy] which is the mainspring of the solution.

2. The selected Architecture Building Blocks of the organisational view shows a [Public Policy] that is implemented by a [Public Service] which can be an aggregation of other [Public Services] serving [Public Service Consumers] and is provided by a [Public Service Provider]. The [Public Service] is realized by a [Business Capability] which can be an aggregation of other [Business Capabilities]. A [Business capability] describes key functions supporting the [Public Service]. An [Exchange of Business Information] accesses [Business Information].

3. The selected Architecture Building Blocks of the semantic view shows that the [Exchange of Business Information] is realized by a [Representation] of [Data] which describes interactions between public administrations, businesses, and citizens.

4. The selected Architecture Building Blocks of the technical views shows that an [Interoperable European Solution] supports one or more [Public Services] and lets consumers access it via [Machine to Machine Interface] and/or [Human Interface]. An [Interoperable European Solution] exposes one or more [Application Services] via its [Machine to Machine Interfaces] and/or Human Interfaces]. It makes use of [Orchestration Services] and [Choreography Services]. The [Interoperable European Solution] uses [Digital Service Infrastructure] which uses a [Hosting and Networking Infrastructure]. It can also use other [Interoperable European Solutions].

5. The selected Architecture Building Blocks of the EIF Underlying Principle view show that [Interoperability Specifications] realise [Interoperability Principles], the general intended properties used to achieve interoperability. The interoperability Specifications can be used to define the interoperability aspects for any of the Architecture Building Blocks.

4.2 Legal view

The Legal view models the most salient public policy development enablers and implementation instruments that shall be considered in order to support legal interoperability.
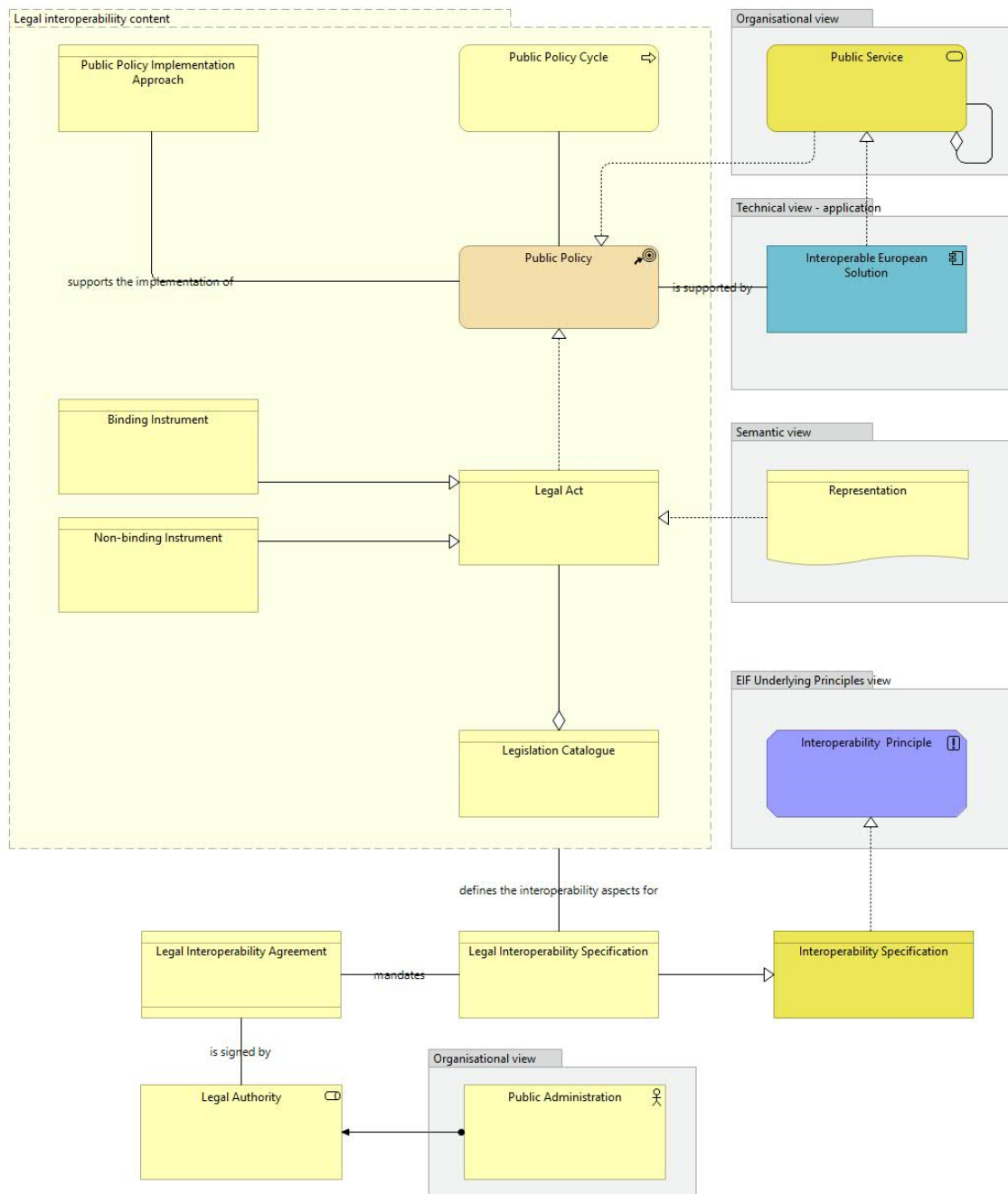
Figure 8 – Legal view of the EIRA© (3)

Narrative: A [Public Policy] is the outcome of a specific [Public Policy Cycle] that aims at addressing the needs of a group of stakeholders and of [Public Policy Implementation Approaches] that supports its implementation. The policy is formulated and implemented with the help of [Legal Act] in the form of either [Binding Instruments] or [Non-Binding Instruments. [Legislation Catalogue] aggregates [Legal Act].

These different Architecture Building Blocks define the [Legal Interoperability content] and each of these Architecture Building Blocks can have any [Interoperability Specification] associated, of which the [Legal Interoperability Specification] is a specialisation. Moreover, [Legal Interoperability Specification] defines the interoperability aspects for [Legislation Catalogue]. [Legal Authority]

signs [Legal Interoperability Agreement], which mandates [Legal Interoperability Specification].

Focal Architecture Building Block: Public Policy and Legal Interoperability Specification:

- A **Public Policy** is a designated name for grouping legal acts with a common scope to be implemented by a public authority. It is based on certain values and objectives and is implemented using a variety of resources. It applies on the territory within which the public authority has delegated powers by the legislative authority. The policies; overview of EU activities in all areas, from agriculture to transport can be found on the EU Strategy page[14] (Based on EuroVoc).

- A **Legal Interoperability Specification** is a specialisation of Interoperability Specification containing agreed legal normative statements for Solution Building Blocks legal used in information exchange context. It refers to EU legal acts adopted by the European institutions (Article 288 TFEU).

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[14] https://ec.europa.eu/info/strategy_en

4.3 Organisational view

The Organisational view models the most salient Architecture Building Blocks that shall be considered in order to support organisational interoperability among providers and users of a public service.
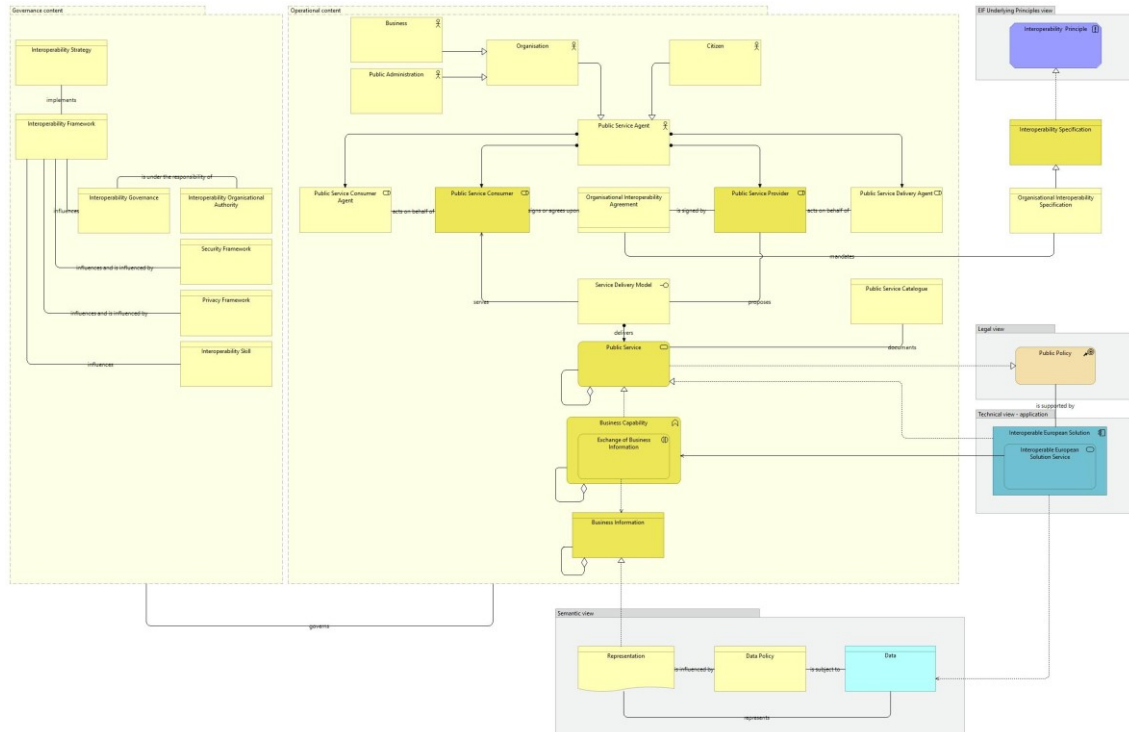
Figure 9 – Organisational view of the EIRA© [4]

Narrative: [Organisations] in the role of [Public Service Providers] supply [Public Services] to [Citizens] and [Businesses] and/or [Public Administrations] which have the role of [Public Service Consumer]. The [Public Service] is delivered according to its [Service Delivery Model]. [Public Services] are documented in [Public Service Catalogues] that can be used among others for service portfolio management. [Public Service Providers] can delegate the delivery of [Public Services] to [Public Service Delivery Agents] who will act on behalf of [Public Service Providers]. [Public Service Providers] can sign an [Interoperability Agreement] to agree on how to deliver a [Public Service] to its users. The delivery of these public services is realised through [Business Capabilities] using an [Exchange of Business Information] that exchanges [Business Information]. [Business Information] is instance oriented and is subject to [Business Rules] originating from [Organisational Interoperability Enablers] like [Organisational Structures], [Organisational Procedures], [Organisational Policies] or the [Organisational Skills] of the [Organisations] involved. The [Interoperability Organisational Authority] is responsible for [Interoperability Governance] which influences the [Interoperability Strategy]. The [Interoperability Strategy] implements the [Interoperability Framework]. [Interoperability Skills] are a specific form of [Organisational Skills] that allows the organisation to excel in interoperability. A [Security Framework] is a specific form of a [Security Policy] which is an [Organisational Policy] focussed on security related aspects.

These different Architecture Building Blocks define the [Organisational content] and each of these Architecture Building Blocks can have any [Interoperability Specification] associated, of which the [Organisational Interoperability Specification] is a specialisation.

Focal Architecture Building Blocks: Public Service, Public Service Consumer, Public Service Provider, Business Capability, Exchange of Business Information, Business Information and Interoperability Specification.

- A European public service comprises any public sector service exposed to a cross-border dimension and supplied by public administrations, either to one another or to businesses and citizens in the Union. A **Public Service** comprises any public sector service exposed to a cross-border dimension and supplied by public administrations, either to one another or to businesses and citizens in the Union. A Public Service is a mandatory or discretionary set of acts performed, or able to be performed, by or on behalf of a public organisation. Services may be for the benefit of an individual, a business, or other public authority, or groups of any of these. The capacity to act exists whether it is used or not, and the term 'benefit' may apply in the sense of enabling the fulfilment of an obligation. As defined in the revised version of the European Interoperability Framework, a European public service comprises any service provided by public administrations in Europe, or by other organisations on their behalf, to businesses, citizens or others public administrations. Public service – activities that public authorities identify as being of particular importance to citizens (A2C), businesses (A2B) and public administrations (A2A) and that would not be supplied (or would be supplied under different conditions) if there was no public intervention (Based on ISA² Core Vocabularies and the Interoperability Maturity Model (IMM)).

- A **Public Service Consumer** is a Public Administration, Business or Citizen consuming public services (Based on IATE).

- A **Public Service Provider** is any natural or legal person or public entity or group of such persons and/or bodies which offers the execution of public services (Based on IATE).

- A **Business Capability** is a particular ability or capacity that an organisation may possess or exchange to achieve a specific purpose or outcome. Defining a business capability involves identifying and describing what needs to be done by the business in support of its overall mission. Business capabilities provide an abstraction of the business reality in a way that helps to simplify conversations between interested stakeholders (Based on the TOGAF© definition of Business Capability).

- An **Exchange of Business Information** is a communication of business information by a business capability. This ABB is a key interoperability enabler for assessing the compatibility of interaction in exchanged information.

- **Business Information** is the Representation of data that in the context of a public service enables interpretation (i.e. situational meaning). Examples are a medical prescription and a driving license.

- An **Interoperability Specification** is a document containing agreed normative statements for Solution Building Blocks used in an information exchange context. It can refer to existing standards or specifications (Source: How does the EIRA© support Interoperability).

- An **Organisational Interoperability Specification** is concerned with how organisations, such as public administrations in different Member States, cooperate to achieve their mutually agreed goals. In practice, organisational interoperability implies integrating business processes and related data exchange. Organisational interoperability also aims to meet the requirements of the user community by making services available, easily identifiable, accessible and user-focused.

4.4 Semantic view

The Semantic view models the most salient Architecture Building Blocks that should be considered in order to support semantic interoperability of information exchanges between administrations, businesses and citizens.
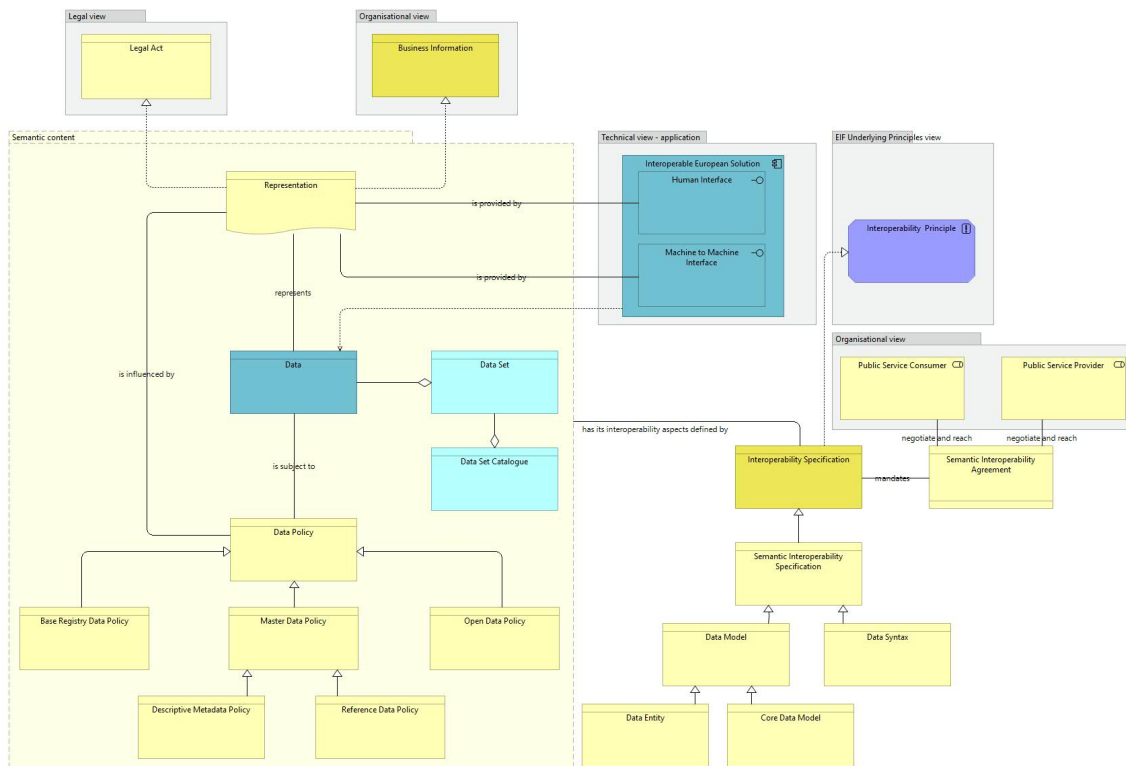
Figure 10 - Semantic view of the EIRA© (3)

Narrative: [Business Information] is realised by a [Representation] of [Data]. [Data] can be grouped in [Data Sets], which can be documented in [Data Set Catalogues]. A [Legal Act] has also a [Representation]. [Data] is subject to [Data policies], which also influence its [Representation]. [Data Policy] defines a guiding framework for data usage. Specific cases of [Data Policies] are [Master Data Policy], [Open Data Policy] and [Descriptive Metadata Policy]. [Reference Data Policy] and [Base Registry Data Policy]

These different Architecture Building Blocks define the [Semantic content] and each of these Architecture Building Blocks can have any [Interoperability Specification] associated, of which the [Semantic Interoperability Specification] is a specialisation. The following [Semantic Interoperability Specifications] are divided in [Data Models], of which [Core Data Models] and [Data Entities] are specialisations, and which implement the semantic interoperability associated with the data, and [Data Syntaxes], which implement the syntactic interoperability. An [Interoperability Specification] is mandated by a [Semantic Interoperability Agreement]. [Semantic Interoperability Agreement] are negotiated and reached by a [Public Service Consumer] and a [Public Service Provider].

Focal Architecture Building Blocks: Representation, Data Policy, Data and Interoperability Specification.

- **Representation** The perceptible form of data. Representations can be classified in various ways; for example, in terms of medium (e.g. electronic or paper documents, audio, etc.) or format (HTML, ASCII, PDF, RTF, etc.).

- **Data Policy** is a set of broad, high level principles which form the guiding framework in which data management can operate (Based on OECD).

- **Data** are symbols obtained through an encoding process of a phenomena.

- An **Interoperability Specification** is a document containing agreed normative statements for Solution Building Blocks used in an information exchange context. It can refer to existing standards or specifications (Source: How does the EIRA© support Interoperability).

- A **Semantic Interoperability Specification** enables organisations to process information from external sources in a meaningful manner. It ensures that the precise meaning of exchanged information is understood and preserved throughout exchanges between parties. In the context of the EIF, semantic interoperability encompasses the following aspects:

  o Semantic interoperability is about the meaning of data elements and the relationship between them. It includes developing vocabulary to describe data exchanges, and ensures that data elements are understood in the same way by communicating parties.

  o Syntactic interoperability is about describing the exact format of the information to be exchanged in terms of grammar, format and schemas.

  Semantic interoperability specifications support semantic interoperability by addressing the core semantic interoperability background for solutions.

4.5 Technical - application view

The Technical - Application view contains the most salient application Architecture Building Blocks that need to be considered in order to support technical interoperability when building an Interoperable European Solution. An Interoperable European Solution can support one or more public policies.
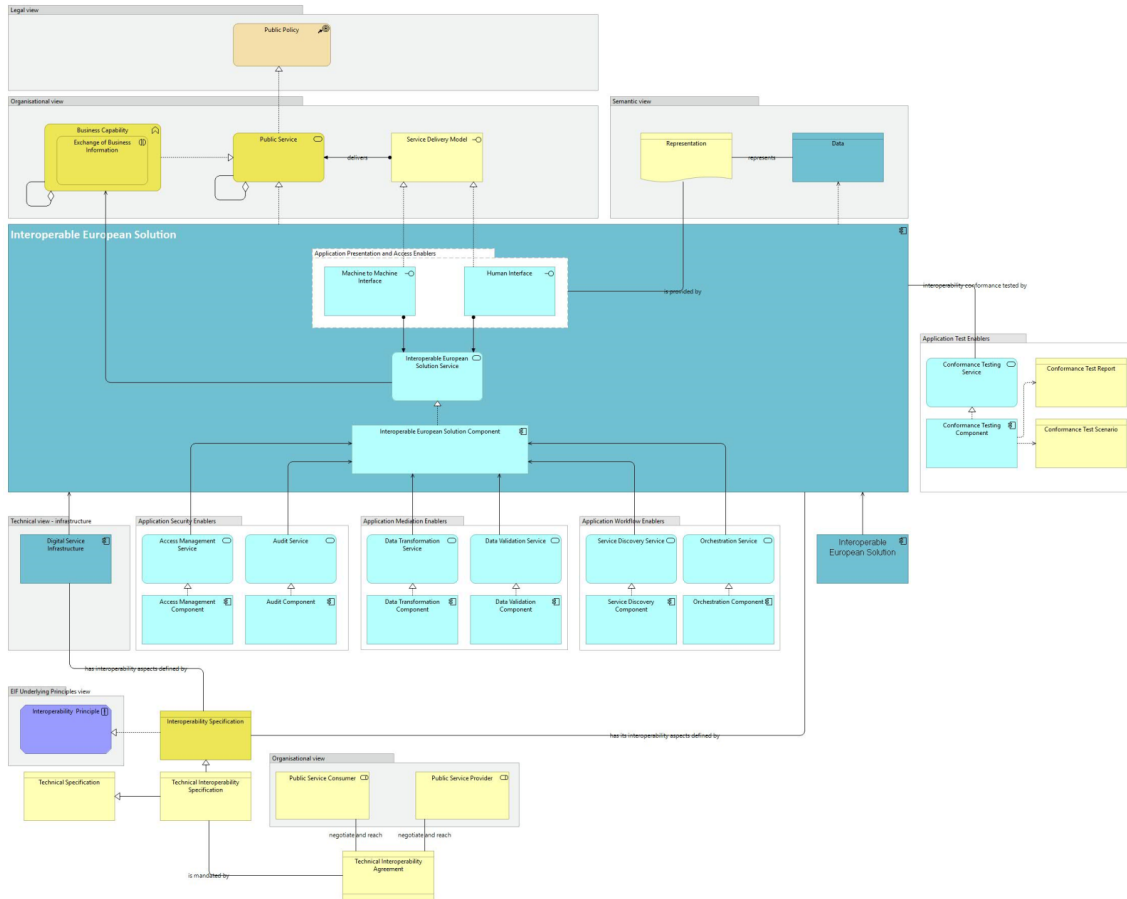
Figure 11 - Technical - application view of the EIRA© (3)

Narrative: An [Interoperable European Solution Service] implements [Public Service] and is supporting a [Public Policy]. An [Interoperable European Solution Service] can be accessed through [Machine to Machine Interfaces] or [Human Interfaces] in the [Application Presentation and Access Enablers] assigned to [Application Services]. [Interoperable European Solution Component] realizes [Interoperable European Solution Service]. The [Interoperable European Solution Component] is tested through the use of [Application Test Enablers]. Data can be exchanged, cross-border and cross-sector, with the support of [Application Mediation Enablers] containing the logic for data transfer and validation. [Interoperable European Solution Component] can execute complex business processes through [Application Workflow Enablers]. Access control is managed through the services offered by [Application Security Enablers].

The Architecture Building Blocks defined in the [Interoperable European Solution] can have any [Interoperability Specification] associated, of which the [Technical Interoperability Specification] is a specialisation, which is mandated by a [Technical Interoperability Agreement]. [Technical Specification] is a specialization of [Technical Interoperability Specification].

Focal Architecture Building Blocks: Human Interface and Machine to Machine Interface, Interoperable European Solution, Orchestration Service and Technical Interoperability Specification.

- A **Human Interface** is a boundary set of means enabling the exchange of data between an individual and a service. This ABB is a key interoperability enabler for assessing compatible interfaces.

- A **Machine to Machine Interface** is a boundary set of means enabling the exchange of data between a service and other services. This ABB is a key interoperability enabler for assessing compatible interfaces

- An **Interoperable European Solution** (IES) is a solution, developed by Public Administrations that facilitate the delivery of electronic Public Services and cross-border exchange of information between Public Administrations (or Citizens) in support to the implementation and advancement of EU, national or local Public Policies (Based on the ISA² definition of a Trans-European System (TES)).

- An **Orchestration Service** shares the functionality of defining the sequence and conditions in which one service invokes other services in order to realize some useful function (Based on W3C).

- An **Interoperability Specification** is a document containing agreed normative statements for Solution Building Blocks used in an information exchange context. It can refer to existing standards or specifications (Source: How does the EIRA© support Interoperability).
- A **Technical Interoperability Specification** is a specification contained in a document which lays down the characteristics required of a product such as levels of quality, performance, safety or dimensions, including the requirements applicable to the product as regards the name under which the product is sold, terminology, symbols, testing and test methods, packaging, marking or labelling and conformity assessment procedures.

4.6 Technical - infrastructure view

The Technical - Infrastructure view provides an architecture content metamodel for the most salient *cross-sectorial* infrastructure services, along with the supporting hosting and networking facilities, which shall be considered in order to support technical interoperability when building an Interoperable European Solution. The difference with the application part of the Technical view (see Section 4.5) is that the Architecture Building Blocks in the infrastructure view are considered to be relevant for solutions in *any* sector of government.
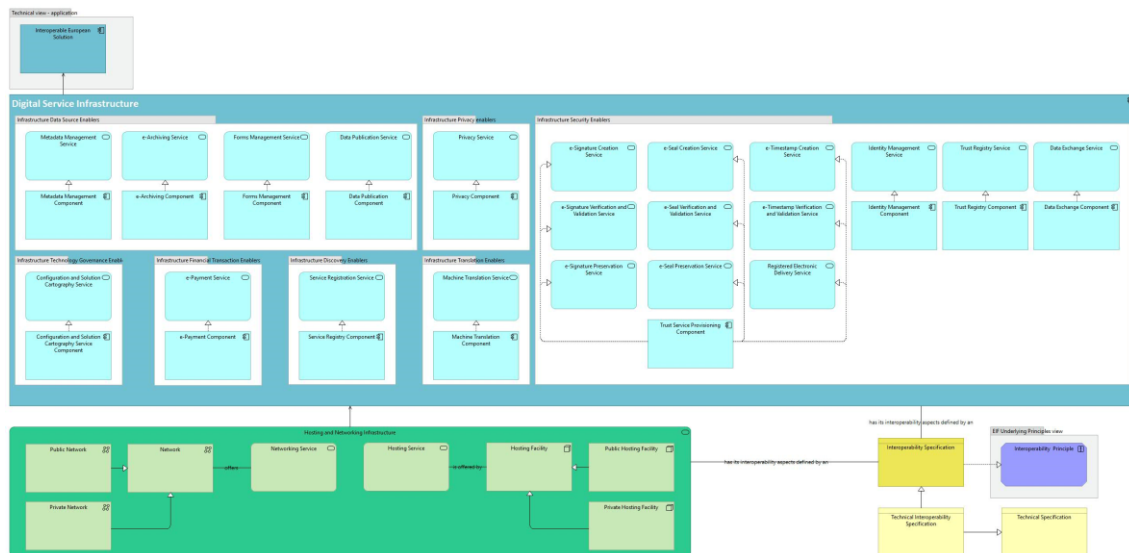
Figure 12 - Technical - infrastructure view of the EIRA© (3)

Narrative: An [Interoperable European Solution] and its application components make use of cross-sectorial [Digital Service Infrastructures]. It provides access to data through [Infrastructure Data Source Enablers] such as [Forms Management Service], [Record Management Services], [e-Archiving Service], or [Metadata Management Service]. The [Data] can be archived using [e-Archiving Services] and published to external data sources with a [Data Publication Service]. [Collaboration Enablers] can exchange messages between [Interoperable European Solutions] using [Messaging Services] and exchange multimedia using [Audio-visual Services]. The [Application Services] provided by an [Interoperable European Solution] can be discovered by users or systems through [Discovery Enablers]. Privacy preservation is performed by the [Privacy Enablers]. The administration and operational management of an [Interoperable European Solution] is performed through [Administration Enablers]. Trust between systems is established with [Trust Service Provisioning Components] realised using Signature validation and verification such as [e-Signing Creation Service], [e-Signature Verification and Validation Service], [e-Signature Preservation Service], and through e-Seal services such as [e-Seal Creation Service], [e-Seal Verification and Validation Service], [e-Seal Preservation Service], and e-timestamping services such as [e-Timestamp Creation Service], [e-timestamp Verification and Validation Service]. Identity management is realised with [Identity Management Service]/[Identity Management Component]. Evidence of transaction between parties is realised using the [Registered Electronic Delivery Service]. The [Interoperable European Solution] can register its architecture, and application documentation using a [Configuration and Cartography service]. The [Interoperable European Solutions] and the [Digital Service Infrastructures] are

deployed and operated through [Hosting and Networking Services Infrastructures], provided by a [Public / Private Hosting Facility], and make use of a [Public / Private Network] to exchange data. .

The Architecture Building Blocks defined in both the [Digital Service Infrastructure] and the [Hosting and Network Service] can have any [Interoperability Specification] associated, of which the [Technical Interoperability Specification] is a specialisation. [Technical Interoperability Specification] is also a specialization of [Technical Specification].

Focal Architecture Building Blocks: Digital Service Infrastructure, Hosting and Networking Infrastructure Service and Interoperability Specification.

- A **Digital Service Infrastructure** is an infrastructure which enable networked services to be delivered electronically, typically over the internet, providing trans-European interoperable services of common interest for citizens, businesses and/or public authorities, and which are composed of core service platforms and generic services (Source: Regulation (EU) No 283/2014) .

- A **Hosting and Networking Infrastructure Service** shares the functionalities for i) hosting Interoperable European Solutions and ii) providing the necessary networks for operating these solutions.

- An **Interoperability Specification** is a document containing agreed normative statements for Solution Building Blocks used in an information exchange context. It can refer to existing standards or specifications (Source: How does the EIRA© support Interoperability).

- A **Technical Interoperability Specification** is a specification contained in a document which lays down the characteristics required of a product such as levels of quality, performance, safety or dimensions, including the requirements applicable to the product as regards the name under which the product is sold, terminology, symbols, testing and test methods, packaging, marking or labelling and conformity assessment procedures.

4.7 Conceptual Model for Integrated Public Service Provisioning viewpoint

The EIF defines the Conceputal Model for Integrated Public Service Provisioning as depicted in the figure below.
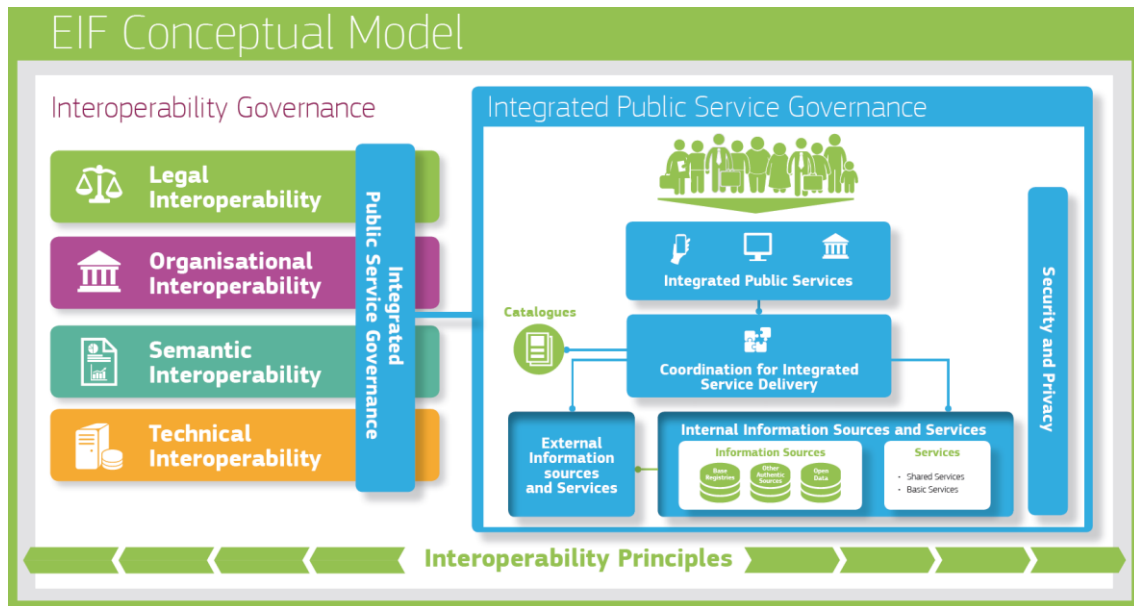
Figure 13 - EIF conceptual model for public services (2)

The Conceptual Model for Integrated Public Service Provisioning promotes reusability as a driver for interoperability, recognising that the European public services should reuse information and services that already exist and may be available from various sources inside or beyond the organisational boundaries of public administrations. Information and services should be retrievable and be made available in interoperable formats. Security and privacy requirements should be considered and measures for the provision of each public service according to risk management plans should be identified. Trust services should be used according to the Regulation on eID and Trust Services as mechanisms that ensure secure and protected data exchange in public services.

EIRA implements this concept through the Conceptual Model for Integrated Public Service Provisioning viewpoint, shown in the figure below.
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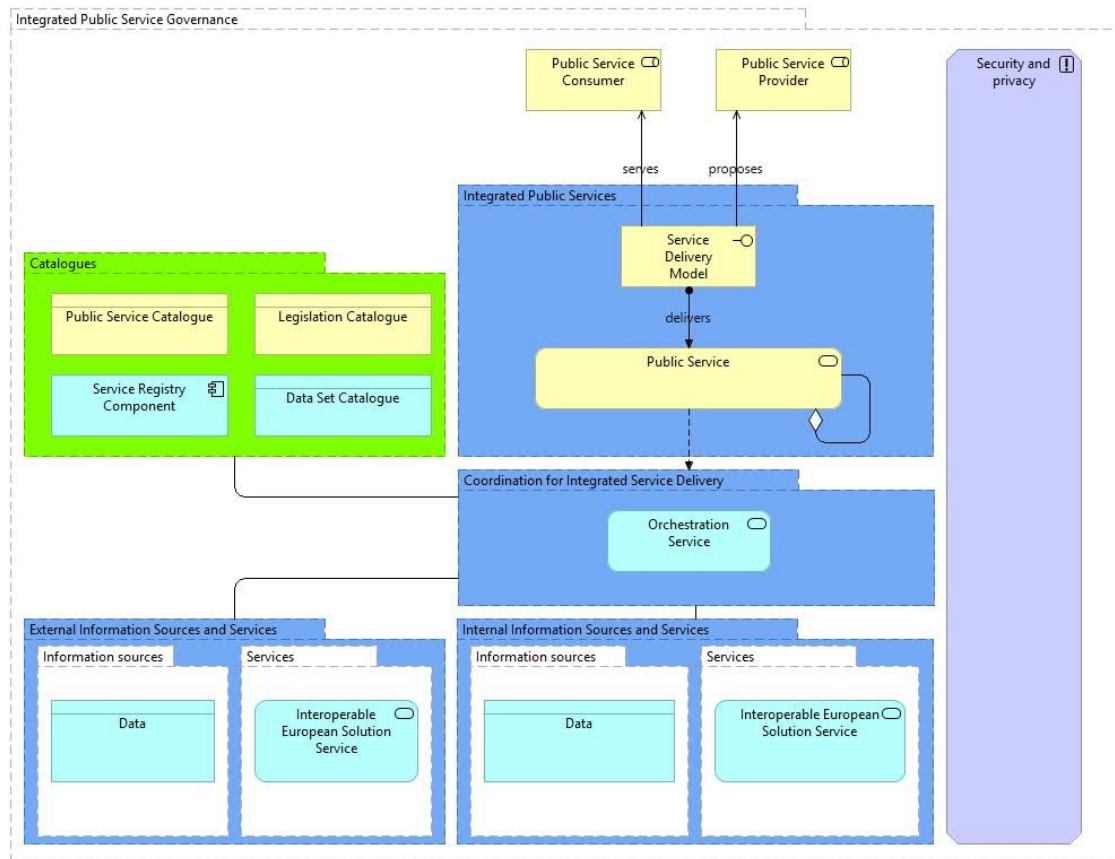
Narrative: A [Public Service Consumer] consumes a [Public Service] which is provided by a [Public Service Provider] via a [Service Delivery Model]. This [Public Service] can use other [Public Services], coordinated via [Orchestration Services]. These services use Catalogues ([Public Service Catalogues], [Legislation Catalogues], [Data Set Catalogues] or [Service Registry Components]) to assess sharing and reuse readiness and rely on Internal Information Sources and Services or External Information Sources and Services which contain [Data] as information sources, provided by [Interoperable European Solution Service]. [Security and Privacy] principles apply to the entire conceptual model.

4.8 EIRA Metamodel viewpoint
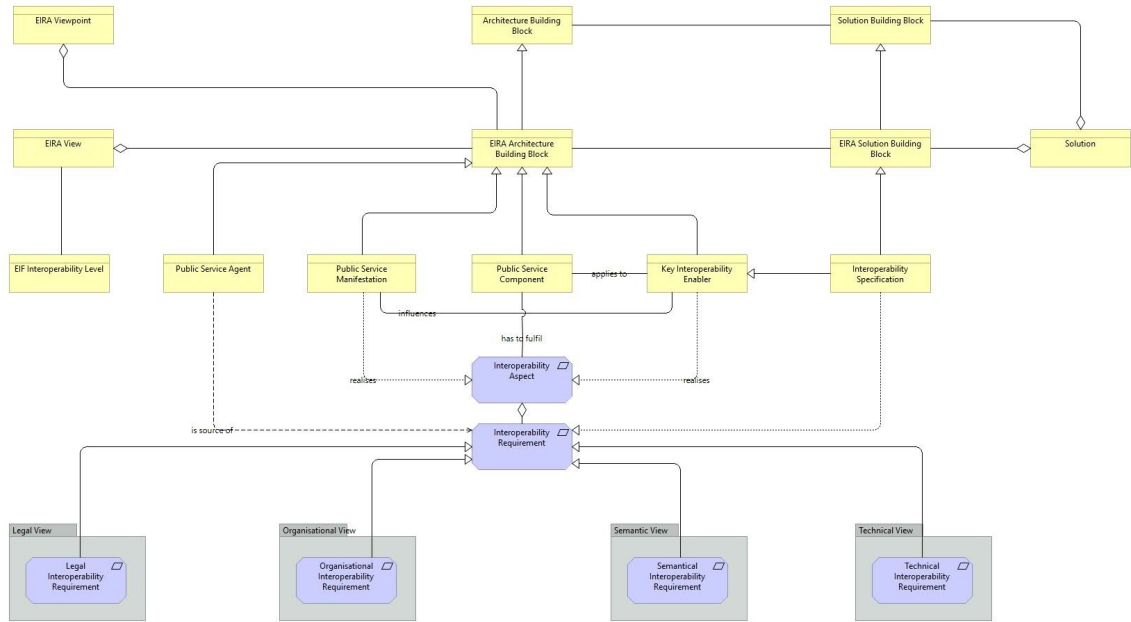
This viewpoint has already been described in section 3.1.

4.9 Interoperability Privacy viewpoint
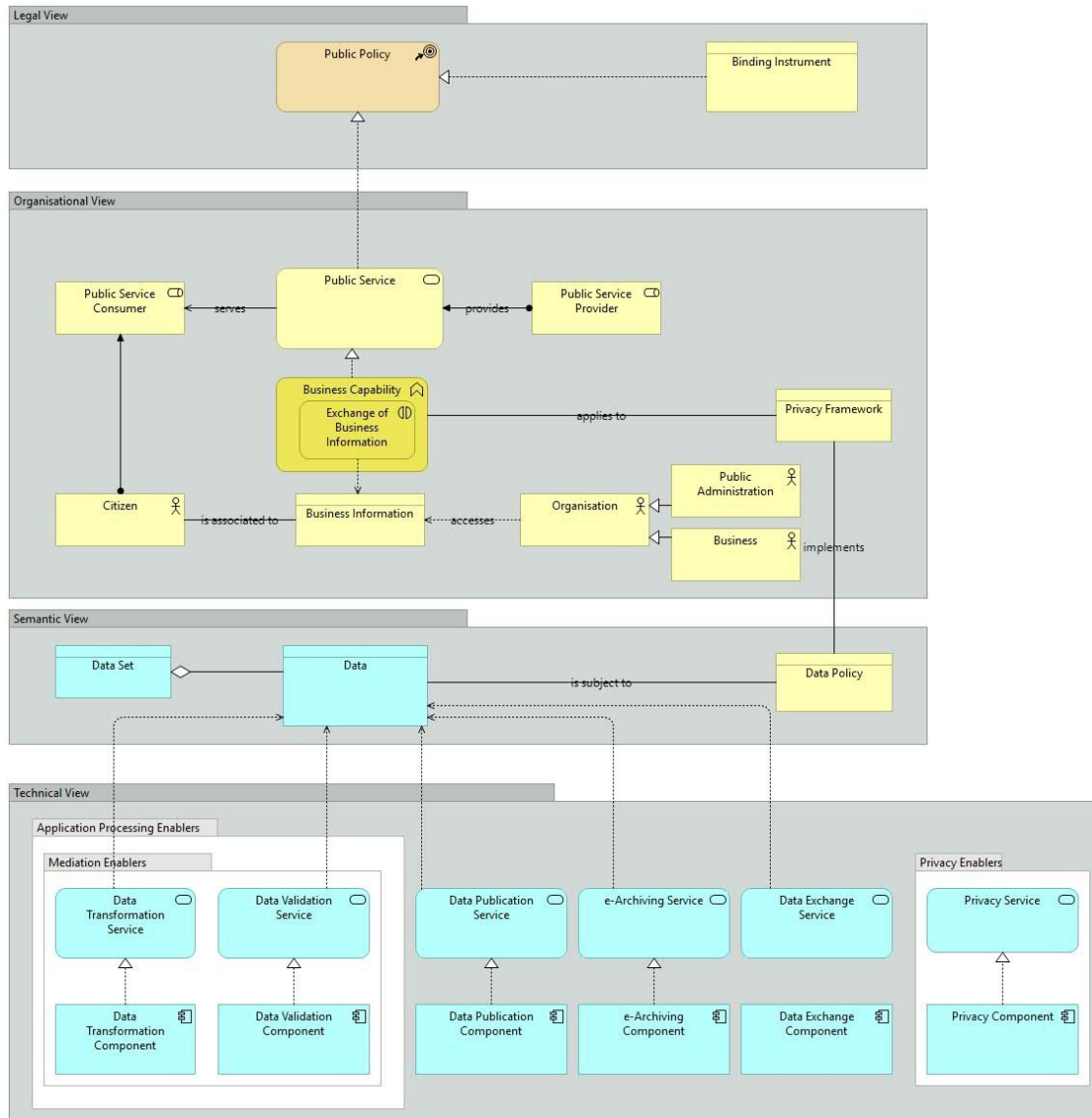
The Interoperability Privacy viewpoint highlights the EIRA building blocks that are relevant when implementing the EU General Data Protection Regulation (GDPR) or assessing an existing architecture against the GDPR principles. Public administrations must indeed guarantee the citizens' privacy, and the confidentiality, authenticity, integrity and non-repudiation of information provided by citizens and businesses.

Narrative: The selected Architecture Building Blocks from the five different views highlight the Architecture Building Blocks of the EIRA that are that are relevant with respect to GDPR:

1. The selected Architecture Building Blocks of the legal view show that privacy requirements are coming from a [Public Policy] realised by a [Binding instrument] (the GDPR itself).
2. The selected Architecture Building Blocks of the organisational view show that the roles of [Public Service Consumer] and [Public Service Provider] in the delivery of a [Public Service] are impacted by GDPR. Specific privacy roles are indeed associated to these roles by GDPR. All [Exchanges of Business Information] are impacted if the associated [Business Information] involve personal data of a [Citizen]. A [Privacy Framework], aligned with GDPR, needs then to be associated to the [Business Capability] implemented by the

[Exchange of Business Information].

3. The selected Architecture Building Blocks of the semantic view show that [Data] and [Data Sets], if involving personal data, are impacted by GDPR, as a relevant [Data Policy], respecting the [Privacy Framework], needs to be applied.

4. The selected Architecture Building Blocks of the Technical View show that many service involving data are impacted by the privacy regulation, such as [Data Transformation Service], [Data Validation Service], [e-Archiving Service], [Data Publication Service], [Data Exchange Service]. Additionally, a [Privacy Service] implementing GDPR principle can be used to ensure compliance.

4.10 Interoperability Governance viewpoint

The Interoperability Governance viewpoint models the most salient Architecture Building Blocks that refer to decisions on interoperability frameworks, institutional arrangements, organisational structures, roles and responsibilities, policies, agreements and other aspects of ensuring and monitoring interoperability at national and EU levels. As such, it does not include operational Architecture Building Blocks like interoperability agreements.
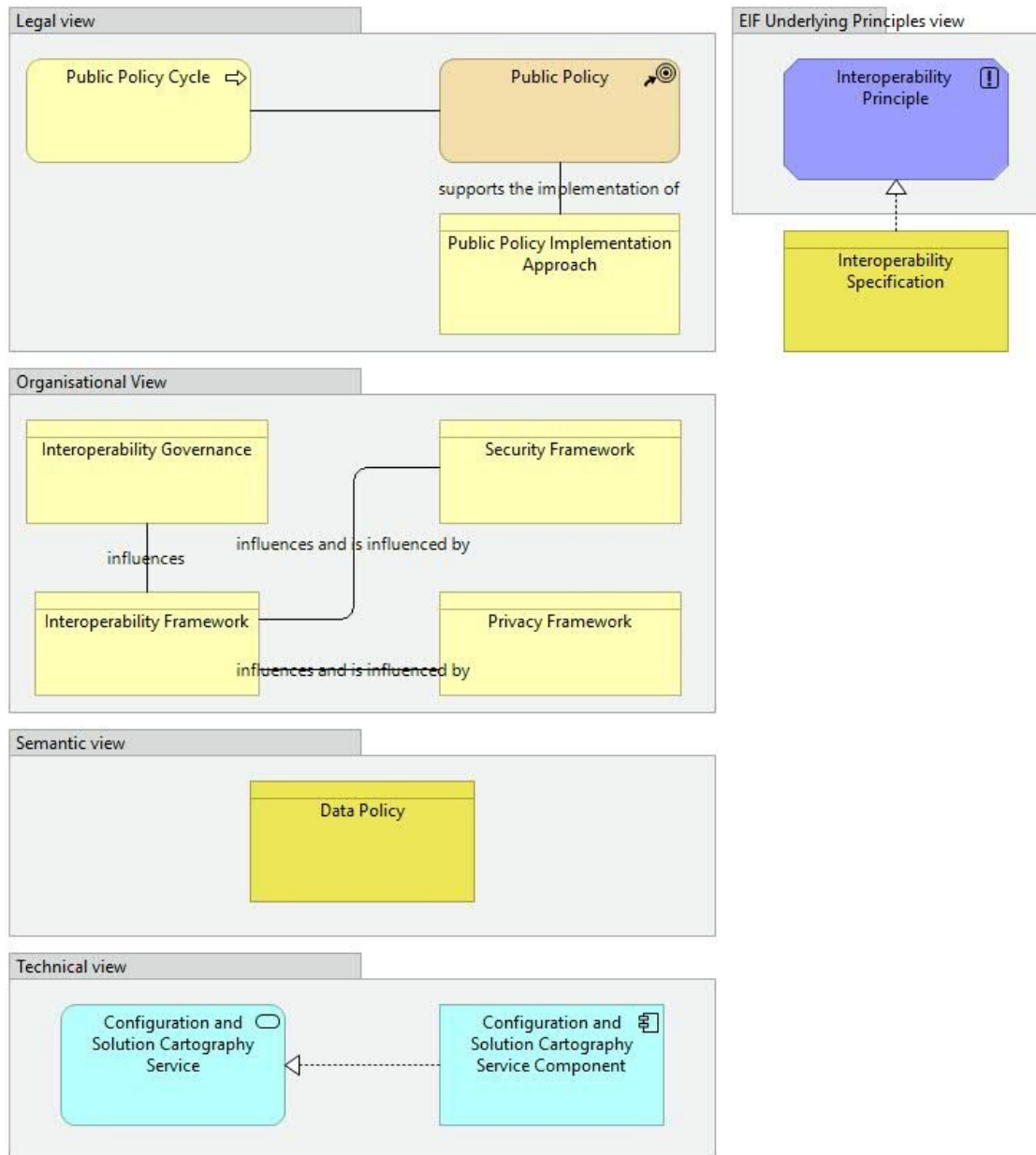
Figure 14 - Interoperability Governance viewpoint

Interoperability governance is the key to a holistic approach on interoperability, as it brings together all the instruments needed to apply it.

Narrative: The selected Architecture Building Blocks from the five different views highlight the Architecture Building Blocks of the EIRA that are related to Interoperability Governance:

1. The selected Architecture Building Blocks of the legal view show that a [Public Policy] is associated with a [Public Policy Cycle] where it is created and governed. [Public Policy Implementation Approach] supports the implementation of [Public Policy].
2. The selected Architecture Building Blocks of the organisational view show that [Security Framework] is influenced and is influenced by [Interoperability Framework], which influences [Interoperability Governance], influences and is influenced by [Privacy Framework].
3. The selected Architecture Building Block of the semantic view shows [Data Policy], which is that mainspring of the solution.
4. The selected Architecture Building Blocks of the technical view show that a [Configuration and solution Cartography Service Component] realises a [Configuration and Solution Cartography Service].
5. The selected Architecture Building Blocks of the EIF Underlying Principle view show that [Interoperability Specifications] realise [Interoperability Principles], the general intended properties used to achieve interoperability. The interoperability Specifications can be used to define the interoperability aspects for any of the Architecture Building Blocks.

4.11 Interoperability Security viewpoint

The Interoperability Security viewpoint models the most salient Architecture Building Blocks related to security in the domain of interoperability. Citizens and businesses must be confident that when they interact with public authorities they are doing so in a secure and trustworthy environment and in full compliance with relevant regulations, e.g. the Regulation on electronic identification and trust services.
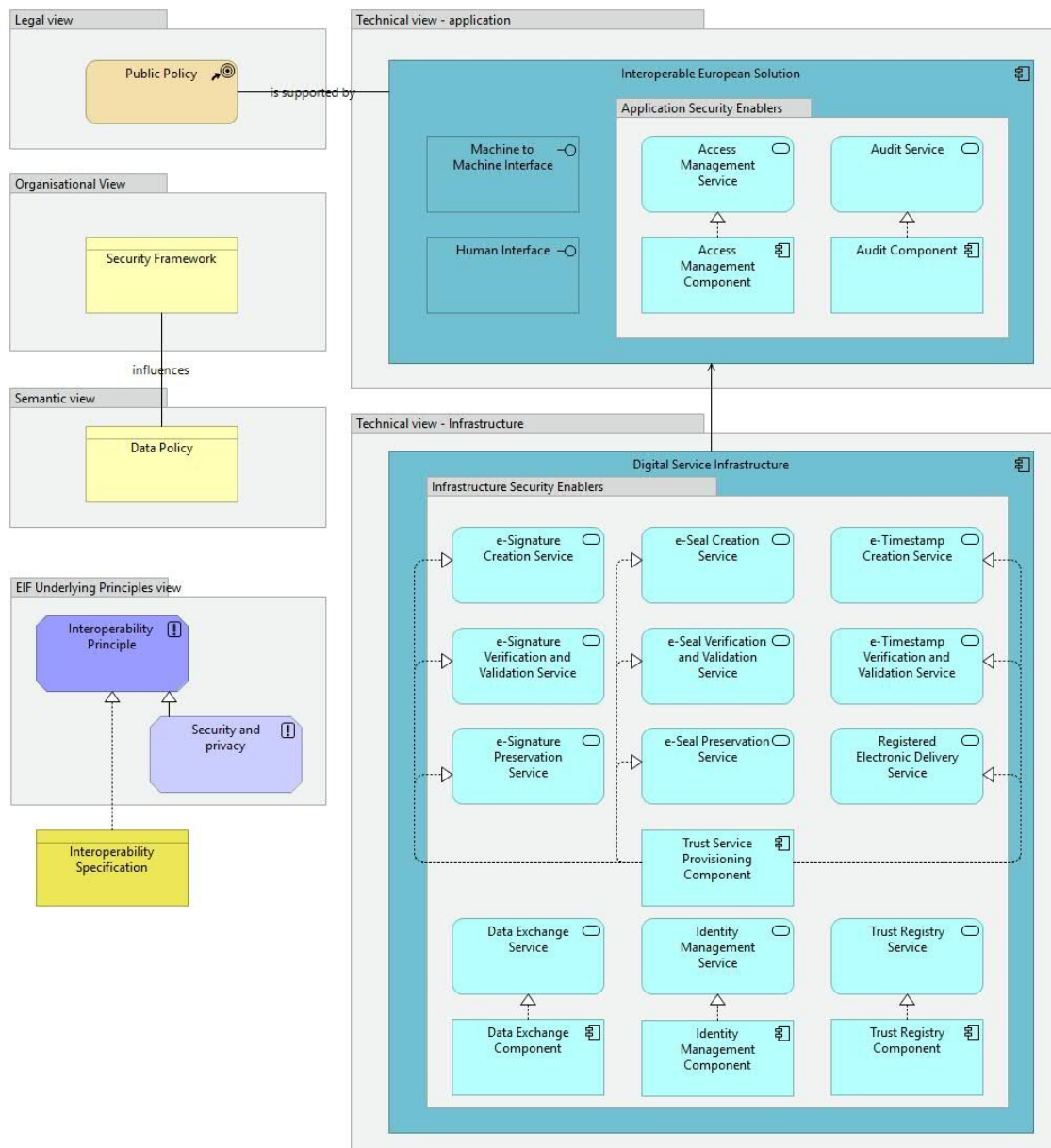
Figure 15 - Interoperability Security viewpoint

Security is primary concern in the provision of public services. When public administrations and other entities exchange official information, the information should be transferred, depending on security requirements, via a secure, harmonised, managed and controlled network. Transfer mechanisms should facilitate information exchanges between administrations, businesses and citizens. Appropriate mechanisms should allow secure exchange of electronically verified messages, records, forms and other kinds of information between the different systems; should handle specific security requirements and electronic identification and trust services such as electronic signatures/seals creation and verification; and should monitor traffic to detect intrusions, changes of data and other type of attacks.

Narrative: This viewpoint selects Architecture Building Blocks from the five different views highlighting the Security aspects of the EIRA:

1. The selected Architecture Building Block of the legal view shows the [Public Policy], which is that mainspring of the solution

2. The selected Architecture Building Block of the organisational view show that a [Security Framework] influences [Data Policy].

3. The selected Architecture Building Block of the semantic view shows the [Data Policy] which is influenced by [Security Framework].

4. The selected Architecture Building Blocks of the technical views show that a [Public Policy] is supported by an [Interoperable European Solution] which uses a [Digital Service Infrastructure]. An [Interoperable European Solution] is associated with a [Machine to Machine Interface] and a [Human Interface]. An [Access Management Service], which is realised by an [Access Management Component], and an [Audit Service], which is realised by an [Audit Component] are defined as [Application Security Enablers]. [Infrastructure Security Enablers] such as [e-Signature Creation Service], [e-Seal Creation Service], [e-Timestamp Creation Service], [e-Signature Verification and Validation Service], [e-Seal Verification and Validation Service], [e-Timestamp Verification and Validation Service], [e-Signature Preservation Service], [e-Seal Preservation Service] and [Registered Electronic Delivery Service], which are all realised by a [Trust Service Provisioning Component] are modelled as [Infrastructure Security Enablers], as well as the [Data Exchange Service] realised by the [Data Exchange Component], the [Identity Management Service] realised by the [Identity Management Component] and the [Trust Registry Service] realised by the [Trust Registry Component].

5. The selected Architecture Building Block of the EIF Underlying Principles view show that [Interoperability Specifications] realise [Interoperability Principles], the general intended properties used to achieve interoperability, of which the [Security and Privacy Principle] is a specialisation. The interoperability Specifications can be used to define the interoperability aspects for any of the Architecture Building Blocks.

4.12 Interoperability Specification viewpoint

The Interoperability specification viewpoint models the most salient Architecture Building Blocks that shall be considered when providing interoperability specifications. It provides an overview of Architecture Building Blocks from the different views, and depicts them as a taxonomy of interoperability specifications. Each EIRA© view has Architecture Building Blocks that support interoperability.
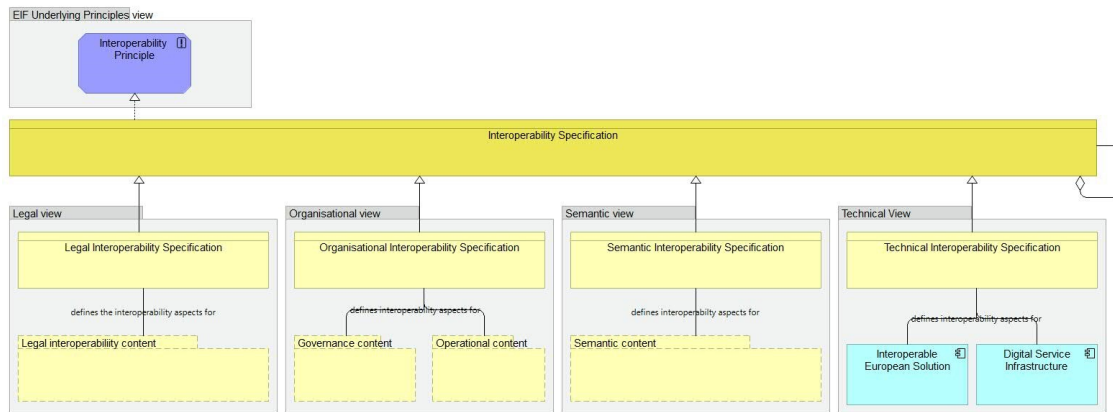
Figure 16 - Interoperability Specification viewpoint

Each view's interoperability specifications serve to define the interoperability aspects of catalogues and registries, addressing both their contents and the respective catalogue or registry as a whole. Given the linked nature of the EIRA©'s views, the interoperability specifications from all views can be considered to affect each individual catalogue or registry. However, the focus in each case is kept within the specific view to best capture the level of detail that each view's specifications deal with.

Narrative: An [Interoperability Specification] can be composed of other [Interoperability Specifications]. It exists at the four levels of interoperability defined in the European Interoperability Framework.

This viewpoint selects Architecture Building Blocks from the five different views highlighting the interoperability specification related Architecture Building Blocks of the EIRA:

1. The selected Architecture Building Blocks of the legal view shows that a [Legal Interoperability Specification] defines the interoperability aspects for [Legal Interoperability Content]

2. The selected Architecture Building Blocks of the Organisational view shows that an [Organisational Interoperability Specification] defines the interoperability aspects for [Governance Content] and [Operational Content]

3. The selected Architecture Building Blocks of the semantic view shows that a [Semantic Interoperability Specification] defines the interoperability aspects for [Semantic Content]

4. The selected Architecture Building Blocks of the Technical view shows that a [Technical Interoperability Specification] defines the interoperability aspects for [Interoperable European Solution] and [Digital Service Infrastructure]

5. The selected building block of the EIF Underlying Principle view show that [Interoperability Specifications] realise [Interoperability Principles], the general intended properties used to achieve interoperability. The interoperability Specifications can be used to define the interoperability

aspects for any of the Architecture Building Blocks.

4.13 Key Interoperability Enablers viewpoint

The Key Interoperability Enablers viewpoint models the most salient key interoperability enablers (13). The viewpoint uses the ArchiMate© motivation extension to assess the "Sharing and reuse" readiness, the "Exchange readiness" and the "Interoperability readiness" of solutions that are necessary to enable the efficient and effective delivery of public services across administrations. European public service provision often requires different public administrations to work together to meet end users' needs and provide public services in an integrated way. When multiple organisations are involved there is a need for coordination and governance by the authorities with a mandate for planning, implementing and operating European public services. Services should be governed to ensure: integration, seamless execution, reuse of services and data, and development of new services and 'building blocks'.
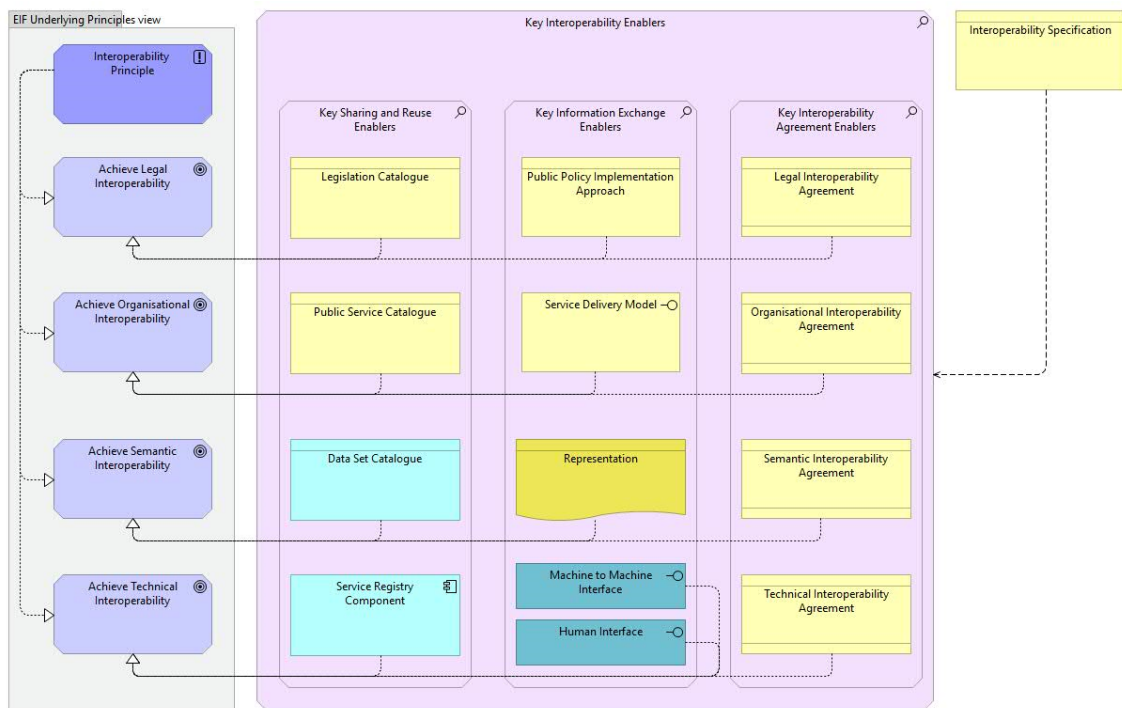
Figure 17 – Key Interoperability Enablers viewpoint

Key Interoperability Enablers viewpoint should cover all layers: legal, organisational, semantic and technical. Ensuring interoperability when preparing legal instruments, organisation business processes, information exchange, services and components that support European public services is a continuous task, as interoperability is regularly disrupted by changes to the environment, i.e. in legislation, the needs of businesses or citizens, the organisational structure of public administrations, the business processes, and by the emergence of new technologies.

Narrative: This viewpoint selects Architecture Building Blocks related to Key Interoperability Enablers:

1. EIF [Interoperability Principles] are used to realise the overall goal of [Achieving Interoperability].

2. Particularly, the goal of [Achieving Legal Interoperability] is realised by [Legislation Catalogues] that are used for provisioning/consuming legal texts, by [Public Policy Implementation Approaches] that are used to ensure compatibility cross legal/juridical certainties and by a [Legal Interoperability Agreements] which are used to ensure agreed legal terms/conditions for sharing, reuse and exchange of information.

3. Particularly, the goal of [Achieving Organisational Interoperability] is realised by [Public Service catalogues] that are used for provisioning/consuming front-office public services as well as by the [Service Delivery Model] that are used to ensure compatibility between business interfaces and by [Organisational Interoperability Agreement] that defines the operational terms/conditions for sharing, reuse and exchange of information.

4. Particularly, the goal of [Achieving Semantic Interoperability] is realised by [Data Set Catalogues] that are used for provisioning/consuming data, by [Representations] that are used to ensure compatibility between interpretations of business information and by [Semantic Interoperability Agreement] which are used to ensure agreed semantic terms/conditions for sharing, reuse and exchange of information.

5. Particularly, the goal of [Achieving Technical Interoperability] is realised by [Service Registry Components] that are used for provisioning/consuming back-office services, by [Machine to Machine Interfaces] and/or [Human Interfaces] that are used to ensure compatibility between technical interfaces and by [Technical Interoperability Agreement] which are used to ensure agreed technical terms/conditions for sharing, reuse and exchange of information.

4.14 European Interoperability Framework underlying principles view

The European Interoperability Framework underlying principles view models the motivation of the EIRA © in terms of goals to be achieved and the principles to be followed in order to achieve interoperability in public services.

The interoperability principles are fundamental behavioural aspects to drive interoperable public services. They describe the context in which European public services are designed and implemented.

The twelve underlying principles of the EIF are grouped into four categories:

1. Principle setting the context for EU actions on interoperability (Subsidiarity and proportionality);

2. Core interoperability principles (Openness, Transparency, Reusability, Technological neutrality and data portability);

3. Principles related to generic user needs and expectations (User-centricity, Inclusion and accessibility, Security and privacy, Multilingualism);

4. Foundation principles for cooperation among public administrations (Administrative simplification, Preservation of information, Assessment of Effectiveness and Efficiency).
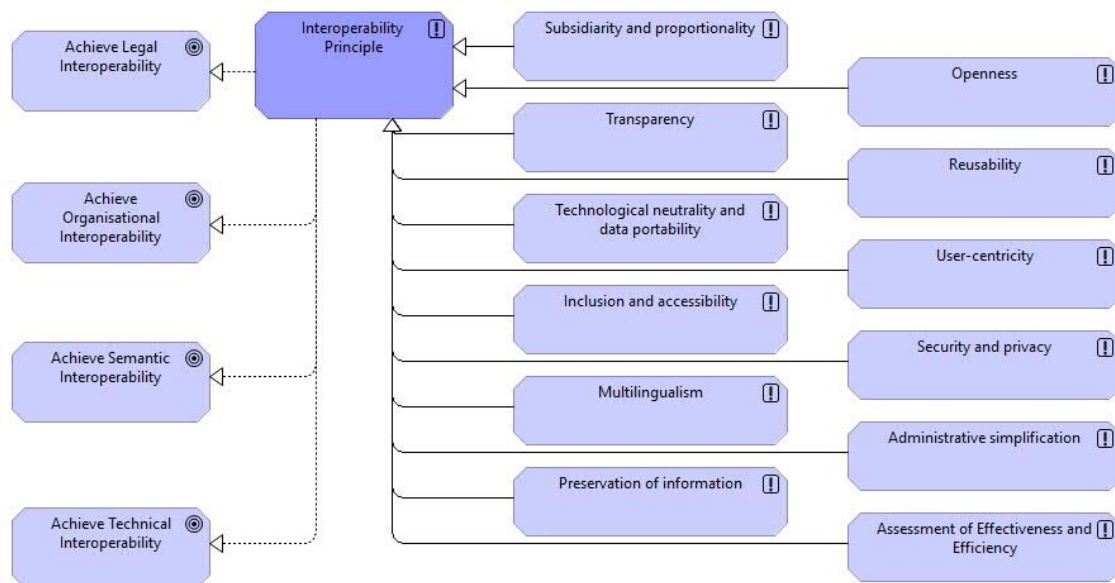
Figure 18 - EIF Underlying Principles view

Narrative: The twelve interoperability principles of the New EIF ([Subsidiarity and proportionality], [Openness], [Transparency], [Reusability], [Technological neutrality and data portability], [User-centricity], [Inclusion and accessibility], [Security and privacy], [Multilingualism], [Administrative simplification], [Preservation of information] and [Assessment of Effectiveness and Efficiency]) together fulfil the goals of achieving interoperability: [Achieve Legal Interoperability], [Achieve Organisational Interoperability], [Achieve Semantic Interoperability] and [Achieve Technical Interoperability].

Focal Architecture Building Blocks: Interoperability Principle

- An **Interoperability Principle** describes fundamental behavioural aspects to drive interoperability actions. It describes the context in which European public services are designed and implemented. (Source: the New EIF)

5 GLOSSARY

Table 5-1 provides an overview of the most common terms and acronyms used throughout this document. Further context to some of these terms can be found in Section 3.1.

Table 5-1 - Glossary

Term / acronym	Definition
Architecture Building Block (ABB)	An abstract component that captures architecture requirements and that directs and guides the development of Solution Building Blocks (SBBs) (TOGAF® (7)).
Architecture content metamodel	A model consisting of common Architecture Building Blocks that describes how and with what an architecture is to be described in a structured way (TOGAF® (7)).
Connecting Europe Facility (CEF)	The Connecting Europe Facility (CEF) supports trans-European networks and infrastructures in the sectors of transport, telecommunications and energy.
Digital Service Infrastructure (DSI)	A Digital Service Infrastructure is a collection of cross-sectorial infrastructure services and components. They are decoupled from the business which a specific interoperable solution implements. They can be re-used with no or very minor changes by other interoperable solutions or in different policy contexts.
Digital Single Market (DSM)	A Digital Single Market (DSM) is one in which the free movement of persons, services and capital is ensured and where the individuals and businesses can seamlessly access and exercise online activities under conditions of fair competition, and a high level of consumer and personal data protection, irrespective of their nationality or place of residence.
Directorate-General (DG)	European Commission Directorate-General is a department of the European Commission.
European Interoperability Framework (EIF)	The purpose of the New European Interoperability Framework (EIF) is: • To inspire European public administrations in their efforts to design and deliver seamless European public services to other public administrations, citizens and businesses which are to the degree possible, digital-by-default (i.e. providing services and data preferably via digital channels), cross-border by-default (i.e. accessible for all citizens in the EU) and open-by-default (i.e. enabling reuse, participation/access and transparency); • To provide guidance to public administrations on the design and update of national interoperability frameworks (NIFs) (2), or national policies, strategies and guidelines promoting interoperability;

Term / acronym	Definition
	• To contribute to the establishment of the digital single market by fostering cross-border and cross-sectoral interoperability for the delivery of European public services
European Interoperability Reference Architecture (EIRA©)	European Interoperability Reference Architecture. It is the result of an enterprise architectural effort using TOGAF®, SOA as the architectural style and ArchiMate® as the reference model.
European Interoperability Framework – Interoperability Strategy (EIF-IS)	The European Interoperability Framework – Interoperability Strategy (EIF-IS) aims to provide guidance and to prioritise the actions needed to improve interaction, exchange and cooperation among European public administrations across borders and across sectors for the delivery of European public services.
Interoperability Maturity Model (IMM)	The Interoperability Maturity Model measures how well a public administration interacts with external entities in order to organise the efficient provisioning of its public services to other public administrations, businesses and or citizens. The IMM helps owners of a Public Service to enhance the quality of the service delivery, reduce costs and overcome integration issues by reusing available services and orchestrate services in an effective manner to maximize service outcome and benefits for citizens and public administrations. (14)
Interoperability Solutions for European Public Administrations (ISA)	Interoperability Solutions for European Public Administrations is the programme executing the ISA decision.
Interoperable European Solution (IES)	An Interoperable European Solution (IES) is a solution, developed by public administrations that facilitate the delivery of electronic public services and cross-border exchange of information between public administrations, business or citizens in support to the implementation and advancement of EU, national or local public policies.
Member State (MS)	Member State of the European Union
Requirement	A requirement is a condition that must be met by a solution.
Service Oriented Architecture (SOA)	Service Oriented Architecture is an application pattern where application offer services to other application by means of interfaces.
Solution Architecture Template (SAT)	A solution architectural template (SAT) is a sub-set of Architecture Building Blocks of the EIRA©. It focuses on the most salient Architecture Building Blocks needed to build an interoperable solution addressing a particular interoperability need.

Term / acronym	Definition
Solution Building Block (SBB)	A Solution Building Block (SBB) can be defined as a concrete element that implements the required capabilities of one or more Architecture Building Blocks (TOGAF® (7)).
Specification	A Specification is a document that states requirements. A specification can be related to activities (e.g. procedure document, process specification and test specification), or products (e.g. product specification, performance specification and drawing). [ISO 9000:2005] Source: https://www.iso.org/obp/ui/#iso:std:iso:9000:ed-3:v1:en:term:3.7.3
The Open Group Architecture Framework (TOGAF)	The Open Group Architecture Framework (TOGAF®) (7) is a framework for enterprise architecture.
Trans-European Solution (TES)	An IES developed by the European Commission or other bodies (in some cases co-funded by MSs) in support to the implementation and advancement of EU policies.

6 REFERENCES

1. **The Open Group.** ArchiMate 3.0.1 Specification. [Online] 2017. ®The Open Group. http://pubs.opengroup.org/architecture/archimate3-doc/.

2. **European Commission, ISA2 Programme.** The New European Interoperability Framework (EIF) for European public services. [Online] 2017. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2017:134:FIN.

3. —. European Interoperability Reference Architecture (EIRA). [Online] 2018. https://joinup.ec.europa.eu/solution/eira/about.

4. —. European Interoperability Framework - Implementation Strategy (EIF-IS). [Online] http://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_1&format=PDF.

5. —. Promoting sharing and reuse of IT solutions. [Online] European Commission, ISA2 Programme. https://ec.europa.eu/isa2/actions/promoting-sharing-and-reuse-interoperability-solutions_en.

6. —. Assessment of trans-European systems supporting EU policies. [Online] https://ec.europa.eu/isa2/actions/evaluating-and-rationalising-ict-public-administrations_en.

7. **The Open Goup.** The Open Group Architecture Framework (TOGAF). [Online] 2011. http://pubs.opengroup.org/architecture/togaf9-doc/arch/index.html.

8. **Thierry Perroud, Reto Inversini.** *Enterprise Architecture Patterns, practical solutions for recurring IT-Architetcure Problems.* s.l. : Springer, 2013.

9. **Gravesen, Jan K.** "What defines success with public sector enterprise architecture". [Online] 11 December 2012. http://www.ibm.com/developerworks/rational/library/define-success-public-sector-enterprise-architecture/.

10. *Nederlandse Overheid Referentie Architectuur.* **(NORA), Nederlandse Overheid Referentie Architectuur.** http://www.noraonline.nl/wiki/NORA_online.

11. **4S.** Danish Reference Architectures. [Online] http://4s-online.dk/wiki/doku.php?id=standards:refark.

12. **W3C.** Asset Description Metadata Schema (ADMS). [Online] http://www.w3.org/TR/vocab-adms/.

13. **ISA2 Programme [Online] 2015, https://eur-lex.europa.eu/eli/dec/2015/2240/oj.**

14. **European Commission, ISA2 Programme. Interoperability Maturity Assessment of Public Services (IMAPS). [Online] https://joinup.ec.europa.eu/collection/imaps-interoperability-maturity-assessment-public-service.**

15. **Connecting Europe Facility. [Online] http://ec.europa.eu/digital-agenda/en/connecting-europe-facility.**

16. Kruchten, Philippe. *The Rational Unified Process: An Introduction.* **s.l. : Addison-Wesley, 2000.**

17. THE COMMON APPROACH TO FEDERAL ENTERPRISE ARCHITECTURE. **[Online]** **2012.** **https://www.whitehouse.gov/sites/default/files/omb/assets/egov_docs/common_appr oach_to_federal_ea.pdf.**

18. Martínez-Fernández, Silverio, et al. Benefits and Drawbacks of Reference Architectures. **[Online]** **http://upcommons.upc.edu/bitstream/handle/2117/20655/Benefits+and+Drawbacks +of+Reference+Architectures.pdf.**

19. *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015D2240.*

20. *Decision (EU) 2015/2240 of the European Parliament and of the Council of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European publihttps://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015D2240.*

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Name (alphabetical order)	Role	EIRA release
Andres Kütt	Lead Architect	EIRA v1.0.0; EIRA v1.1.0; v3.0.0
Barry Nauta	Lead Architect	EIRA v1.0.0; EIRA v1.1.0; EIRA v2.0.0; EIRA v2.1.0; EIRA v3.0.0
Constantinos Simatos	IT Architect	EIRA v1.0.0; EIRA v1.1.0; EIRA v2.0.0; EIRA v2.1.0; EIRA v3.0.0
Fausto Rubino	Lead Architect	EIRA v3.0.0
João Rodrigues Frade	Enterprise Architect	EIRA v1.0.0; EIRA v1.1.0;
Mads Hjorth	Assistant Professor	EIRA v1.0.0; EIRA v1.1.0; EIRA v2.0.0; EIRA v2.1.0; EIRA v3.0.0
Marco Fichera	Lead Architect	EIRA v1.0.0; EIRA v1.1.0; EIRA v3.0.0
Olivier Mahieu	Application Architect	EIRA v2.0.0; EIRA v2.1.0
Philippe Bocquillon	Project Manager	EIRA v2.0.0; EIRA v2.1.0
Raul-Mario Abril-Jimenez	Chief Architect	EIRA v1.0.0; EIRA v1.1.0; EIRA v2.0.0; EIRA v2.1.0; EIRA v3.0.0
Saco Bekius	Enterprise Architect	EIRA v1.0.0; EIRA v1.1.0; EIRA v2.1.0; EIRA v3.0.0
Susanne Wigard	Project Officer	EIRA v1.0.0; EIRA v1.1.0; EIRA v2.0.0; EIRA v2.1.0; EIRA v3.0.0
Valerio Mezzapesa	Manager	EIRA v3.0.0
Zakaria A. Arrassi	Lead Architect	EIRA v2.0.0; EIRA v2.1.0

8   APPENDIX EIRA© VIEWS, VIEWPOINTS AND ABB DEFINITIONS

This appendix contains the EIRA© views, viewpoints and ABB definitions.

8.1 Views and Viewpoints

8.1.1 EIRA© high-level viewpoint
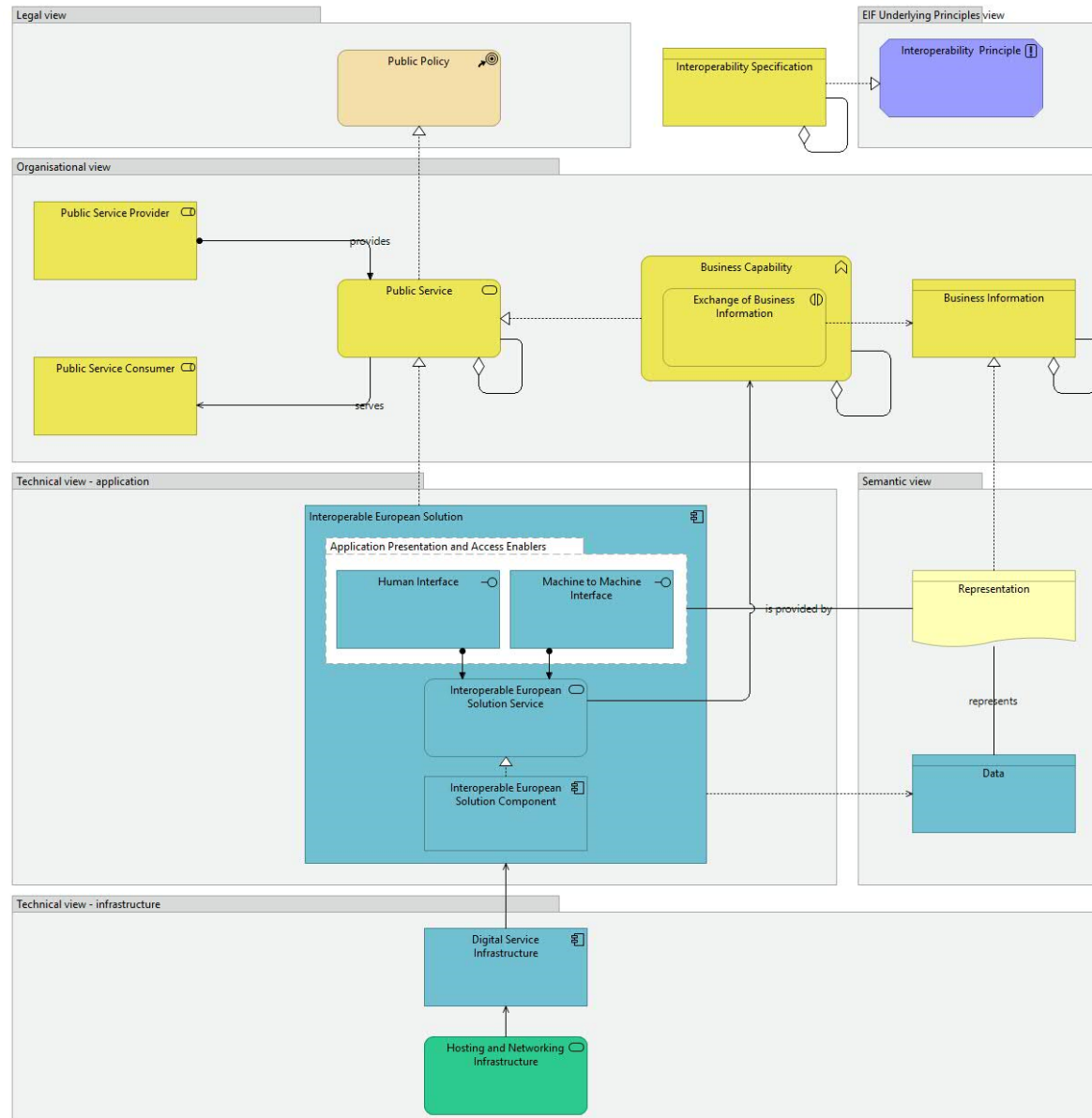
8.1.2 Legal view
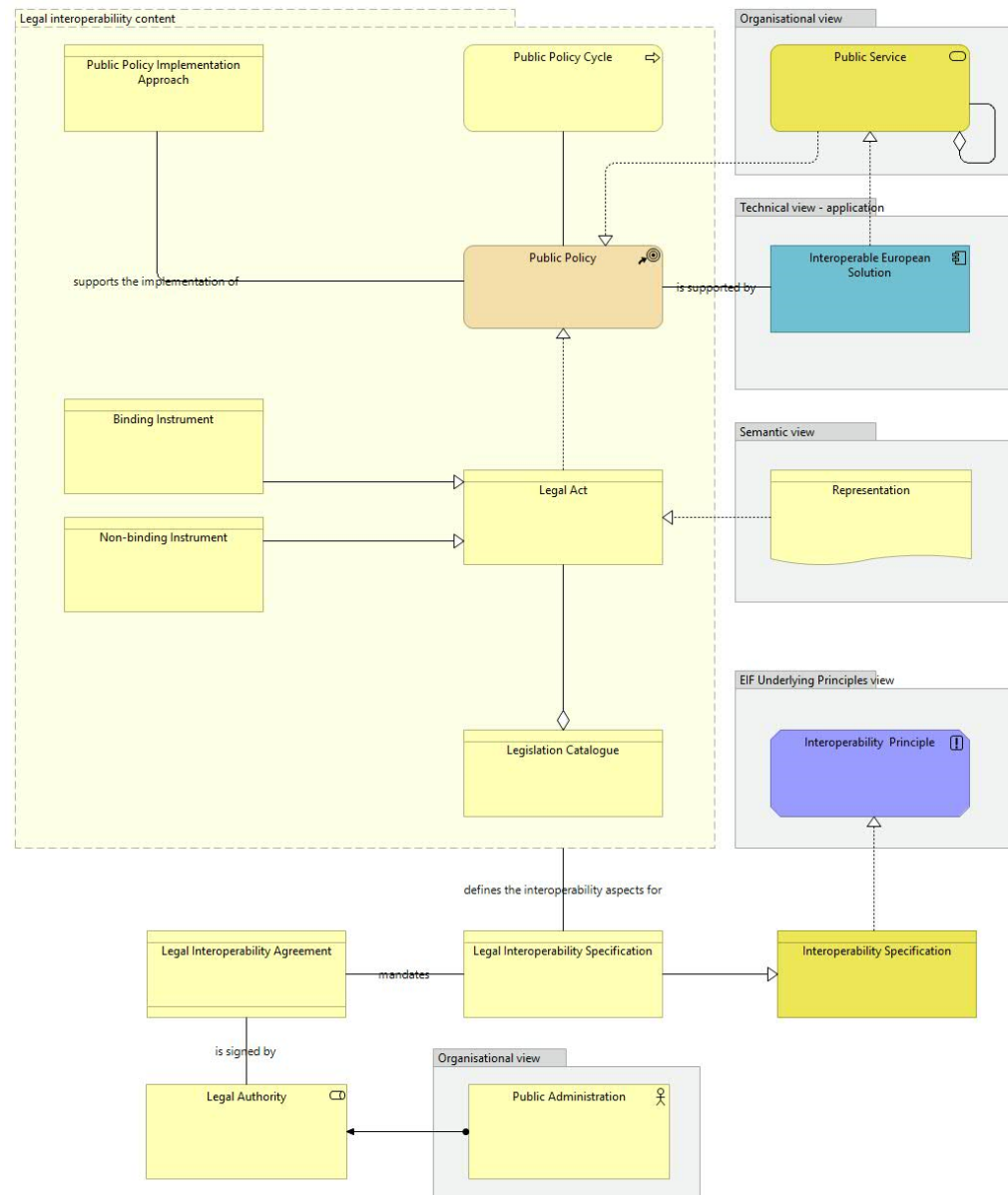
8.1.3 Organisational view
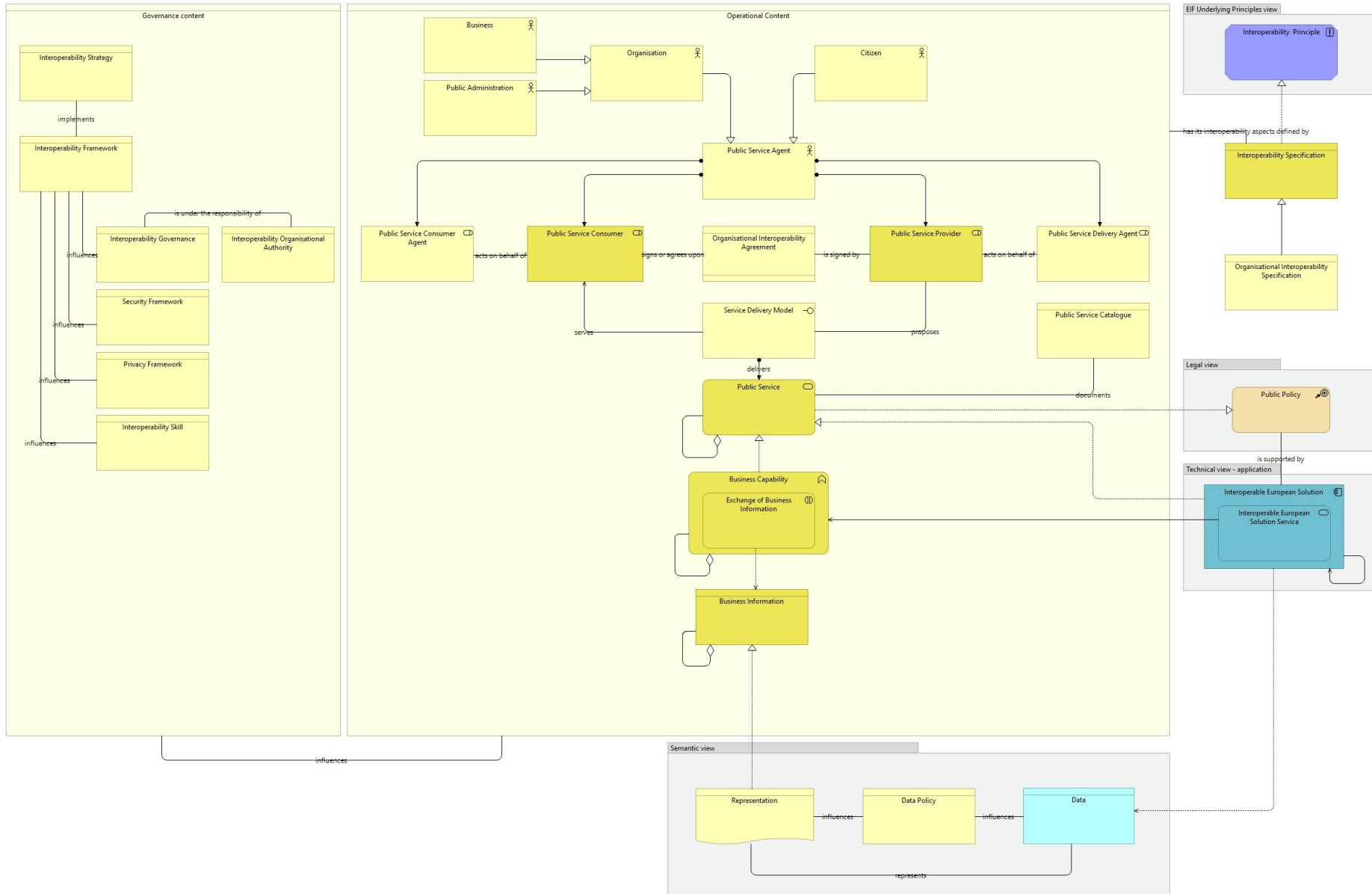
8.1.4 Semantic view
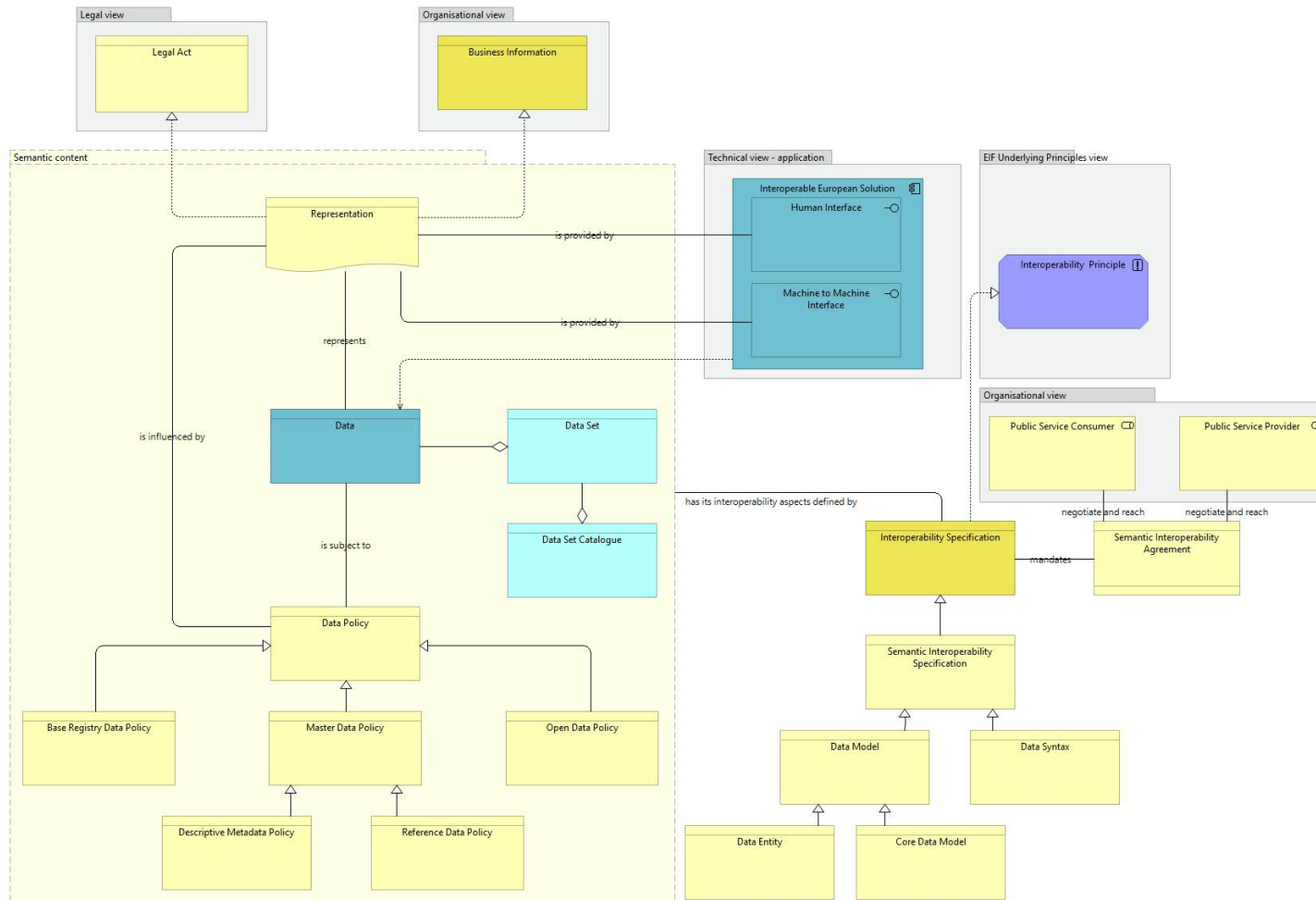
8.1.5 Technical – application view
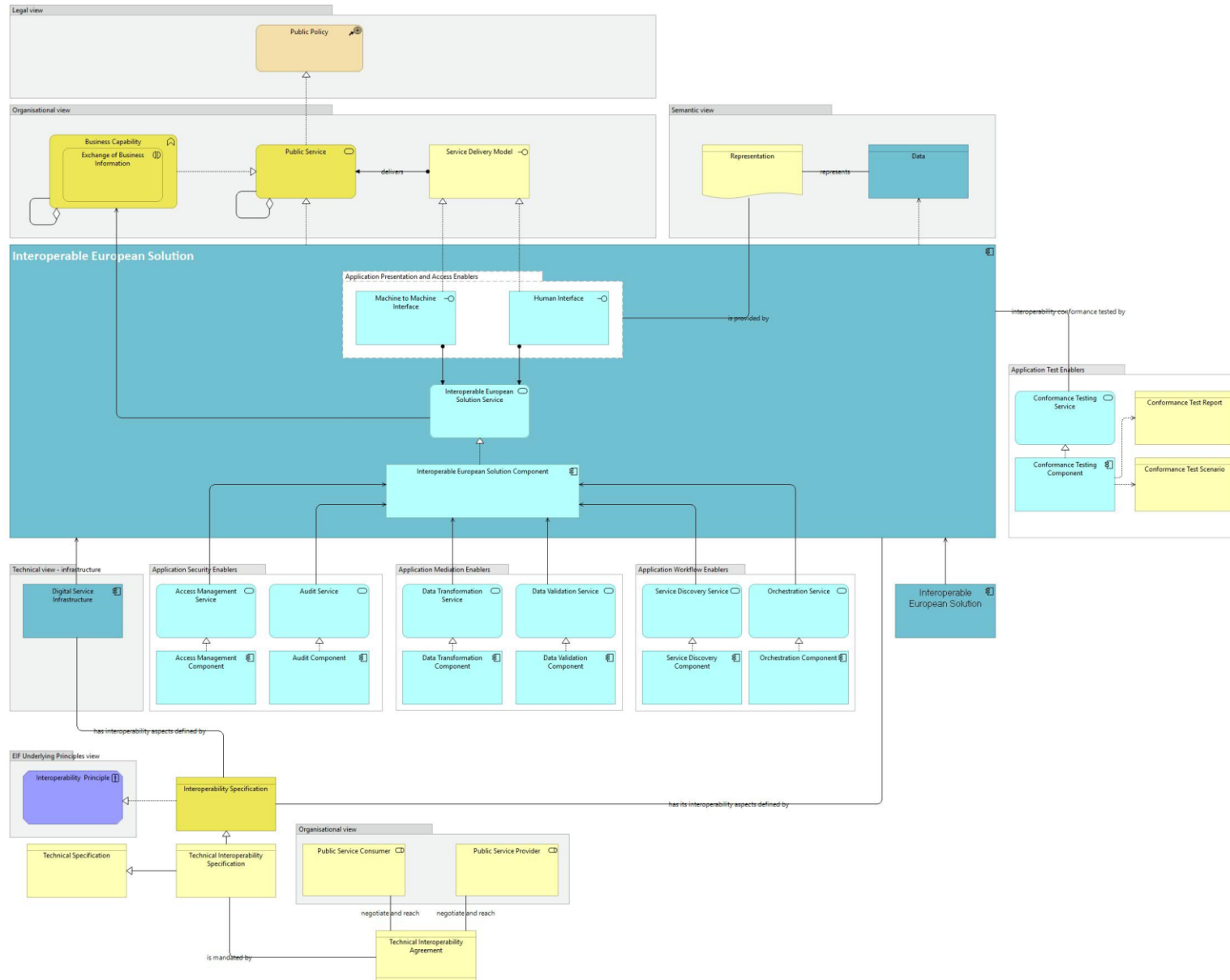
8.1.6 Technical – infrastructure view
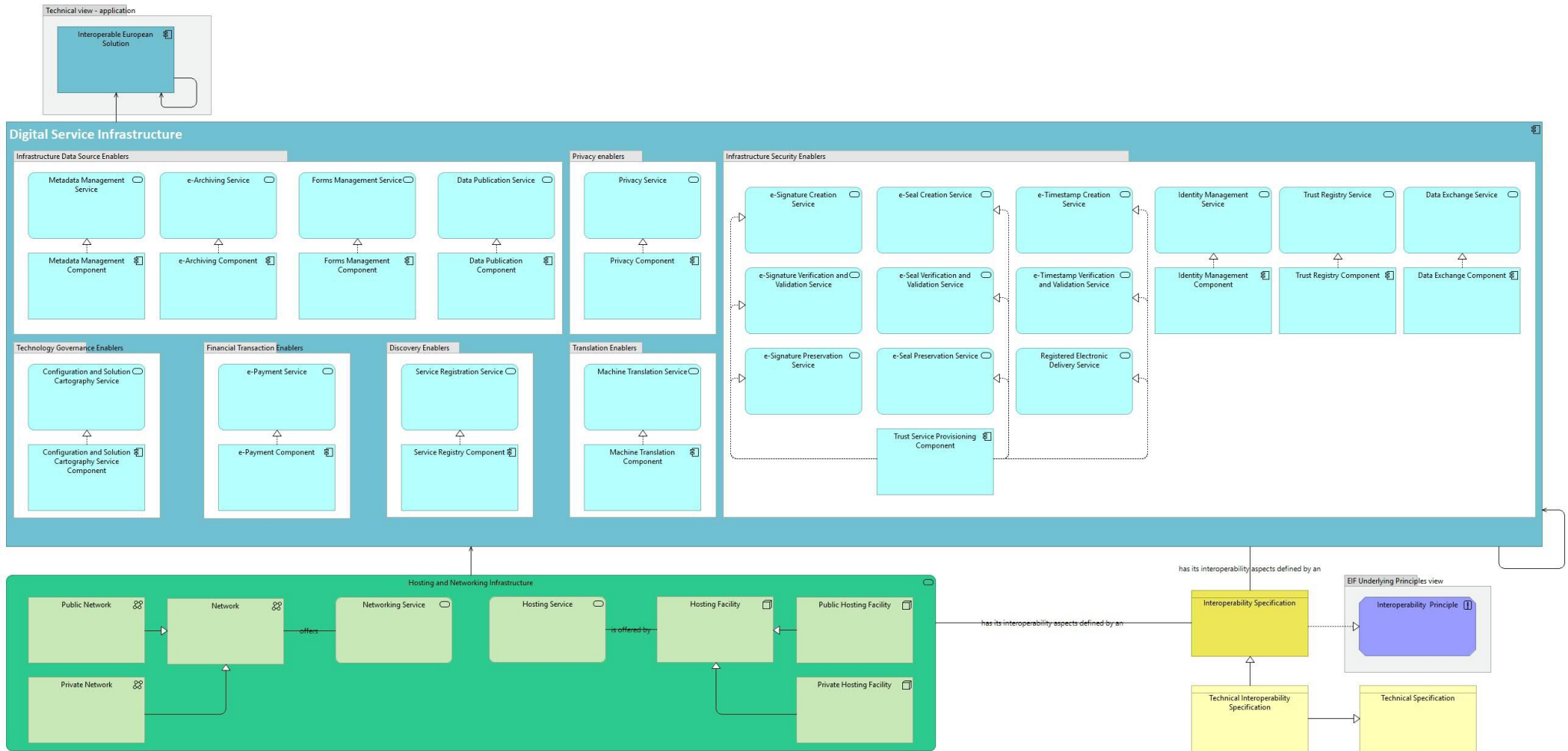
8.1.7 Conceptual Model for Integrated Public Service Provisioning viewpoint
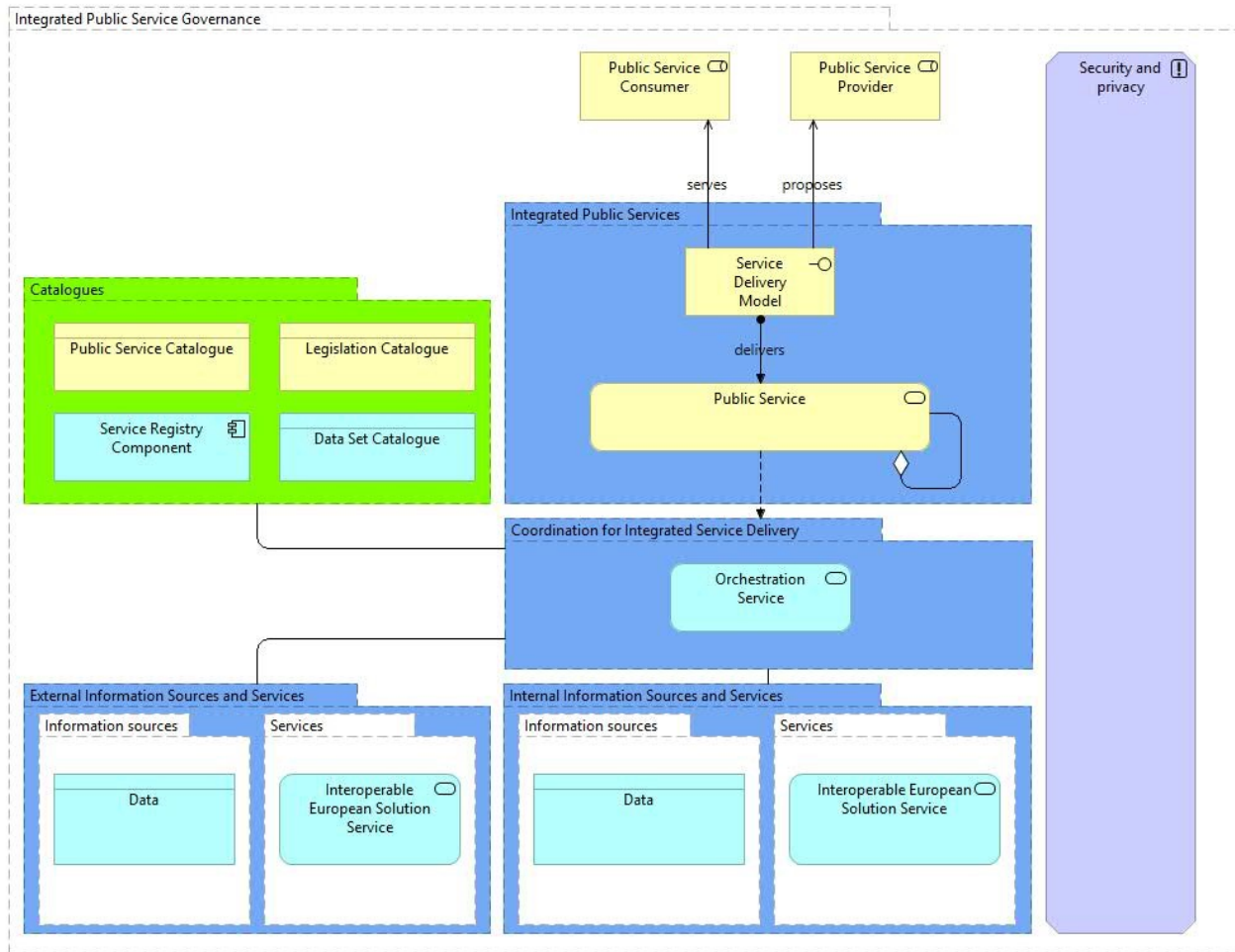
8.1.8 EIRA Metamodel viewpoint
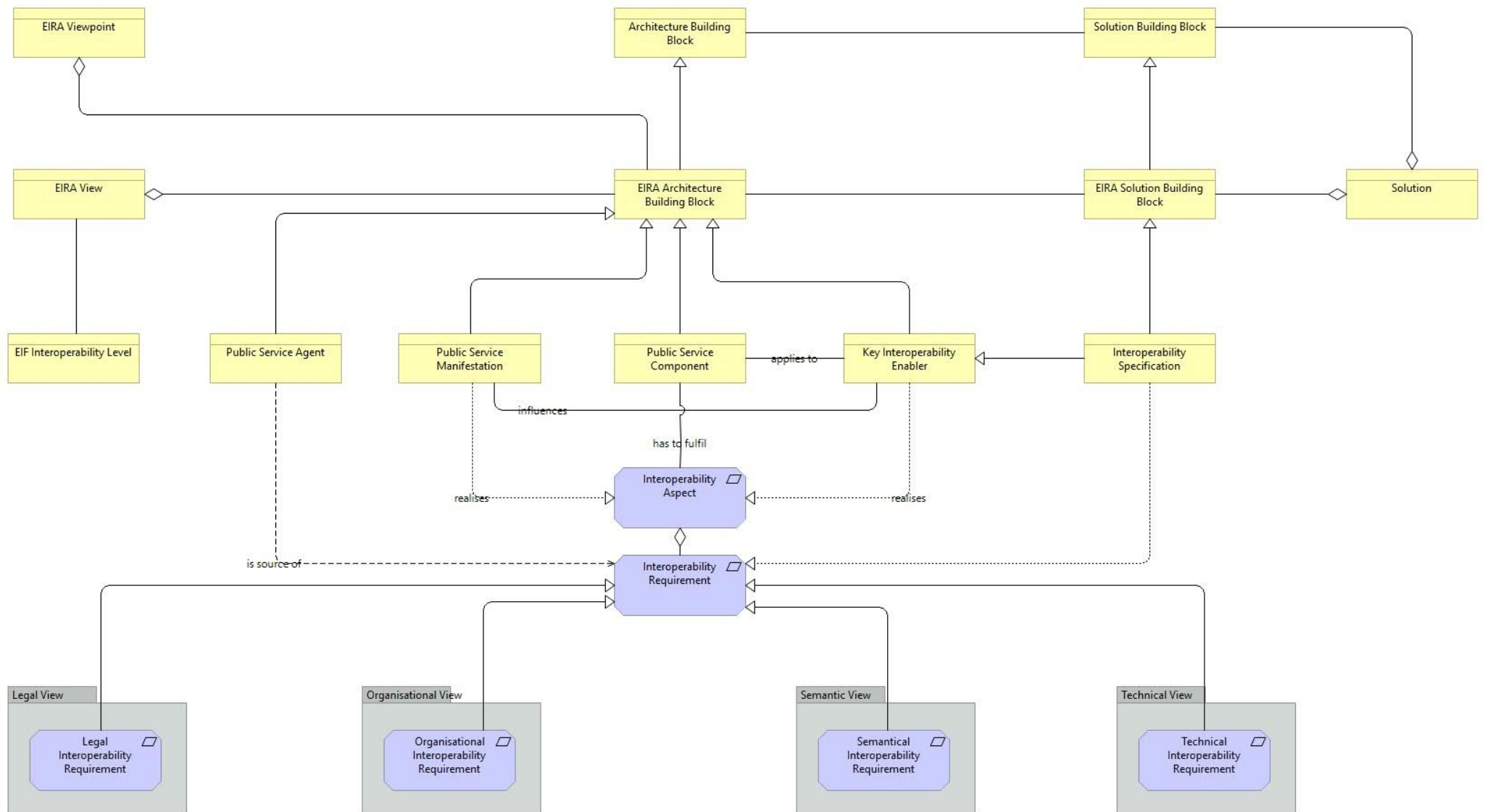
8.1.9 Interoperability Privacy viewpoint
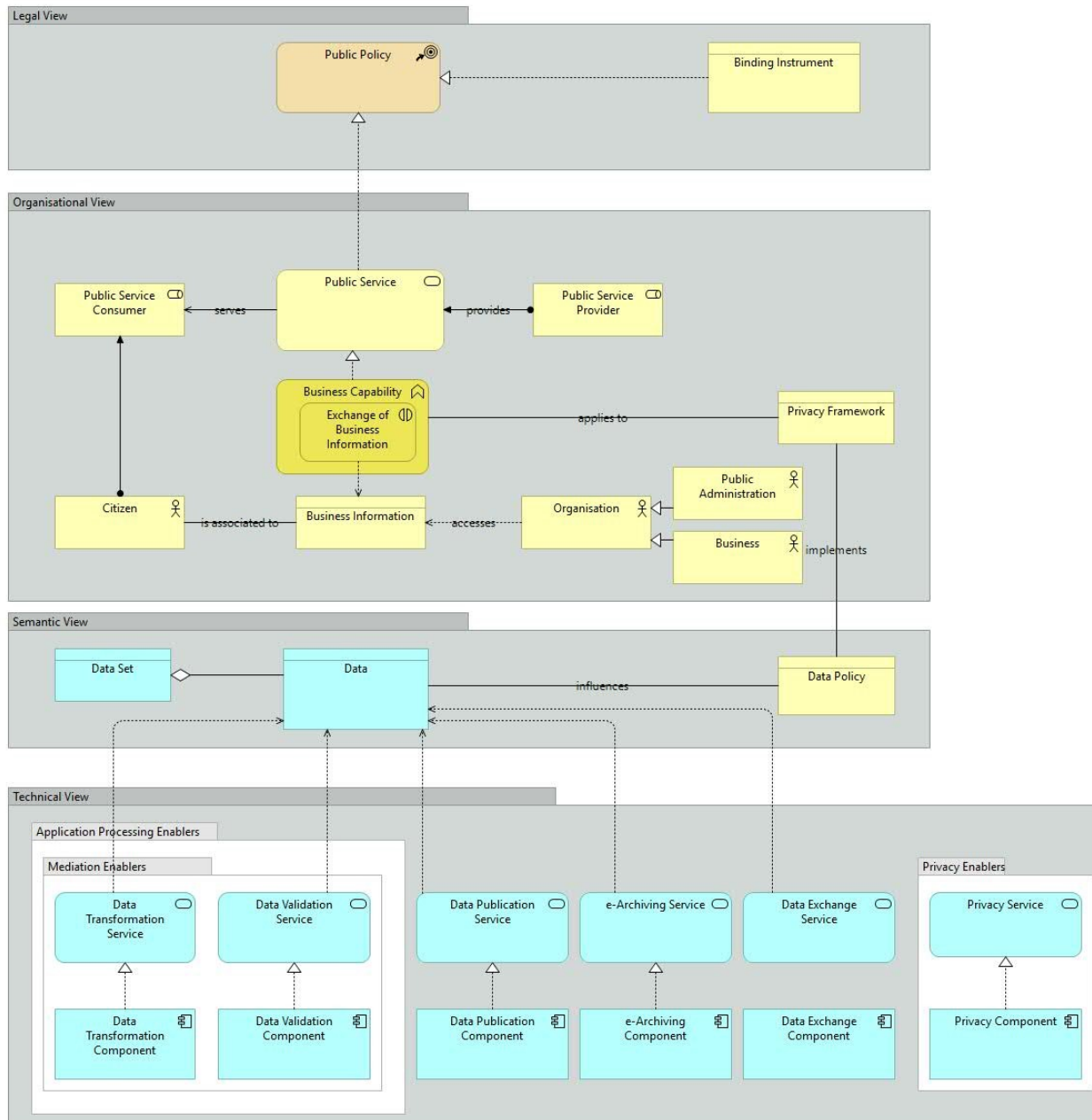
8.1.10 Interoperability Governance Viewpoint
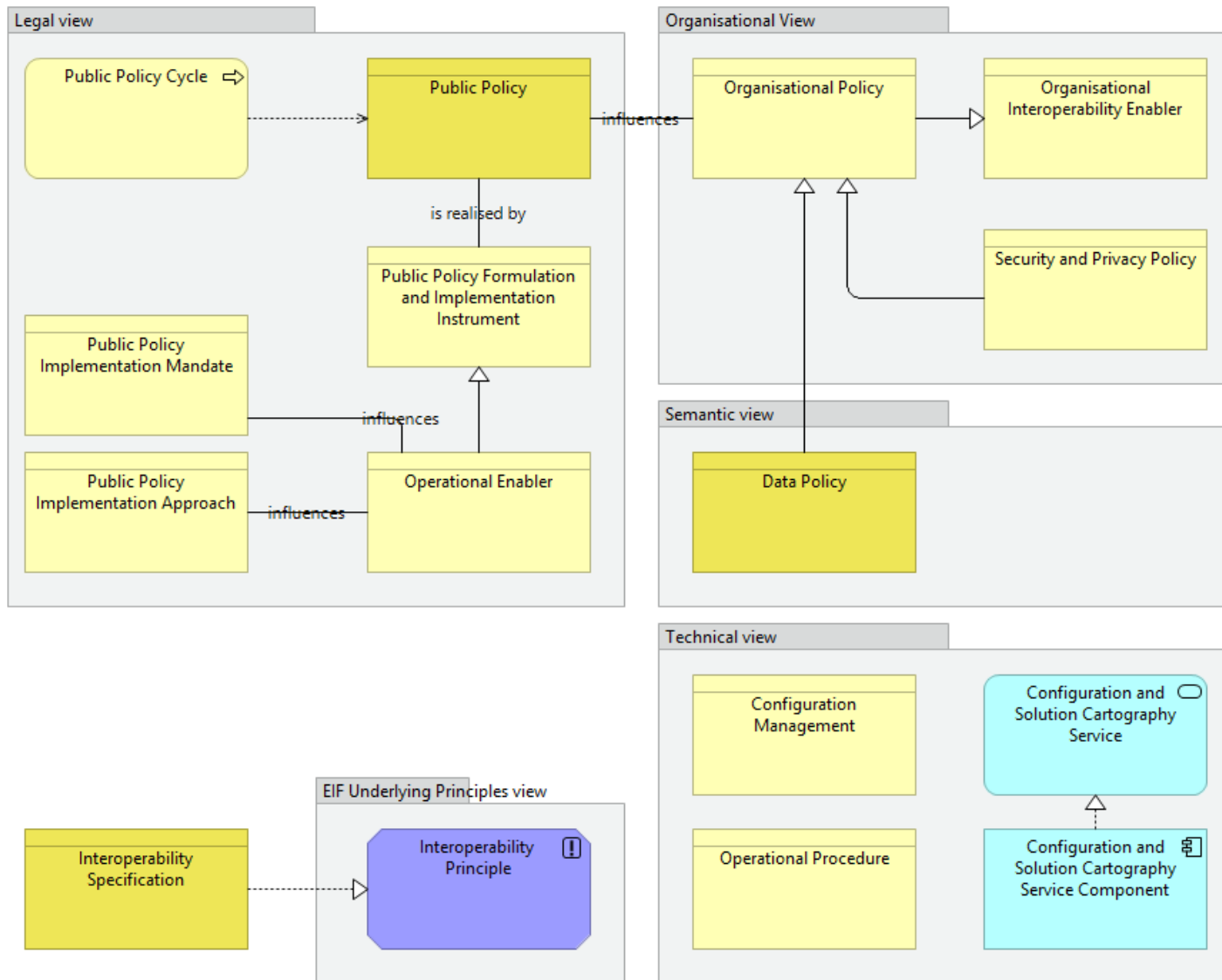
8.1.11   Interoperability Security viewpoint
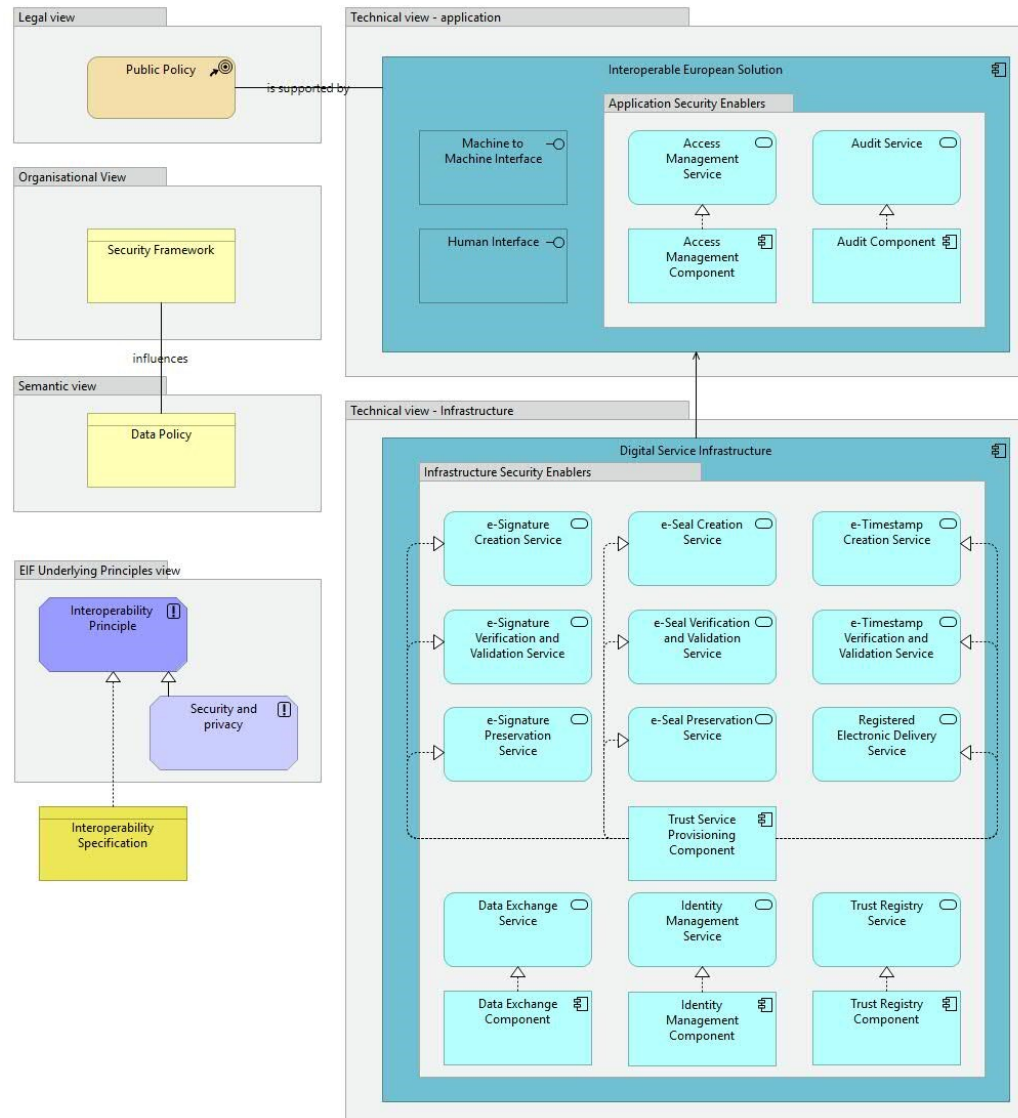
8.1.12 Interoperability Specification viewpoint
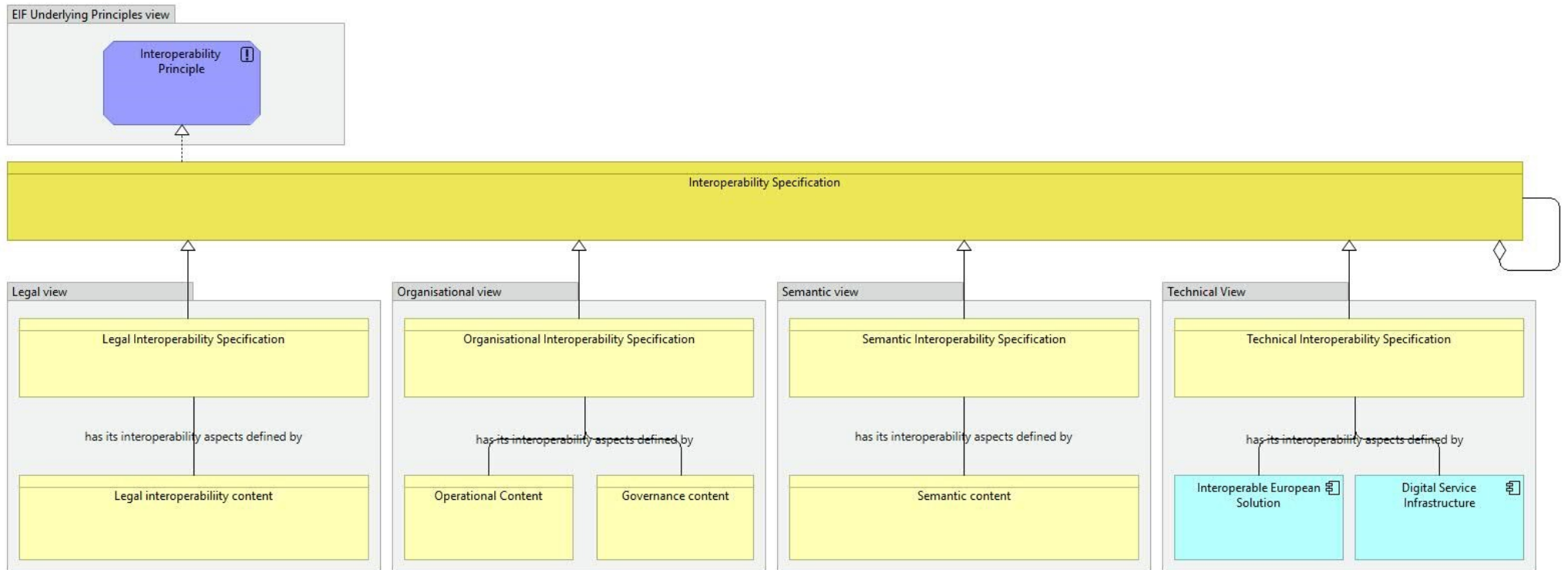
8.1.13   Key Interoperability Enablers viewpoint
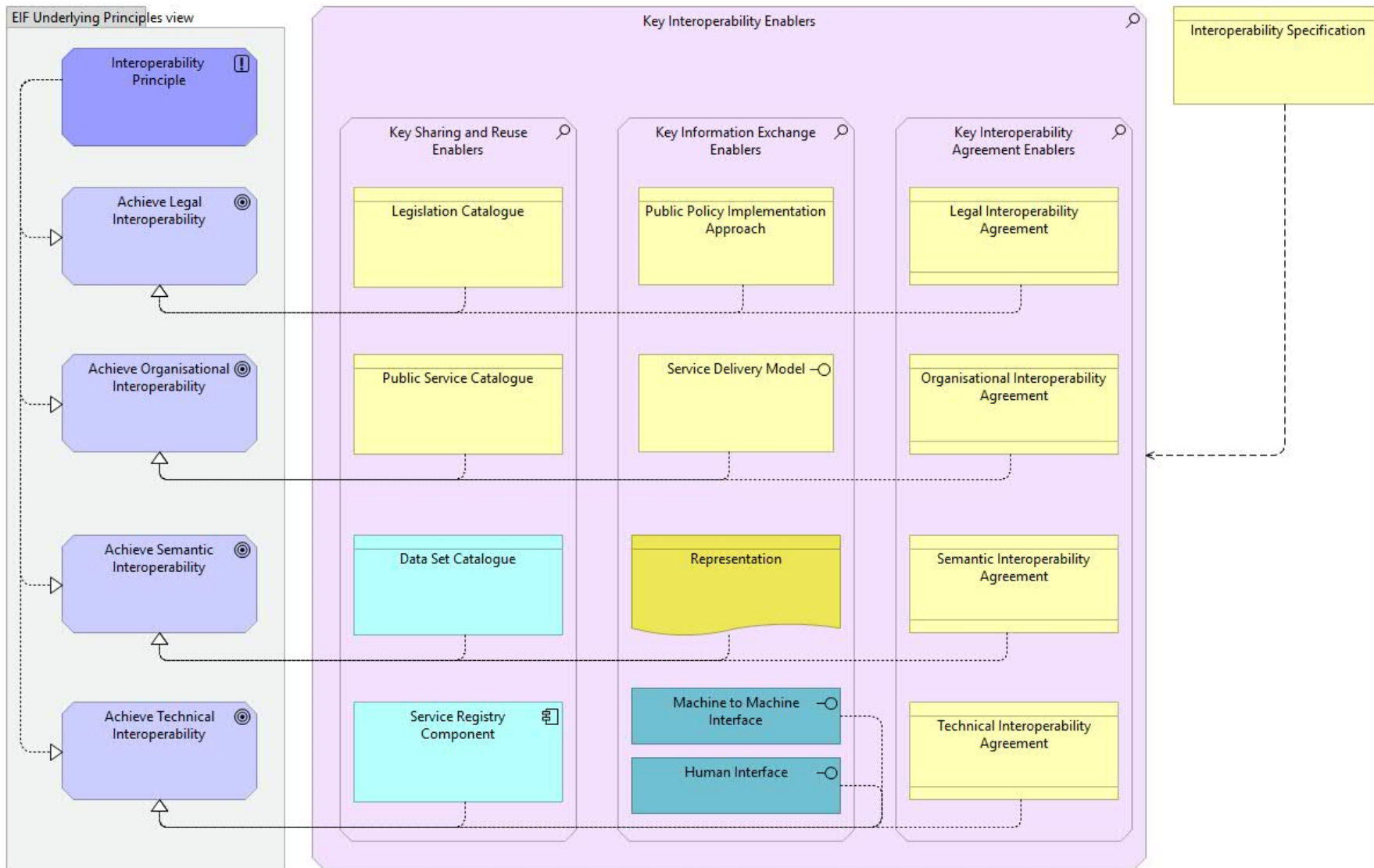
8.1.14 European Interoperability Framework underlying principles view
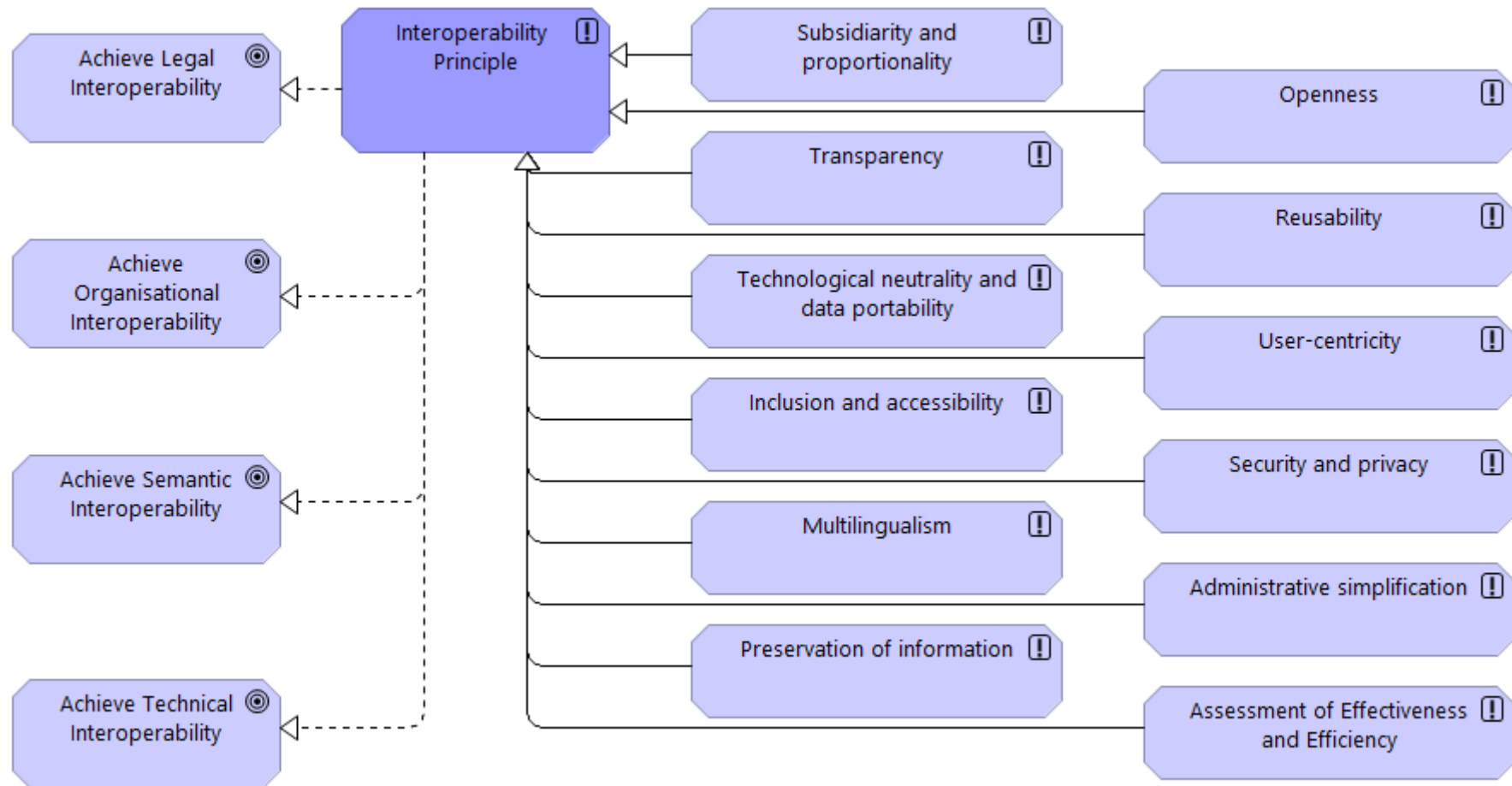
8.2 Architecture Building Blocks definitions

8.2.1 Table 6-1 Legal view definitions

Name	Definition
Binding Instrument	DESCRIPTION: Legal means, involving an obligation, which are available to the European institutions to carry out their tasks. The European binding instruments listed in Article 288 of the Treaty on the Functioning of the European Union are: • regulations: these are binding in their entirety and directly applicable in all EU countries; • directives: these bind the EU countries as to the results to be achieved; they have to be transposed into the national legal framework and thus leave margin for manoeuvre as to the form and means of implementation; • decisions: these are fully binding on those to whom they are addressed. Based on EUR-Lex http://eur-lex.europa.eu/summary/glossary/community_legal_instruments.html The binding legal instruments that make up the secondary legislation of the EU are Regulations, Directives and Decisions. As set out in Article 288 of the Treaty on the Functioning of the European Union: - A Regulation shall have general application. It shall be binding in its entirety and directly applicable in all Member States. - A Directive shall be binding, as to the result to be achieved, upon each Member State to which it is addressed, but shall leave to the national authorities the choice of form and methods. - A Decision shall be binding in its entirety. A Decision which specifies those to whom it is addressed shall be binding only on them. Source: https://ox.libguides.com/c.php?g=422926&p=2888217 INTEROPERABILITY SALIENCY: The Binding Instrument ABB is relevant for interoperability as, a specialisation of Legal Act, it makes mandatory the implementation of the policy (and therefore the underlying interoperability implications). EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Decision No 922/2009/EC of the European Parliament and of the Council of 16 September 2009 on interoperability solutions for European public administrations (ISA)* 1. This Decision establishes, for the period 2010-2015, a programme on interoperability solutions for European public administrations, including local and regional administrations and Community institutions and bodies, providing common and shared solutions facilitating interoperability (the ISA programme).

Name	Definition
	2. The objective of the ISA programme is to support cooperation between European public administrations by facilitating the efficient and effective electronic cross-border and cross-sectoral interaction between such administrations, including bodies performing public functions on their behalf, enabling the delivery of electronic public services supporting the implementation of Community policies and activities. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009D0922

Name	Definition
Legislation Catalogue	DESCRIPTION: Inventory of legal documents. This ABB is a key interoperability enabler (*) enabling sharing/PROVISIONING and reusing/CONSUMPTION LEGAL documents (*)DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector Based on IATE (definition of catalogue, entry Documentation [COM]) http://iate.europa.eu/ INTEROPERABILITY SALIENCY: The Legislation Catalogue ABB is a key interoperability enabler because it helps achieve legal interoperability by ensuring the provision/consumption of legal texts. Catalogues are also key element of the EIF "Integrated Public Service Governance" conceptual model. According to the EIF Recommendation n. 44: "Put in place catalogues of public services, public data, and interoperability solutions and use common models for describing them." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EUR-Lex* EUR-Lex provides free access, in the 24 official EU languages, to: • the authentic Official Journal of the European Union • EU law (EU treaties, directives, regulations, decisions, consolidated legislation, etc.) • preparatory acts (legislative proposals, reports, green and white papers, etc.) • EU case-law (judgments, orders, etc.) • international agreements • EFTA documents • summaries of EU legislation, which put legal acts into a policy context, explained in plain language • other public documents. It also allows you to follow the procedures leading to the adoption of legal acts. http://eur-lex.europa.eu/

Name	Definition
Legal Interoperability Specification	DESCRIPTION: Legal interoperability covers the broader environment of laws, policies, procedures and cooperation agreements needed to allow the seamless exchange of information between different organisations, regions and countries. Legal interoperability specifications support interoperability by addressing the core legal interoperability background for solutions. Source: How does the EIRA© support interoperability? https://joinup.ec.europa.eu/sites/default/files/how_does_eira_support_interoperability_v1_0_0.pdf INTEROPERABILITY SALIENCY The Legal Interoperability Specification ABB is relevant for interoperability because it helps achieve legal interoperability by addressing the core legal interoperability background for solutions. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *e-procurement SAT - Directive 2014/24/EU on public procurement* DIRECTIVE 2014/24/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on public procurement and repealing Directive 2004/18/EC (Text with EEA relevance). The directive sets out rules on the use of public contracts for the provision of works, supplies or services by companies or individuals and the exemptions which can be applied. The legislation specifies that when national authorities use public procurement to invite tenders to provide works, supplies or services, they must treat all applicants equally and not discriminate between them. They must also be transparent in their dealings. This Directive is considered as a Legal Interoperability Specification, as it shall be transposed in a National or Regional Binding Instrument when designing the solution using the e-procurement Solution Architecture Template. https://joinup.ec.europa.eu/asset/eia/description

Name	Definition
Legal Interoperability Agreement	DESCRIPTION: Legal interoperability Agreement is the means through which Legal Authorities mandate specific Legal Interoperability Specifications, ensuring organisations (operating under different legal frameworks, policies and strategies) are able to work together. Based on EIF: https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf#page=27 INTEROPERABILITY SALIENCY The Legal Interoperability Agreement ABB is a key interoperability enabler because it supports legal interoperability by providing cooperation agreements needed to allow the seamless exchange of information between different organisations, regions and countries. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Treaty of Lisbon* The European Union is based on the rule of law. This means that every action taken by the EU is founded on treaties that have been approved voluntarily and democratically by all EU member countries. For example, if a policy area is not cited in a treaty, the Commission cannot propose a law in that area. A treaty is a binding agreement between EU member countries. It sets out EU objectives, rules for EU institutions, how decisions are made and the relationship between the EU and its member countries. The Lisbon treaty clarifies which powers: - belong to the EU - belong to EU member countries - are shared. The goals and values of the EU and are laid out in the Lisbon Treaty and the EU Charter of fundamental rights. https://europa.eu/european-union/law/treaties_en

Name	Definition
Legal Authority	DESCRIPTION: Legal Authority is an entity which certifies Legal Interoperability Agreement in order to guarantee its reliability and trustworthiness. Based on EIF: https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf INTEROPERABILITY SALIENCY: The Legal Authority ABB is salient for interoperability because it supports legal interoperability by providing reliability and trustworthiness of Legal Interoperability Agreement. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EU Parliament* European Parliament The European Parliament (EP) is the directly elected parliamentary institution of the European Union (EU). Together with the Council of the European Union (the Council) and the European Commission, it exercises the legislative function of the EU. http://www.europarl.europa.eu/plenary/en/home.html

Non-binding Instrument	DESCRIPTION: Legal means, involving no obligation, which are available to the European institutions to carry out their tasks. The European non-binding, declaratory instruments listed in Article 288 of the Treaty on the Functioning of the European Union are recommendations and opinions: • Recommendations are non-mandatory acts issued by the European Commission, the Council of the European Union, or the European Central Bank which suggest a certain form of conduct to those to whom they are addressed without imposing any legal obligations. • Opinions are non-binding legal acts adopted by the European institutions which do not bind those to whom they are addressed. Based on EUR-Lex and EuroVoc http://eur-lex.europa.eu/summary/glossary/community_legal_instruments.html?locale=en http://eurovoc.europa.eu/drupal/?q=request&concepturi=http%3A%2F%2Feurovoc.europa.eu%2F2927&termuri=http%3A%2F%2Feurovoc.europa.eu%2F439743&language=en&view=pt&ifacelang=en http://eurovoc.europa.eu/drupal/?q=request&concepturi=http%3A%2F%2Feurovoc.europa.eu%2F6284&termuri=http%3A%2F%2Feurovoc.europa.eu%2F438412&language=en&view=pt&ifacelang=en Article 288 of the Treaty on the Functioning of the European Union also provides for non binding legal instruments. - Recommendations call upon the party to whom they are addressed to behave in a particular way without placing them under any legal obligation - Opinions issued by the EU institutions give assessments of situations or developments in the Union or in the individual Member States. They may also also prepare the way for subsequent, legally binding acts, or be a prerequisite for the institution of proceedings before the Court of Justice Recommendations and Opinions have moral and political significance, without being legally binding The three other main forms of actions that shape the EU legal order without having legally binding effect are Resolutions, Declarations and Action programmes. INTEROPERABILITY SALIENCY: The Non-binding Instrument ABB is a key interoperability enabler as a specialisation of the Legal Act. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Action Plan for the future of Organic Production in the European Union* The Commission launched a consultation for the review of the European policy on organic agriculture in 2012-2013. This consultation has also been an opportunity to consult experts, stakeholders and the public on areas where a new action plan might be needed. To help organic farmers, producers and retailers adjust to the proposed policy changes and meet future challenges, the Commission has also approved an Action Plan on the future of Organic Production in Europe. The Plan foresees to better inform farmers on rural development and EU farm policy initiatives encouraging organic farming, to

Name	Definition
	strengthen links between EU research and innovation projects and organic production and to encourage the use of organic food, e.g. in schools. https://ec.europa.eu/agriculture/organic/eu-policy/european-action-plan_en

Public Policy Implementation Approach	DESCRIPTION: The specific rules and processes finalised at implementing a policy through organisations, persons, objects or events. Based on Hill, M. and Hupe, P, Implementing Public Policy: Governance in Theory and in Practice, SAGE Publications Ltd 2002 A [Public Policy Implementation Approach] is influenced by a Regulatory State and a Delegation of Powers which determine the role of the organisation, person, object or event. This role is determined by the following quadrant: Option A - The Controlled Scenario: This approach is characteristic of a public policy centralisation of powers and a strongly regulatory state. The recommended interoperability focus is on semantic interoperability (i.e. data architecture, base registries) Option B - The Normative Scenario: This approach is characteristic of a public policy delegation of powers and a strongly regulatory state. The recommended interoperability focus is on technology interoperability (i.e. interoperability specifications) Option C - The Federated Scenario: This approach is characteristic of a public policy centralisation of powers and a softly regulatory state. The recommended interoperability focus is on organizational interoperability (i.e. interoperability agreements)
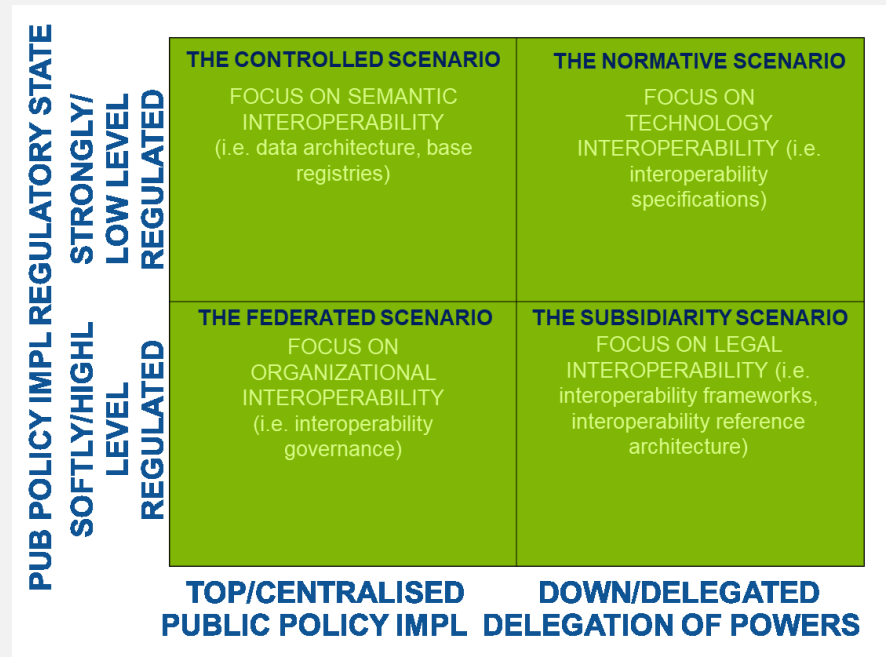
Name	Definition
	Option D - The Subsidiarity Scenario: This approach is characteristic of a public policy delegation of powers and a softly regulatory state. The recommended interoperability focus is on legal interoperability (i.e. interoperability frameworks, interoperability reference architecture) INTEROPERABILITY SALIENCY: The Public Policy Implementation Approach ABB is a key interoperability enabler because it influences the way legislation is created to implement a public policy, and sets its focus. The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *The Customs 2020 Programme* Customs 2020 is an EU cooperation programme providing national customs administrations with the possibility to create and exchange information and expertise. It allows developing and operating major trans-European IT systems in partnership and establishing various human networks by bringing together national officials from across Europe. The programme has a budget of € 547.3 million and will run for 7 years from January 1 2014. https://ec.europa.eu/taxation_customs/business/customs-cooperation-programmes/customs-2020-programme_en

Name	Definition
Public Policy	DESCRIPTION: Action taken by a public authority to bring about social change in the medium and long term. It is based on certain values and objectives and is implemented using a variety of methods. It applies on the territory within which the authority is authorised to act. Based on EuroVoc http://eurovoc.europa.eu/drupal/?q=request&concepturi=http%3A%2F%2Feurovoc.europa.eu%2F8466&termuri=http%3A%2F%2Feurovoc.europa.eu%2F209598&language=en&view=pt&ifacelang=en The policies; overview of EU activities in all areas, from agriculture to transport: http://ec.europa.eu/policies/index_en.htm Syn. Policy Action INTEROPERABILITY SALIENCY: The Public Policy ABB is salient for legal interoperability because it drives the production and formulation of legislation, and it is one of the main context elements to be taken into account when organisation need to work together, as stated in the EIF: "Legal interoperability is about ensuring that organisations operating under different legal frameworks, policies and strategies are able to work together". EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Common Agricultural Policy (CAP)* The common agricultural policy (CAP) – one of Europe's oldest policies – has evolved along with the EU. Today's CAP supports a modern, market-oriented farming sector ensuring the provision of safe, affordable, high quality food, produced sustainably and respecting strict standards (environmental, animal welfare, food safety, etc.), as well as supporting investment in the broader rural economy. https://ec.europa.eu/info/strategy/agriculture_en

Name	Definition
Public Policy Cycle	DESCRIPTION: The series of public policy phases that are regularly repeated in order to manage all aspects of a public policy. Based on EU Better Regulation (list of phases) and Oxford dictionary (cycle definition) http://ec.europa.eu/smart-regulation/guidelines/ug_chap1_en.htm (chapter 2 "What is Better Regulation?") http://publicadministrationtheone.blogspot.be/2012/08/public-policy-models-of-policy-making_27.html Syn. Policy Cycle INTEROPERABILITY SALIENCY: The Public Policy Cycle ABB is salient for legal interoperability because it impacts the design and formulation of public policies, which are implemented through legal acts. Interoperability principles need to be taken into account during the whole public policy cycle. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Performance-based Full Policy Cycle for the Digital Single Market* The key features of a performance-based full policy cycle are a clear articulation of policy objectives, the identification and use of quantitative indicators of expected short-term and longer-term policy impacts, the identification of synergies between policies, a much greater use of quantitative data in ex-ante impact assessments, the implementation of robust, data-based, independent ex post assessments of the performance of policies relative to their expected impacts and a wide dissemination of lessons learned in such ex-post performance assessments. http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507457/IPOL-IMCO_ET(2013)507457_EN.pdf

Name	Definition
Legal Act	DESCRIPTION: EU legal acts are legislative or non-legislative acts adopted by the European institutions (Article 288 TFEU). With the entry into force of the Treaty of Lisbon on 1 December 2009, the names "European Union" or "EU" have replaced "European Community", "Community" or "EC". Source : https://publications.europa.eu/en/web/eu-vocabularies/th-concept/-/resource/eurovoc/5258?target=Browse INTEROPERABILITY SALIENCY: The Legal Act ABB is salient for interoperability because it helps achieve legal interoperability by ensuring compatible legal/juridical certainty in the exchange of information. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *COMMISSION REGULATION (EU) 2018/1881* *of 3 December 2018* amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards Annexes I, III,VI, VII, VIII, IX, X, XI, and XII to address nanoforms of substances. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1544102387245&uri=CELEX:32018R1881

8.2.2 Table 6-2 Organisational view definitions

Name	Definition
Business	DESCRIPTION: Employment, occupation, profession, or commercial activity engaged in for gain or livelihood. Activity or enterprise for gain, benefit, advantage or livelihood. Enterprise in which person engaged shows willingness to invest time and capital on future outcome. Source: IATE (definition of business, entry Environment [CdT]) http://iate.europa.eu/ Syn. Company INTEROPERABILITY SALIENCY: The Business ABB is salient for organisation interoperability because organisations can play the role of consumers of Public Services (Public Administration or businesses), as stated in the EIF: "A European public service comprises any public sector service exposed to a cross-border dimension and supplied by public administrations, either to one another or to businesses and citizens in the Union." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Cosmetic Product Notification Portal - Economic operators* Economic operators involved in intra-community trade are using the Cosmetic Product Notification Portal in order to either notify cosmetic products put on the EU market (distributors) or notify and update the data (manufacturers and importers). https://webgate.ec.europa.eu/cpnp/faq/?event=faq.show

Name	Definition
Business Capability	DESCRIPTION: A particular ability or capacity that an organisation may possess or exchange to achieve a specific purpose or outcome. Defining a business capability involves identifying and describing what needs to be done by the business in support of its overall mission. Business capabilities provide an abstraction of the business reality in a way that helps to simplify conversations between interested stakeholders. Business capabilities may or may not be specifically aiming at enabling interoperability. Based on TOGAF definition and description of business capability. https://www2.opengroup.org/ogsys/catalog/g161 Syn. Business Ability INTEROPERABILITY SALIENCY: The Business Capability ABB is salient for organisational interoperability because it defines the main business reason for exchanging business information with other business capabilities in another organisation or in the same organisation. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Surveillance3 reporting and generation of data sets* The reporting and generation of data sets business capability brought by Surveillance3 enables the reporting and analysis of data by the end users, through integration mechanisms to other applications. Surveillance3 aggregates the declaration data and additional data such as Binding Tariff Information (BTI) decisions and Surveillance definitions in order to produce consolidated reports about: 1. The BTI usage for the DG TAXUD BTI sector users and for Member State users and 2. Surveillance statistical data http://ec.europa.eu/taxation_customs/dds2/surv/surv_consultation.jsp?Lang=en

Name	Definition
Business Information	DESCRIPTION: Organizationally constructed meaning describing business facts, assets, or opinions that are exchanged in the context of a public service to support its delivery. Examples include an invoice, a medical prescription, a driving license. Based on TOGAF guide about business capabilities and TOGAF definition of information. https://www2.opengroup.org/ogsys/catalog/g161 http://pubs.opengroup.org/architecture/togaf9-doc/arch/ Syn. Business Facts, Business Data, Business Opinions INTEROPERABILITY SALIENCY: The Business Information ABB is salient for organisational interoperability because business information is exchanged between organisations. Its interoperability needs to be guaranteed by means of organisational and semantic interoperability specifications. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Surveillance3 - Surveillance information* Published Surveillance information (Business Information) on Europa: Textile category 1 - Cotton yarn, not put up for retail sale [Council Regulation (EEC) No 3030/93] from Belarus in 2015: see URL for details. http://ec.europa.eu/taxation_customs/dds2/surv/surv_data_list.jsp?Lang=en&survNumber=670010&survType=1&startDate=20150101&originCode=BY

Name	Definition
Exchange of Business Information	DESCRIPTION: Communication of business information by a business capability. Based on TOGAF definitions. https://www2.opengroup.org/ogsys/catalog/g161 http://pubs.opengroup.org/architecture/togaf9-doc/arch/ (*)DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector. Syn. Exchange of Business Facts, Exchange of Business Data, Exchange of Business Opinions INTEROPERABILITY SALIENCY: The Exchange of business Information ABB is salient for interoperability because it helps achieve organisational interoperability by ensuring compatible interaction between organisations, as stated in the EIF: "For the purpose of the EIF, interoperability is the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business processes they support, by means of the exchange of data between their ICT systems". EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Easi-MicPro - Agreement of Code of good conduct* Proof of transparency and usage of pan-European reporting standards. https://webgate.ec.europa.eu/easi-micpro/application#!cogcPublicPage

Name	Definition
[Organisational Interoperability Agreement](#)	DESCRIPTION: Concrete and binding documents which set out the precise obligations of two parties cooperating across an 'interface' to achieve interoperability. This ABB is a key interoperability enabler (*) for assessing the TERMS/CONDITIONS for SHARING&REUSING AND EXCHANGING information. An Interoperability Agreement is the means through which organisations (public administrations, or businesses) formalises the cooperation with one another. These agreements aim at the development of interoperability solutions, which meets the functional / technical requirements and needs of one another (European Interoperability Framework). Source ISA2, EIFv2 https://ec.europa.eu/isa2/isa2_en (*)DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector. The agreement should include purposes and goals, terms and conditions, governance, and the description of the channel(s). The EIRA© differentiates the following Interoperability Agreements: • Interoperability Service Agreement (between Public Service Consumers and Public Service Providers; • Interoperability Collaboration Agreement (between Organisations); or • Interoperability Provider Agreement (between Public Service Providers). INTEROPERABILITY SALIENCY: The Organisational Interoperability Agreement ABB is a key interoperability enabler because it helps achieve organisational interoperability by assessing and formalising terms and conditions for sharing/reusing/exchanging information between two cooperating parties as stated in the EIF Recommendation 26: "Establish interoperability agreements in all layers, complemented by operational agreements and change management procedures." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *ICAO Service Level Agreement Template* A Service Level Agreement (SLA) is an example of Interoperability Agreement in which parties agree on the description of the services to be provided by one or several parties to the other one(s). The SLA tackles topics like: service description, optional services, exclusions, limitations, service levels, service credits, escalation procedure, reporting and points of contact. https://www.icao.int/ESAF/Documents/APIRG/APIRG18/Docs/wp17_appendices_en.pdf

Name	Definition
Interoperability Framework	DESCRIPTION: An agreed approach to interoperability for organisations that wish to work together towards the joint delivery of public services. Within its scope of applicability, it specifies a set of common elements such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices. Source: ISA2, EIFv2 https://ec.europa.eu/isa2/isa2_en Syn. Interoperability Supporting Structure INTEROPERABILITY SALIENCY: The Interoperability Framework ABB is an interoperability enabler because it helps achieve organisational interoperability by defining a set of rules, practices and a commonly agreed approach to the delivery of European public services. The EIF is an instance of this building block: "The European interoperability framework is a commonly agreed approach to the delivery of European public services in an interoperable manner. It defines basic interoperability guidelines in the form of common principles, models and recommendations." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *The new European Interoperability Framework (EIF)* The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services. It offers public administrations 47 concrete recommendations on how to improve governance of their interoperability activities, establish cross-organisational relationships, streamline processes supporting end-to-end digital services, and ensure that both existing and new legislation do not compromise interoperability efforts. The new EIF is undertaken in the context of the Commission priority to create a Digital Single Market in Europe. The public sector, which accounts for over a quarter of total employment and represents approximately a fifth of the EU's GDP through public procurement, plays a key role in the Digital Single Market as a regulator, services provider and employer. The successful implementation of the EIF will improve the quality of European public services and will create an environment where public administrations can collaborate digitally. https://ec.europa.eu/isa2/eif_en

Name	Definition
Interoperability Governance	DESCRIPTION: Refers to decisions on interoperability frameworks, institutional arrangements, organisational structures, roles and responsibilities, policies, agreements and other aspects of ensuring and monitoring interoperability at national and EU levels. Source: the New EIF http://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_3&format=PDF Syn. Interoperability management method or system INTEROPERABILITY SALIENCY: The Interoperability Governance ABB is an interoperability enabler because it helps achieve organisational interoperability as it is "the key to a holistic approach on interoperability, as it brings together all the instruments needed to apply it" (EIF). As stated in EIF Recommendation 20: "Ensure holistic governance of interoperability activities across administrative levels and sectors." EXAMPLES: The following implementations are examples on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): INSPIRE Directive 2007/2/EC of 14 March 2007, Article 18 Member States shall ensure that appropriate structures and mechanisms are designated for coordinating, across the different levels of government, the contributions of all those with an interest in their infrastructures for spatial information. These structures shall coordinate the contributions of, inter alia, users, producers, added-value service providers and coordinating bodies, concerning the identification of relevant data sets, user needs, the provision of information on existing practices and the provision of feedback on the implementation of this Directive. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007L0002&from=EN *Governance defined in the new European Interoperability Framework (EIF)* § 3.1 of the new EIF Annex II: Interoperability governance refers to decisions on interoperability frameworks, institutional arrangements, organisational structures, roles and responsibilities, policies, agreements and other aspects of ensuring and monitoring interoperability at national and EU levels. The European interoperability framework, the Interoperability Action Plan (Annex 1 to the Communication) and the European interoperability architecture (EIRA) are important parts of interoperability governance at the EU level. http://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_3&format=PDF

Name	Definition
Interoperability Organisational Authority	DESCRIPTION: A person or organisation having the political and/or administrative power to create and govern the interoperability capabilities of an organisation. Based on the definitions of authority and organisational in the Oxford dictionary. https://en.oxforddictionaries.com/definition/authority Syn. Interoperability Coordination Power or Right, or Control INTEROPERABILITY SALIENCY: The Interoperability Organisational Authority ABB is an interoperability enabler because it helps achieve organisational interoperability by ensuring political and/or administrative governance of the interoperability capabilities of an organisation as stated in the EIF Recommendation 20: "Ensure holistic governance of interoperability activities across administrative levels and sectors". EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *INSPIRE Directive 2007/2/EC of 14 March 2007, Article 19* 1. The Commission shall be responsible for coordinating Inspire at Community level and shall be assisted for that purpose by relevant organisations and, in particular, by the European Environment Agency. 2. Each Member State shall designate a contact point, usually a public authority, to be responsible for contacts with the Commission in relation to this Directive. This contact point will be supported by a coordination structure, taking account of the distribution of powers and responsibilities within the Member State. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007L0002&from=EN

Name	Definition
Interoperability Strategy	DESCRIPTION: The overarching strategic plan in the area of cross-border interoperability, developed by the European Commission in conjunction with Member State Chief Information Officers (CIOs). Source: ISA2 https://ec.europa.eu/isa2/actions/continuously-updating-european-interoperability-strategy_en INTEROPERABILITY SALIENCY: The Interoperability Strategy ABB is an interoperability enabler because it helps achieve organisational interoperability by setting up the vision and principles for the development of the interoperability capabilities. The European Interoperability Framework implements the European Interoperability Strategy. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *European Interoperability Strategy (EIS)* COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS - Towards interoperability for European public services This Communication introduces the European Interoperability Strategy (EIS) and the European Interoperability Framework (EIF) for European public services, two key elements in the Digital Agenda. Together, they promote interoperability among public administrations. The European Interoperability Strategy (EIS) is developed by the European Commission's Directorate-General for Informatics. The EIS aims to provide guidance and to prioritise the actions needed to improve interaction, exchange and cooperation among European public administrations across borders and across sectors for the delivery of European public services. http://eur-lex.europa.eu/resource.html?uri=cellar:f132547a-7d66-4626-8eb6-9f7428394de7.0017.03/DOC_2&format=PDF

Name	Definition
Interoperability Skill	DESCRIPTION: Expertise in organizing interoperability as defined in the New EIF. Based on the definitions of skill and organisational in the Oxford dictionary. https://en.oxforddictionaries.com/definition/skill Syn. Interoperability Competence INTEROPERABILITY SALIENCY The Interoperability Skill ABB is an interoperability enabler because it helps achieve organisational interoperability by removing a barrier to implement interoperability policies, as stated in the EIF: "Member States should include interoperability skills in their interoperability strategies, acknowledging that interoperability is a multi-dimensional issue that needs awareness and skills in legal, organisational, semantic and technical." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Surveillance3 - Knowledge of English to access and use the open data provided through the EU Open Data Portal* Knowledge of English is required in order to access and use the database of specific products under 'surveillance' or monitoring imported into the EU customs territory in the present and past years. The database for surveillance on the EUROPA web-site displays the volumes of specific products imported into the EU customs territory in the present and in the past year. https://data.europa.eu/euodp/data/dataset/surveillance

Name	Definition
Organisation	DESCRIPTION: An Organisation is an entity that provides and/or consumes Public Services. Organisations here [in new EIF] means public administration units or any entity acting on their behalf, or EU institutions or bodies. Public Organization: Any organization that is defined as being part of the public sector by a legal framework at any level. Based on the New EIF and the ISA2 Core Vocabularies http://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_3&format=PDF https://joinup.ec.europa.eu/asset/cpov/asset_release/core-public-organisation-vocabulary-v100#download-links Syn. Institution, body INTEROPERABILITY SALIENCY: The Organisation ABB is salient for organisation interoperability because organisations can play the role both of providers of Public Services (mainly Public Administrations) and consumers of Public Services (Public Administration or businesses), as stated in the EIF: "A European public service comprises any public sector service exposed to a cross-border dimension and supplied by public administrations, either to one another or to businesses and citizens in the Union." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *AFIS - Europol organisation* Europol is the European Union's law enforcement agency. Its main goal is to achieve a safer Europe for the benefit of all the EU citizens. https://www.europol.europa.eu/

Name	Definition
[Organisational Interoperability Specification](#)	DESCRIPTION: This aspect of interoperability is concerned with how organisations, such as public administrations in different Member States, cooperate to achieve their mutually agreed goals. In practice, organisational interoperability implies integrating business processes and related data exchange. Organisational interoperability also aims to meet the requirements of the user community by making services available, easily identifiable, accessible and user-focused. INTEROPERABILITY SALIENCY: Organisation interoperability specifications support organisational interoperability by addressing the core organizational interoperability background for solutions. Source: How does the EIRA© support interoperability? https://joinup.ec.europa.eu/sites/default/files/how_does_eira_support_interoperability_v1_0_0.pdf EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Memorandum of Understanding on Economic and Financial Statistics between the DG Statistics of the European Central Bank and Eurostat* The purpose of this Memorandum of Understanding is to set out the respective areas of responsibility in economic and financial statistics at the Community level of the ECB (Directorate General Statistics) and the Commission (Eurostat); to provide a framework for the exchange and reproduction of data; to note the forms which co-operation between the Directorate General Statistics (DG Statistics) and Eurostat will take; and to set down a procedure for resolving disagreements. https://www.ecb.europa.eu/ecb/legal/pdf/en_mou_with_eurostat1.pdf

Name	Definition
Public Administration	DESCRIPTION: A state, regional or local authority governed by public law or an association formed by one or several such authorities or a private entity mandated by at least one of those authorities or associations to provide public services, when acting under such a mandate. Source: Connecting Europe Facility (CEF), eIDAS regulation https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/CEF+Definitions Syn. Public institution, public body INTEROPERABILITY SALIENCY: The Public Administration ABB is salient for organisation interoperability because Public Administrations can play the role both of providers and consumers of Public Services, as stated in the EIF: "A European public service comprises any public sector service exposed to a cross-border dimension and supplied by public administrations, either to one another or to businesses and citizens in the Union." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EWRS – ECHA* The European Chemicals Agency (ECHA) is the driving force among regulatory authorities in implementing the EU's ground breaking chemicals legislation for the benefit of human health and the environment as well as for innovation and competitiveness. https://echa.europa.eu/about-us

Name	Definition
Public Service	DESCRIPTION: A European public service comprises any public sector service exposed to a cross-border dimension and supplied by public administrations, either to one another or to businesses and citizens in the Union. A Public Service is a mandatory or discretionary set of acts performed, or able to be performed, by or on behalf of a public organisation. Services may be for the benefit of an individual, a business, or other public authority, or groups of any of these. The capacity to act exists whether it is used or not, and the term 'benefit' may apply in the sense of enabling the fulfilment of an obligation. As defined in the revised version of the European Interoperability Framework, a European public service comprises any service provided by public administrations in Europe, or by other organisations on their behalf, to businesses, citizens or others public administrations. Public service – activities that public authorities identify as being of particular importance to citizens (A2C), businesses (A2B) and public administrations (A2A) and that would not be supplied (or would be supplied under different conditions) if there was no public intervention. Sources: EIF, ISA2 Core Vocabularies, IMM http://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_3&format=PDF https://joinup.ec.europa.eu/catalogue/distribution/cpsv-ap-specification-v20-pdf https://joinup.ec.europa.eu/sites/default/files/imm_guideline_1.pdf https://ec.europa.eu/isa2/actions/assessing-progress-being-made-towards-interoperability_en INTEROPERABILITY SALIENCY: The Public Service ABB is salient for organisational interoperability because it is the central element around which interoperabilty needs to be ensured, as stated in the EIF: "The European Interoperability Framework is a commonly agreed approach to the delivery of European public services in an interoperable manner". EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EUROPASS2 - Make better use of skills and opportunities across Europe* Europass is a service to help individuals to communicate their skills, qualifications and experience through the use of standardised documents templates. http://ec.europa.eu/social/main.jsp?catId=1266&langId=en

Name	Definition
Public Service Catalogue	DESCRIPTION: A catalogue of public services is a collection of descriptions of active public services that are provided by public administrations at any administrative level (i.e. local, regional, national or pan-European). All public service descriptions published in a catalogue of public services conform to a common data model for representing public services. This ABB is a key interoperability enabler (*) for sharing/PROVISIONING and reusing/CONSUMING of front-office public services. Source: ISA2 Core Vocabularies https://joinup.ec.europa.eu/catalogue/distribution/cpsv-ap-specification-v20-pdf (*)DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector. Syn. Public Service Registry, Public Service Inventory INTEROPERABILITY SALIENCY: The Public Service Catalogue ABB is a key interoperability enabler because it helps achieve organisational interoperability by ensuring ensuring the provision/consumption of front-office public services. Catalogues are also key element of the EIF "Integrated Public Service Governance" conceptual model. According to EIF Recommendation 44: "Put in place catalogues of public services, public data, and interoperability solutions and use common models for describing them." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *FEDICT service catalogue* FEDICT, part of the Federal Public Service Policy and Support of Belgium, offers a public service catalogue. Here are a few examples of the offered services: Company data (company information and certificates), Digiflow (access to online certificates), E-mail Relay (relay of e-mail to and from the federal public services and institutions, as a protection to viruses and spam), eBirth (birth online notification and transfer of statistics), eDepot (for notaries), Federal Authentication Service (authentication of individuals for access to online government applications), etc. http://www.fedict.belgium.be/en/service_catalogue

Name	Definition
Public Service Consumer	DESCRIPTION: A Public Service Consumer is a Public Administration, Business or Citizen consuming public services. [European Interoperability Framework] Source: Based on EIF 2.0 http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf INTEROPERABILITY SALIENCY: The Public Service Consumer ABB is salient for organisational interoperability because it is one of the main actors involved in the interoperability of the public service as stated in the EIF: "Service orientation, upon which the conceptual model for public services is conceived, means that the relationship between service providers and service consumers must be clearly defined". EIF Recommendation n.29 also suggests: "Clarify and formalise your organisational relationships for establishing and operating European public services." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Cosmetic Product Notification Portal CPNP - Poison centre, Responsible person, Market surveillance authority, Distributor, Health advisor, Administrations* The CPNP is making this information available electronically to: • Competent Authorities (for the purposes of market surveillance, market analysis, evaluation and consumer information) • Poison Centres or similar bodies established by EU countries (for the purposes of medical treatment). The CPNP is accessible to: • Competent Authorities • European Poison Centres • Cosmetic products responsible persons • Distributors of cosmetic products https://ec.europa.eu/growth/sectors/cosmetics/cpnp_fr

Name	Definition
Public Service Delivery Agent	DESCRIPTION: Any agent that delivers or has the power to deliver a public service. This includes people, organisations and groups. A Public Service Delivery Agent delivers a public service on behalf of a Service Providers. An example of this would be pharmacies that deliver a service 'on the behalf of' the Ministry of Health. In this case the pharmacies would be captured as a Service Delivery Agent whereas the Service Provider would be the Ministry of Health. Based on definition of Agent class in ISA2 Core Vocabularies https://joinup.ec.europa.eu/catalogue/distribution/cpsv-ap-specification-v20-pdf INTEROPERABILITY SALIENCY: The Public Service Delivery Agent is salient for organisational interoperability because it acts on behalf of a Public Service Provider (the "Principal") to deliver a Public Service. An agent is described by the tuple <agent_type, principal_type>, where agent_type belongs to {human, machine}, and principal_type belongs to {citizen, business, PA}. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Your Europe Advice – ECAS* Your Europe Advice is an EU advice service provided by legal experts from ECAS (European Citizen Action Service) operating under contract with the European Commission. It consists of a team of about 60 lawyers who cover all 24 official EU languages and are familiar both with EU law and national laws in all EU countries. Your Europe Advice replies to questions from citizens or businesses on their personal EU rights. The experts respond to the questions within one week, free of charge and in the language chosen by the user. ECAS' mission is to empower citizens to exercise their rights and promote open and inclusive decision-making through the provision of high quality advice, research and advocacy, as well as capacity building for civil society organisations. http://ecas.org/services/your-europe-advice-yea/

Name	Definition
Public Service Provider	DESCRIPTION: Any natural or legal person or public entity or group of such persons and/or bodies which offers the execution of public services. Based on IATE definition (definition of service producer, entry Economics, Taxation [Council]) http://iate.europa.eu/ INTEROPERABILITY SALIENCY: The Public Service Provider ABB is salient for organisational interoperability because it is one of the main actors involved in the interoperability of the public service as stated in the EIF: ""Service orientation, upon which the conceptual model for public services is conceived, means that the relationship between service providers and service consumers must be clearly defined. EIF Recommendation 29 also suggests: "Clarify and formalise your organisational relationships for establishing and operating European public services." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Ecolabel - Member State Competent Body* The Competent Body is the independent organisation responsible for assessing, awarding, and managing EU Ecolabel applications and licences on the national level. The Competent Body provides guidance on the documents needed for the dossier, such as declarations, data sheets, and test results. Recommendations on product testing laboratories that are ISO 17025 accredited or equivalent are shared, along with any relevant technical expertise needed to complete the application. Upon application approval, the Competent Body issues the contract and licence upon approving the application. This contract sets out the services or range of products covered within the licence, including any trade names or manufacturer's internal reference numbers. It will also lay out the terms of use of the EU Ecolabel, following the standard contract in Annex IV of the Regulation (EC) No 66/2010 of 25 November 2009. Once the contract has been signed, a certificate can be asked for/will be sent, depending on the Competent Body. This certificate will detail: the licence number that can be used with the EU Ecolabel logo; the legal name of the applicant; the services or range of products awarded the EU Ecolabel; all relevant trade names under which the product is sold or the service is marketed. The Competent Body will give the final validation on when the EU Ecolabel logo and the licence number can be used on the EU Ecolabel services and products that have met the criteria. http://ec.europa.eu/environment/ecolabel/how-to-apply-for-eu-ecolabel.html http://ec.europa.eu/environment/ecolabel/competent-bodies.html#be

Name	Definition
Public Service Agent	DESCRIPTION: Any agent that consumes or delivers a public service. This includes people, organisations and groups. Source: https://joinup.ec.europa.eu/rdf_entity/http_e_f_fdata_ceuropa_ceu_fw21_f7661a4a0_bbdf9_b4e98_bb04a_b967c6a1053f9 INTEROPERABILITY SALIENCY: The Public Service Agent is salient for organisational interoperability because it acts on behalf of a Public Service Consumer Agent to consume a Public Service and Public Service Provider Agent to deliver a Publice Service. EXAMPLES: *Your Europe Advice – ECAS* Your Europe Advice is an EU advice service provided by legal experts from ECAS (European Citizen Action Service) operating under contract with the European Commission. It consists of a team of about 60 lawyers who cover all 24 official EU languages and are familiar both with EU law and national laws in all EU countries. Your Europe Advice replies to questions from citizens or businesses on their personal EU rights. The experts respond to the questions within one week, free of charge and in the language chosen by the user. ECAS' mission is to empower citizens to exercise their rights and promote open and inclusive decision-making through the provision of high quality advice, research and advocacy, as well as capacity building for civil society organisations. http://ecas.org/services/your-europe-advice-yea/

Name	Definition
Public Service Consumer Agent	Any agent that consumes a public service. This includes people, organisations and groups. A Public Service Consumer Agent consumes a public service on behalf of a Service Consumers. Source: https://joinup.ec.europa.eu/rdf_entity/http_e_f_fdata_ceuropa_ceu_fw21_f7661a4a0_bbdf9_b4e98_bb04a_b967c6a1053f9" INTEROPERABILITY SALIENCY: The Public Service Consumer Agent is salient for organisational interoperability because it acts on behalf of a Public Service Consumer (the "Principal") to consume a Public Service. An agent is described by the tuple <agent_type, principal_type>, where agent_type belongs to {human, machine}, and principal_type belongs to {citizen, business, PA}. EXAMPLES: *Your Europe Advice – ECAS* Your Europe Advice is an EU advice service provided by legal experts from ECAS (European Citizen Action Service) operating under contract with the European Commission. It consists of a team of about 60 lawyers who cover all 24 official EU languages and are familiar both with EU law and national laws in all EU countries. Your Europe Advice replies to questions from citizens or businesses on their personal EU rights. The experts respond to the questions within one week, free of charge and in the language chosen by the user. ECAS' mission is to empower citizens to exercise their rights and promote open and inclusive decision-making through the provision of high quality advice, research and advocacy, as well as capacity building for civil society organisations. http://ecas.org/services/your-europe-advice-yea/

Name	Definition
Security Framework	DESCRIPTION: Agreed approach made of interlinked items supporting the management and protection sensitive information, individual's information and other resources. Source: ISA2, EIFv2 https://ec.europa.eu/isa2/isa2_en INTEROPERABILITY SALIENCY: The Security Framework ABB is salient for interoperability because "security and privacy are primary concerns in the provision of public services" (EIF) and, as stated in EIF Recommendation 15: "Define a common security and privacy framework and establish processes for public services to ensure secure and trustworthy data exchange between public administrations and in interactions with citizens and businesses." EXAMPLES: *The EU cybersecurity certification framework* The European Commission puts forward the creation of a EU certification framework for ICT security products in its 2017 proposal for a regulation. On 13 September 2017 the Commission issued a proposal for a regulation on ENISA, the ""EU Cybersecurity Agency"", and on Information and Communication Technology cybersecurity certification (''Cybersecurity Act''). Certification plays a critical role in increasing trust and security in products and services that are crucial for the digital single market. At the moment, a number of different security certification schemes for ICT products exist in the EU. Without a common framework for EU-wide valid cybersecurity certificates, there is an increasing risk of fragmentation and barriers in the single market. The proposed certification framework will provide EU-wide certification schemes as a comprehensive set of rules, technical requirements, standards and procedures. This will be based on agreement at EU level for the evaluation of the security properties of a specific ICT-based product or service e.g. smart cards. The certification will attest that ICT products and services that have been certified in accordance with such a scheme comply with specified cybersecurity requirements. The resulting certificate will be recognized in all Member States, making it easier for businesses to trade across borders and for purchasers to understand the security features of the product or service. The schemes proposed in the future European framework will rely as much as possible on international standards as a way to avoid creating trade barriers and ensuring coherence with international initiatives." https://ec.europa.eu/digital-single-market/en/eu-cybersecurity-certification-framework

Name	Definition
Privacy Framework	DESCRIPTION: Agreed approach made of interlinked items supporting the management, distribution of sensitive information and individual's information. Source: ISA2, EIFv2 https://ec.europa.eu/isa2/isa2_en INTEROPERABILITY SALIENCY: The Privacy Framework ABB is salient for interoperability because "security and privacy are primary concerns in the provision of public services" (EIF) and, as stated in EIF Recommendation 15: "Define a common security and privacy framework and establish processes for public services to ensure secure and trustworthy data exchange between public administrations and in interactions with citizens and businesses." EXAMPLES: *European Privacy Framework* European privacy legislation is made up of two parts: The Data Protection Directive (95/46/EC) exists as a common ground across Europe. The Directive is a legislative act of the European Union that requires all member states to ensure there is an "adequate" level of data protection. The second part consists of diverse national laws. https://www.privacy-europe.com/european-privacy-framework.html

Name	Definition
Service Delivery Model	DESCRIPTION: Way of delivering to public service consumers, or otherwise interacting with them, for the purpose of supplying specific public services. This involves a number of management practices to ensure that the public services are provided as agreed between the public service provider and the consumer. Based on the definitions in Innovation Policy Platform (World Bank and OECD) https://www.innovationpolicyplatform.org/printpdf/12406 INTEROPERABILITY SALIENCY: The Service Delivery Model ABB is a key interoperability enabler because it represents the channel through which interoperable public services are provided to the consumers. Multi-channel service delivery is important to ensure broader access to the service, as stated in the EIF: "A multi-channel service delivery approach, meaning the availability of alternative channels, physical and digital, to access a service, is an important part of public service design, as users may prefer different channels depending on the circumstances and their needs." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Ecolabel - EU and Member State web sites* EU web site: permits to discover the types of products and services that can be awarded with the EU Ecolabel. Furthermore, the site permits to browse through the EU Ecolabel Product Catalogue and Tourist Accommodation Catalogue to find currently awarded products and services. Member State Competent Bodies provide information to businesses and consumers. http://ec.europa.eu/environment/ecolabel/index_en.htm https://www.ecolabel.be/fr https://www.gov.uk/guidance/apply-for-an-eu-ecolabel

8.2.3 Table 6-3 Semantic view definitions

Name	Definition
Core Data Model	DESCRIPTION: A context-neutral data model that captures the fundamental characteristics of an entity or a core set of entities. Based on Core Vocabularies Handbook https://joinup.ec.europa.eu/site/core_vocabularies/Core_Vocabularies_user_handbook/ INTEROPERABILITY SALIENCY: The Core Data ABB is salient for semantic interoperability because it supports semantic interoperability by providing simplified, reusable and extensible data models that capture the fundamental characteristics of a data entity in a context-neutral and syntax-neutral fashion. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *ISA2 Core Vocabularies* Core Vocabularies are simplified, re-usable and extensible data models that capture the fundamental characteristics of an entity in a context-neutral fashion. Public administrations can use and extend the Core Vocabularies in the following contexts: • Development of new systems: the Core Vocabularies can be used as a default starting point for designing the conceptual and logical data models in newly developed information systems. • Information exchange between systems: the Core Vocabularies can become the basis of a context-specific data model used to exchange data among existing information systems. • Data integration: the Core Vocabularies can be used to integrate data that comes from disparate data sources and create a data mash-up. • Open data publishing: the Core Vocabularies can be used as the foundation of a common export format for data in base registries like cadastres, business registers and service portals. • ISA² has developed the Core Vocabularies for public administrations in an open process with the active involvement of specific working groups. The Core Vocabularies developed are the following: - Core Person: captures the fundamental characteristics of a person, e.g. name, gender, date of birth, location. - Registered organisation: captures the fundamental characteristics of a legal entity (e.g. its identifier, activities) which is created through a formal registration process, typically in a national or regional register. - Core Location: captures the fundamental characteristics of a location, represented as an address, a geographic name or geometry. - Core Public service: captures the fundamental characteristics of a service offered by a public administration. - Core Criterion and Core Evidence: describe the principles and the means that a private entity must fulfil to become eligible or qualified to perform public services. A Criterion is a rule or a principle that is used to judge, evaluate or test something. An Evidence is a means to prove a Criterion. - Core Public organisation: describes public organisations in the European Union. https://ec.europa.eu/isa2/solutions/core-vocabularies_en

Name	Definition
Data	DESCRIPTION: Data are symbols obtained through an encoding process of business information or a legal act. Source: Burke 1989 (15) (*)DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector Syn. Information INTEROPERABILITY SALIENCY: The Data ABB is salient for semantic interoperability because it is the most important mean of interaction between ICT systems of organisations in order to ensure interoperability as stated in the EIF recommendation n° 30: "Perceive data and information as a public asset that should be appropriately generated, collected, managed, shared, protected and preserved." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *ETS - Aggregated data* The EU ETS data viewer provides an easy access to emission trading data contained in the European Union Transaction Log (EUTL). The EUTL is a central transaction log, run by the European Commission, which checks and records all transactions taking place within the trading system. The EU ETS data viewer provides aggregated data by country, by main activity type and by year on the verified emissions, allowances and surrendered units of the more than 12 000 stationary installations reporting under the EU emission trading system, as well as 1400 aircraft operators. https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1

Name	Definition
Data Entity	DESCRIPTION: A classification of objects found in the real world described by the Noun part of speech – persons, places, things, concepts, and events – of interest to the enterprise. Source: DAMA DM_BOK http://www.dama.org Syn. Coherent set of information INTEROPERABILITY SALIENCY: The Data Entity ABB is salient for semantic interoperability because it represents a basic component of a Data Model ABB. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EURES - Job vacancy* Most of the jobs on the EURES Job Mobility Portal come from the job vacancies databases managed by the Public Employment Services of the countries participating in EURES. Using a technology called Web Services, the EURES search engine instantly, in real time, interrogates each national database for jobs. These jobs can be of two types: "EURES jobs", displayed with a blue flag, which are jobs where an employer has expressed an interest in recruiting from another country, or any other jobs advertised in the national jobs databases. There is, in addition, a central database where EURES advisers can manually post jobs that will all be flagged as "EURES jobs". This is for the time being the only way for those few countries that are not yet fully connected to Web Services to advertise jobs on the EURES portal. This solution can, however, also be used for other specific purposes, such as when an employer wishes to publish a vacancy in several languages etc., which may not always be possible in a national database. https://ec.europa.eu/eures/public/en/advertise-a-job?lang=en&app=1.8.1p6-build-0&pageCode=advertise_job

Name	Definition
Data Model	DESCRIPTION: A collection of entities, their properties and the relationships among them, which aims at formally representing a domain, a concept or a real-world thing. Source: ISA2 - SEMIC Action https://joinup.ec.europa.eu/sites/default/files/methodology_and_tools_for_metadata_governance_and_management_for_eu_institutions.pdf INTEROPERABILITY SALIENCY: The Data Model ABB is salient for semantic interoperability because it ensures compatible interpretations of data exchange as specified in the document "Methodology and tools for metadata governance and management for EU Institutions", developed under the SEMIC action of the ISA Programme: "Whilst technological developments offer various means to automate the exchange of information, technological developments alone cannot guarantee a greater interoperability between information systems. A fundamental aspect is the need for common data standards: primarily data models [...]". EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *ESPD - Exchange data model* The ESPD exchange data model (ESPD-EDM) is used for the ESPD service provided by the European Commission. The ESPD Exchange Data Model was designed to implement the data requirements expressed in the Annex 2 of the COMMISSION IMPLEMENTING REGULATION (EU) 2016/7 of 5 January 2016 (from now on "the Annex to the Regulation 2016/7"), establishing the standard form for the European Single Document. Additionally to these requirements, the model took also into account the Information Requirements Model specified by the CEN/BII-Workshops.[3] (namely Workshop 3), and the latest developments relating to the Virtual Company Dossier (VCD) in e-Sens.[4]. One premise that has ruled the design and implementation life-cycle of the ESPD-EDM has been ''not to reinvent the wheel''. Thus some very early key decisions were: (i) select a mature business language for the naming, design and implementation of the ESPD-EDM; (ii) reuse as much as possible existing information components and libraries ''as-they-are''; (iii) for those entities that are not defined in any standard specification, design new components in such a way that they can be reused in other situations and domains, both in e-Procurement and beyond e-Procurement. OASIS UBL-2.1 standard was chosen as the best candidate to base the ESPD-EDM upon. The main reasons for this decisions were: i. The European Commission is already using (and recommending) UBL-2.1 for e-Documents.[5] ; ii. Most of the concepts and components necessary for the ESPD documents were already defined by UBL specifically for e-Procurement; (3) Methodology and tools are available for the development of new documents, the extension of the existing UBL libraries, the semantic validation of XML instances, etc. https://joinup.ec.europa.eu/release/espd-exchange-data-model-v101

Name	Definition
Data Syntax	DESCRIPTION: Data Syntax is a set of rules defining the way in which data is put together with appropriate identifiers, delimiters, separator character(s), and other non-data characters to form messages. Source: reference: https://www.iso.org/obp/ui/#iso:std:iso:14817:-1:ed-1:v1:en:term:4.59 INTEROPERABILITY SALIENCY: The Data Syntax ABB is salient for semantic interoperability because it provides the rules establishing how data have to to be written. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *XML syntax* XML syntax refers to the rules that determine how an XML application can be written. The XML syntax is very straight forward, and this makes XML very easy to learn. Below are the main points to remember when creating XML documents. https://www.quackit.com/xml/tutorial/xml_syntax.cfm

Name	Definition
Data Policy	DESCRIPTION: A set of broad, high level principles which form the guiding framework in which data management can operate. Source: OECD https://stats.oecd.org/glossary/detail.asp?ID=4454 INTEROPERABILITY SALIENCY: The Data Policy ABB is salient for semantic interoperability because it provides a guiding framework to manage data and information according to interoperability principles as stated in the EIF recommendation n° 30: "Perceive data and information as a public asset that should be appropriately generated, collected, managed, shared, protected and preserved." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EU SCIENCE HUB - The European Commission's science and knowledge service - JRC's Data policy* The JRC's data policy is driven by transparency with the aim of contributing to innovation. It is a pillar of the development and implementation of scientific knowledge management at the JRC. It follows the commitments and regulatory basis of the Commission Decision on the reuse of Commission documents (2011/833/EU). The objectives for adopting and implementing the JRC data policy include: • Share and use data on the basis of the JRC Open Data principles: fully, freely, openly and timely; • To be transparent on the reasons for restricted access to certain data; • Provide a coordinated approach to the acquisition of data by the JRC; • Facilitate management, broaden access and use of JRC data; • Reinforce goals of Horizon 2020; • Support EU implementation of the G8 Open Data Charter; • Continuously support evidence-based decision making and research; • Ensure that JRC data is made available through the EU Open Data Portal. For a successful implementation process, the JRC's data policy lays down implementation principles with respect to responsible entities, overall implementation guidelines, and their individual elements like data management plans, as well as the monitoring of its implementation. https://ec.europa.eu/jrc/en/about/jrc-in-brief/data-policy http://publications.jrc.ec.europa.eu/repository/bitstream/JRC95307/lb-na-27163-en-n%20.pdf

Name	Definition
Open Data Policy	DESCRIPTION: The rules and practice of publishing (raw) data in a way that is accessible, reusable, machine readable and licensed permissively. It can be generated by a wide range of parties, including public authorities, the semi-public sector, businesses and the public. In the case of public authorities, such as European Union organisations, making their data available for public reuse supports economic development, openness and transparency. Source: EU Open Data guide http://bookshop.europa.eu/en/eu-open-data-pbOA0416036/downloads/OA-04-16-036-EN-C/OA0416036ENC_002.pdf?FileName=OA0416036ENC_002.pdf&SKU=OA0416036ENC_PDF&CatalogueNumber=OA-04-16-036-EN-C INTEROPERABILITY SALIENCY: The Open Data Policy ABB is salient for semantic interoperability because Open Data is a part of the basic components of the EIF's conceptual model for integrated public services. Opening of public sector datasets for sharing and reuse is encouraged by the Directive on the reuse of public sector information, which provides a common legal framework for reuse of public sector data as stated in the EIF recommendation n° 2: "Publish the data you own as open data unless certain restrictions apply." EXAMPLES: EU implementation of the G8 Open Data Charter https://ec.europa.eu/digital-single-market/en/news/eu-implementation-g8-open-data-charter

Name	Definition
Master Data Policy	DESCRIPTION: A Data Policy applying to the authoritative, most accurate data that is available about key business entities, used to establish the context for business transactions and transactional data. Source: DAMA DM_BOK http://www.dama.org INTEROPERABILITY SALIENCY: The Master Data Policy ABB is salient for semantic interoperability because Master Data is used to establish the context for business transactions and transactional data by providing accurate data usually stored and available for reuse by other parties. Its management should be prioritised as stated in the EIF recommendation n° 31: "Put in place an information management strategy at the highest possible level to avoid fragmentation and duplication. Management of metadata, master data and reference data should be prioritised." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): EMVO: EMVS Master Data Guide The EMVS (European Medicines Verification System) requires that OBP's (OnBoarding Partners) upload both product master data and product batch/pack data. The aim of this guide is to clarify what data is expected to be used for the EMVS master data noting that the long-term goal is to source directly from the IDMP/SPOR system.

Name	Definition
Base Registry Data Policy	DESCRIPTION: A Data Policy applying to a trusted authentic source of information under the control of an appointed public administration or organisation appointed by government. According to the European Interoperability Framework, base registries are: "reliable sources of basic information on items such as persons, companies, vehicles, licenses, buildings, locations and roads" and "are authentic and authoritative and form, separately or in combination, the cornerstone of public services". Source: the New EIF http://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_3&format=PDF INTEROPERABILITY SALIENCY: The Base Registry Data Policy ABB is salient for semantic interoperability because base registries include "authoritative sources of information", that need to be properly governed and made available. EIF's includes base registries in the conceptual model for integrated public services, and describes it as "the cornerstone of European public service delivery". EIF gives several recommendations on how to manage and interact with base registries (recommendation 37, 38, 39 and 40). EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): GOOD PRACTICES ON BUILDING SUCESSFUL INTERCONNECTIONS OF BASE REGISTRIES In order to provide quick and user-friendly public services to citizens and businesses, public administrations are trying to adopt customer-centric approaches and readjust their ways of working. One way to achieve efficiency and increase user-friendliness is through the 'once-only principle'. Instead of asking the citizen for information that they have already provided, public administrations will reuse the information they already have. Much of this information is stored in authoritative databases called base registries. As the authentic sources of data for public administrations, base registries are one of the basic building blocks of public services and are the key to making the once-only principle a reality. The document contains some good practices to foster access to the data contained in these base registries. The good practices presented, are grouped according to the layered interoperability model proposed by the European Interoperability Framework (EIF). https://ec.europa.eu/isa2/sites/isa/files/publications/access-to-base-registries-good-practices-on-building-successful-interconnections-of-base-registries.pdf

Name	Definition
Descriptive Metadata Policy	DESCRIPTION: A Data Policy aiming at making data discoverable and identifiable. It may mandate elements such as title, abstract, author, and keywords. Source: http://www.niso.org/publications/press/UnderstandingMetadata.pdf INTEROPERABILITY SALIENCY: The Descriptive Metadata Policy ABB is salient for semantic interoperability because metadata facilitates opening and sharing data by providing the appropriate format, description of the content, high level of quality in order to achieve interoperability as stated in the EIF recommendation n° 42: "[..] Ensure that open data is accompanied by high quality, machine-readable metadata in non-proprietary formats, including a description of their content, the way data is collected and its level of quality and the licence terms under which it is made available. The use of common vocabularies for expressing metadata is recommended." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): Dublin Core Metadata Element Set, Version 1.1: Reference Description The Dublin Core Metadata Element Set is a vocabulary of fifteen properties for use in resource description. The name "Dublin" is due to its origin at a 1995 invitational workshop in Dublin, Ohio; "core" because its elements are broad and generic, usable for describing a wide range of resources. The fifteen element "Dublin Core" described in this standard is part of a larger set of metadata vocabularies and technical specifications maintained by the Dublin Core Metadata Initiative (DCMI). The full set of vocabularies, DCMI Metadata Terms [DCMI-TERMS], also includes sets of resource classes (including the DCMI Type Vocabulary [DCMI-TYPE]), vocabulary encoding schemes, and syntax encoding schemes. The terms in DCMI vocabularies are intended to be used in combination with terms from other, compatible vocabularies in the context of application profiles and on the basis of the DCMI Abstract Model [DCAM]. http://dublincore.org/documents/dces/

Name	Definition
Reference Data Policy	DESCRIPTION: A Data Policy applying to data used to organise or categorise other data, or for relating data to information both within and beyond the boundaries of the enterprise. Usually it mandates the use of codes and descriptions, or definitions. Source: DAMA DM_BOK http://www.dama.org Reference data consists typically of a small, discrete set of values that are not updated as part of business transactions but are usually used to impose consistent classification. Reference data normally has a low update frequency. Reference data is relevant across more than one business systems belonging to different organisations and sectors [Source: J. Jordan & C. Ellen (2009). Business need, data and business intelligence]. INTEROPERABILITY SALIENCY: The Reference Data Policy ABB is salient for semantic interoperability because Reference Data can be shared and reused (e.g. in the form of taxonomies or controlled vocabularies) between organisation to agree on some basic information. Management of reference data is a priority as suggested by EIF's recommendation 31: "Put in place an information management strategy at the highest possible level to avoid fragmentation and duplication. Management of metadata, master data and reference data should be prioritised." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): FIRDS Reference Data System The intended audience of this document is National Competent Authorities, Trading Venues Systematic Internalisers and Data Reporting Service Provider (including Approved Publication Arrangement and Consolidated Tape Providers), who are going to implement system interfaces for the uploading of data to the Financial Instruments Reference Data System. This document aims to specify the exchange of Reference Data Information (RDI) between NCAS, Trading Venues, Systematic Internalisers and the Financial Instruments Reference System. https://www.esma.europa.eu/sites/default/files/library/esma65-11-1193_firds_reference_data_reporting_instructions_v2.0.pdf

Name	Definition
Data Set	DESCRIPTION: A Data Set is a collection of data, published or curated by a single agent, and available for access or download in one or more formats. Source: W3C http://www.w3.org/TR/vocab-dcat/#class-dataset INTEROPERABILITY SALIENCY: The Data Set ABB is salient for semantic interoperability because it provides a collection of data to be shared or exchanged between ICT systmes as stated in the EIF recommendation n° 30: "Perceive data and information as a public asset that should be appropriately generated, collected, managed, shared, protected and preserved." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *European Union Data Portal* - The European Union Open Data Portal (EU ODP) gives you access to open data published by EU institutions and bodies. All the data you can find via this catalogue are free to use and reuse for commercial or non-commercial purposes. https://data.europa.eu/euodp/data/dataset

Name	Definition
Data Set Catalogue	DESCRIPTION: A collection of datasets. This ABB is a key interoperability enabler (*) for sharing/PROVISIONING and reusing/CONSUMING Data. Based on W3C http://www.w3.org/TR/vocab-dcat/#class-catalog (*)DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector Syn. Data Set Registry, Data Set Inventory INTEROPERABILITY SALIENCY: The Data Set Catalogue ABB is a key interoperability enabler / manifestation because it supports to achieve semantic interoperability by ensuring the provision and consumption of data as stated in the EIF recommendation n° 44: "Put in place catalogues of public services, public data, and interoperability solutions and use common models for describing them." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Agricultural and Vegetable Catalogue* The seed of varieties of agricultural and plant species and varieties of vegetable species that are published in the EU level common catalogue is subject to no marketing restrictions with the Community. Publication in the catalogue must be approved as fulfilling minimum requirements laid down in legislation. Data is published on the contents of the catalogues for agricultural and vegetal species and maintainers with details of the reference list. https://data.europa.eu/euodp/data/dataset/7A98oEqVa83q6L7tHQ

Name	Definition
Representation	DESCRIPTION: The description of the perceptible configuration of business information or a Legal act. Representations can be classified in various ways; for example, in terms of medium (e.g. electronic or paper documents, audio, etc.) or format (HTML, ASCII, PDF, RTF, etc.). This ABB is a key interoperability enabler (*) for assessing compatibility between interpretations of business information. Source: ArchiMate® v3 http://pubs.opengroup.org/architecture/archimate3-doc/chap08.html (*)DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector INTEROPERABILITY SALIENCY: The Representation ABB is a key interoperability enabler because it enables consumption and sharing of data by assessing compatible interpretations. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *ESPD data - XML representation* European Single Procurement Document (ESPD) is a self-declaration of the businesses' financial status, abilities and suitability for a public procurement procedure. It is available in all EU languages and used as a preliminary evidence of fulfilment of the conditions required in public procurement procedures across the EU. Thanks to the ESPD, the tenderers no longer have to provide full documentary evidence and different forms previously used in the EU procurement, which means a significant simplification of access to cross-border tendering opportunities. [...] The online form can be filled in, printed and then sent to the buyer together with the rest of the bid. https://ec.europa.eu/tools/espd/filter?lang=en

Name	Definition
Semantic Interoperability Specification	DESCRIPTION: Semantic interoperability enables organisations to process information from external sources in a meaningful manner. It ensures that the precise meaning of exchanged information is understood and preserved throughout exchanges between parties. In the context of the EIF, semantic interoperability encompasses the following aspects: • Semantic interoperability is about the meaning of data elements and the relationship between them. It includes developing vocabulary to describe data exchanges, and ensures that data elements are understood in the same way by communicating parties. • Syntactic interoperability is about describing the exact format of the information to be exchanged in terms of grammar, format and schemas. Semantic interoperability specifications support semantic interoperability by addressing the core semantic interoperability background for solutions. Source: How does the EIRA© support interoperability? https://joinup.ec.europa.eu/sites/default/files/how_does_eira_support_interoperability_v1_0_0.pdf INTEROPERABILITY SALIENCY: The Semantic Interoperability Specification ABB is salient for semantic interoperability because it enables organisations to process information from external sources in a meaningful manner and ensuring that the precise meaning of exchanged information is understood and preserved throughout exchanges between parties as stated in the EIF recommendation n°32: "Support the establishment of sector-specific and cross-sectoral communities that aim to create open information specifications and encourage relevant communities to share their results on national and European platforms." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *United Nations Centre for Trade Facilitation and E-Business (UN/CEFACT) standard - International Plant Protection Convention (IPPC) SPSCertificate* Specification of phytosanitary certificates. These certificates are issued to indicate that consignments of plants, plant products or other regulated articles meet specified phytosanitary import requirements and are in conformity with the certifying statement of the appropriate model certificate. https://www.ippc.int/en/ephyto/ephyto-technical-information/

Name	Definition
Semantic Interoperability Agreement	DESCRIPTION: Semantic Interoperability Agreement is the consensus among a group of co-operation partners on the model and data entities that support common services. Apart from the typology of the data entities, the consensus also covers the characteristics of the data entities as expressed in metadata and the use of common controlled vocabularies. Source: https://joinup.ec.europa.eu/sites/default/files/document/2015-03/Process INTEROPERABILITY SALIENCY: The Semantic Interoperability Agreement ABB is salient for semantic interoperability because it provides a common and agreed procedure for solution building blocks used in an information exchange context as stated in the EIF recommendation n°32: "Support the establishment of sector-specific and cross-sectoral communities that aim to create open information specifications and encourage relevant communities to share their results on national and European platforms." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *e-Invoicing Semantic Data Model* The semantic data model includes only the essential information elements that an electronic invoice needs to ensure legal (including fiscal) compliance and to enable interoperability for cross-border, cross-sector and for domestic trade. The semantic data model may be used by public and private sector organisations for public procurement invoicing and took into account the physical and financial supply chain perspective, reflecting both private and public sector requirements, with a view to allowing the full straight-through processing of an electronic invoice. https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/2017/06/28/CEN+Publishes+eInvoicing+Semantic+Data+Model

8.2.4 Table 6-4 Technical view – application definitions

Name	Definition
Access Management Component	DESCRIPTION: Implements the functionalities of allowing users to make use of i) IT services, ii) data, and/or iii) other assets. Access management helps to protect the confidentiality, integrity and availability of assets by ensuring that only authorised users are able to access or modify the assets. Based on ITIL v3 https://www.axelos.com/Corporate/media/Files/Glossaries/AXELOS-Common-Glossary.pdf INTEROPERABILITY SALIENCY: The Access Management Component ABB is salient for technical interoperability because it provides the implementation the functionality of allowing user to make an authorized and trusted use of IT Services, data and other assets as stated in the EIF: "Public administrations should ensure that a 'data access and authorisation plan' which determines who has access to what data and under what conditions, to ensure privacy. Unauthorised access and security breaches should be monitored and appropriate actions should be taken to prevent any recurrence of breaches" EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *OpenIAM Access Manager* OpenIAM Access Management solution is based on a professional open source model. This is a robust, scalable solution built with Service Oriented Architecture. It integrates seamlessly with the OpenIAM Identity Manager product to provide a comprehensive solution that allows to take control of not only who can access the systems, but what they can do once they are in there. Corporate security policy is enforced across multiple points and managed centrally to improve effectiveness and reduce administrative costs. http://www.openiam.com/products/access-manager/overview/

Name	Definition
[Access Management Service](#)	DESCRIPTION: Shares the functionality of allowing users to make use of i) IT services, ii) data, and/or iii) other assets. Access management helps to protect the confidentiality, integrity and availability of assets by ensuring that only authorized users are able to access or modify the assets. Based on ITIL v3 https://www.axelos.com/Corporate/media/Files/Glossaries/AXELOS-Common-Glossary.pdf Syn. Role Management Service INTEROPERABILITY SALIENCY: The Access Management Service ABB is salient for technical interoperability because it provides the functionality of allowing user to make an authorized and trusted use of IT Services, data and other assets as stated in the EIF: "Public administrations should ensure that a 'data access and authorisation plan' which determines who has access to what data and under what conditions, to ensure privacy. Unauthorised access and security breaches should be monitored and appropriate actions should be taken to prevent any recurrence of breaches" EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Belgian Federal Public Service Policy and Support - Role Management service* The Role Management service gives access managers the possibility to manage roles. A role gives access to an online government application. Characteristics: • A federal access management platform for public e-gov applications • Three separate contexts: Businesses, Officials and Independent • Roles that can only be attributed by a specific group of managers for a specific application within one of the three contexts • Two different security levels of the application depending on the sensitivity of the information: user name, password and token; and electronic identity card with associated PIN code • Authentication when connecting to an application • Support with the implementation of the service • Support while the service is being used Users: All public services and institutions that want a secure access management for their applications: federal public services and institutions; Communities and Regions; Provinces, municipalities and local public social welfare centres; businesses or persons implementing government contracts. Requirements: application with Fedict Service Desk and signing up to a user agreement. http://www.fedict.belgium.be/en/identificatie_beveiliging/rollenbeheer

Name	Definition
Audit Component	DESCRIPTION: Implements the functionality of providing support for the principle of accountability, which is holding users of a system accountable for their actions within the system, and detection of policy violations. The audit policy defines the elements of an information system which need to be traced, for example to assure traceability of actions: what, how, when, where and with what. Based on The Open Group http://www.opengroup.org/security/das/xdas_int.htm INTEROPERABILITY SALIENCY: The Audit Component ABB is salient for technical interoperability because it allows the implementation of audit policies as stated in the EIF: "Public administrations should ensure that a 'data access and authorisation plan' which determines who has access to what data and under what conditions, to ensure privacy. Unauthorised access and security breaches should be monitored and appropriate actions should be taken to prevent any recurrence of breaches" EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Activiti audit feature* The audit feature of Activiti archives all process instances, activity instances, keeps variable values continuously in sync and all form properties that are submitted so that all user interaction through forms is traceable and can be audited. Authenticated users who submitted the forms are accessible in the history as well as for start forms and task forms. https://www.activiti.org/userguide/#historyFormAuditPurposes

Name	Definition
Audit Service	DESCRIPTION: Shares the audit functionality of providing support for the principle of accountability, which is holding users of a system accountable for their actions within the system, and detection of policy violations. The audit policy defines the elements of an information system which need to be traced, for example to assure traceability of actions: what, how, when, where and with what. Based on The Open Group http://www.opengroup.org/security/das/xdas_int.htm INTEROPERABILITY SALIENCY: The Audit Service ABB is salient for technical interoperability because it defines the elements of an information system which need to be traced, for example to assure traceability of user actions as stated in the EIF: "Public administrations should ensure that a 'data access and authorisation plan' which determines who has access to what data and under what conditions, to ensure privacy. Unauthorised access and security breaches should be monitored and appropriate actions should be taken to prevent any recurrence of breaches" EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): OpenIAM audit service OpenIAM Auditing Service ensures that detailed information about events and activities associated with identities or resources are logged into a centralized repository and be tracked. It offers the following features: • Sign-on, Sign-off • User: create, update, delete or disable accounts • Role: create, update, delete or disable accounts • Resource: create, update, delete or disable accounts • Password changes, resets, challenge response questions changes • Synchronization events • Reconciliation events Several reporting templates are provided for a BIRT report writer for use in an Eclipse designer. Organizations can also generate their own reports in BIRT with SQL. https://www.openiam.com/products/identity-manager/features/audit-compliance/

Name	Definition
[Data Transformation Component](#)	DESCRIPTION: Implements the functionality of conversion of data from one representation to another. Source: ISA2 – EIA Action INTEROPERABILITY SALIENCY: The Data Transformation Component ABB is salient for technical interoperability because it enables the implementation of the functionalities to transform internal data structures to common and agreed interoperable formats as stated in the EIF recommendation n° 41: "Establish procedures and processes to integrate the opening of data in your common business processes, working routines, and in the development of new information systems." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Eurostat SDMX converter* The SDMX Converter is a tool that converts statistical datasets between different formats. It is a Java application which is actively developed by Eurostat and is published as open source software. http://ec.europa.eu/eurostat/web/sdmx-infospace/sdmx-it-tools/sdmx-converter

Name	Definition
Data Transformation Service	DESCRIPTION: Shares the functionality of conversion of one representation to another. Source: ISA2 – EIA Action INTEROPERABILITY SALIENCY: The Data Transformation Service ABB is salient for technical interoperability because it provides the functionalities to transform internal data structures to common and agreed interoperable formats as stated in the EIF recommendation n° 41: "Establish procedures and processes to integrate the opening of data in your common business processes, working routines, and in the development of new information systems." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Eurostat transformation service* The transformation service allows datasets to be converted from one file format to another, optionally performing additional tasks, such as mapping and transcoding. The service is operational but is currently only available for internal consumption within Eurostat. However, the source code of both web service and software component is available in the SDMX webspace: http://ec.europa.eu/eurostat/web/sdmx-infospace/validation-transformation/transformation-services

Name	Definition
Data Validation Component	DESCRIPTION: Implements the functionality of referring to any activity aimed at verifying that the value of a data item comes from a given set of acceptable values. Data validation may be followed by corrective actions, such as data editing or data imputation. In statistics, imputation is the process of replacing missing data with substituted values. Based on Eurostat Data Validation http://ec.europa.eu/eurostat/data/data-validation INTEROPERABILITY SALIENCY: The Data Validation Component ABB is salient for technical interoperability because it allows the implementation of the functionality to validate if data received (or to be sent) is compliant with common and agreed interoperable formats as stated in the EIF recommendation n° 41: "Establish procedures and processes to integrate the opening of data in your common business processes, working routines, and in the development of new information systems." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Hibernate Validator* Express validation rules in a standardized way using annotation-based constraints and benefit from transparent integration with a wide variety of frameworks. Application layer agnostic validation: Hibernate Validator allows to express and validate application constraints. The default metadata source are annotations, with the ability to override and extend through the use of XML. It is not tied to a specific application tier or programming model and is available for both server and client application programming. Hibernate Validator presents the following characteristics: • Extendable: Hibernate Validator offers a configurable bootstrap API as well as a range of built-in constraints. The latter can easily be extended by creating custom constraints. • Rich metadata API: Hibernate Validator gives access to constraint configuration via a metadata API facilitating, for example, tooling integration. • Reference implementation: Hibernate Validator 6.x is the reference implementation Bean Validation 2.0. • Added value: Hibernate Validator offers additional value on top of the features required by Bean Validation. For example, a programmatic constraint configuration API as well as an annotation processor which plugs into the build process and raises compilation errors whenever constraint annotations are incorrectly used. http://hibernate.org/validator/

Name	Definition
Data Validation Service	DESCRIPTION: Shares the functionality of referring to any activity aimed at verifying that the value of a data item comes from a given set of acceptable values. Data validation may be followed by corrective actions, such as data editing or data imputation. Based on Eurostat Data Validation http://ec.europa.eu/eurostat/data/data-validation INTEROPERABILITY SALIENCY: The Data Validation Service ABB is salient for technical interoperability because it shares the functionality to validate if data received (or to be sent) is compliant with common and agreed interoperable formats as stated in the EIF recommendation n° 41: "Establish procedures and processes to integrate the opening of data in your common business processes, working routines, and in the development of new information systems." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Eurostat Struval* The Structural Validation service (called STRUVAL) performs structural validation of statistical data files following the SDMX Information Model for a given data flow. It ensures that a data file respects the following key elements: • SDMX compliance in terms of checks on file format and completeness in terms of mandatory fields; • SDMX compliance in terms of the structure and coding defined by the Data Structure Definition (DSD); • The constraints defined for respective data flows. The STRUVAL service returns a response containing a machine-readable message that is processed by the process manager. The invoker of the service receives a validation report, regardless of the result of the process (in case of no failures the reports hold no records). http://ec.europa.eu/eurostat/web/sdmx-infospace/validation-transformation/structural-validation

Name	Definition
Human Interface	DESCRIPTION: A boundary set of means enabling the exchange of data between an individual and a back-office service. This ABB is a key interoperability enabler (*) for assessing compatible technical interfaces. Source: ISA2 - EIA Action (*)DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector. Syn. User interface, UI, Graphical User Interface, GUI INTEROPERABILITY SALIENCY: The Human interface ABB is a key interoperability enabler / manifestation because it supports to achieve technical interoperability exchanging data allowing users to access services through multiple channels as stated in the EIF recommendation n°10: "Use multiple channels to provide the European public service, to ensure that users can select the channel that best suits their needs." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *GrapesJS* GrapesJS is an open-source, multi-purpose, Web Builder Framework which combines different tools and features with the goal to help you (or users of your application) to build HTML templates without any knowledge of coding. It's a perfect solution to replace the common WYSIWYG editors, which are good for content editing but inappropriate for creating HTML structures. You can see it in action with the official demos, but using its API you're able to build your own editors. https://grapesjs.com/

Name	Definition
Interoperable European Solution	A solution, developed by Public Administrations that facilitate the delivery of electronic Public Services and cross-border exchange of information between Public Administrations (or Citizens) in support to the implementation and advancement of EU, national or local Public Policies. Based on ISA TES definition https://joinup.ec.europa.eu/node/149889 The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *eDelivery* Supporting secure and reliable exchange of data and documents eDelivery is a network of nodes for digital communications. It is based on a distributed model where every participant becomes a node using standard transport protocols and security policies. eDelivery helps public administrations to exchange electronic data and documents with other public administrations, businesses and citizens, in an interoperable, secure, reliable and trusted way. eDelivery is one of the building blocks of the European Commission's Connecting Europe Facility (CEF). These building blocks are reusable specifications, software and services that will form part of a wide variety of IT systems in different policy domains of the EU. The CEF eDelivery building block is based on the AS4 messaging protocol, open and free for all, developed by the OASIS standards development organisation. To ease its adoption in Europe, eDelivery uses the AS4 implementation guidelines defined by the Member States in the e-SENS Large Scale Pilot. Organisations must install an Access Point, or use a Service Provider, to exchange information with the AS4 messaging protocol. https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eDelivery

Name	Definition
[Interoperable European Solution Service](#)	DESCRIPTION: Represents an explicitly defined shared application behaviour of an Interoperable European Solution. Based on ArchiMate® v3 http://pubs.opengroup.org/architecture/archimate3-doc/chap09.html INTEROPERABILITY SALIENCY: The Interoperable European Solution service ABB is salient for technical interoperability because it is a central element the EIF's conceptual model for integrated public services. It represents the generalisation of all application services provided by an Interoperable European Solutions as stated in the EIF: "Technical interoperability the applications and infrastructures linking systems and services." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EU Login* EU Login is the European Commission's user authentication service. It allows authorised users to access a wide range of Commission web services and websites, using a single email address and password. EU Login implements the single sign-on functionality. https://webgate.ec.europa.eu/cas/help.html

Name	Definition
[Interoperable European Solution Component](#)	DESCRIPTION: Interoperable European Solution Component represents the encapsulation of a functionality provided by an Interoperable European Solution. Based on ArchiMate® v3 http://pubs.opengroup.org/architecture/archimate3-doc/chap09.html INTEROPERABILITY SALIENCY: The Interoperable European Solution Component ABB is salient for technical interoperability because it is a central element the EIF's conceptual model for integrated public services. it represents all the functionalities provided by an Interoperable European Solutions as stated in the EIF: "Technical interoperability the applications and infrastructures linking systems and services." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EU Login* EU Login is the European Commission's user authentication service. It allows authorised users to access a wide range of Commission web services and websites, using a single email address and password. EU Login implements the single sign-on functionality. https://webgate.ec.europa.eu/cas/help.html

Name	Definition
[Machine to Machine Interface](#)	DESCRIPTION: A boundary set of means enabling the exchange of data between a service and other services. This ABB is a key interoperability enabler (*) for assessing compatible technical interfaces. Source: ISA2 - EIA Action (*)DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector. INTEROPERABILITY SALIENCY: The Machine to machine interface ABB is a key interoperability enabler because it supports to achieve technical interoperability by ensuring availability of interfaces of public administration systems and data they handle as stated in the EIF recommendation n°5: ""Ensure internal visibility and provide external interfaces for European public services" and recommendation n°9:"Ensure data portability, namely that data is easily transferable between systems and applications supporting the implementation and evolution of European public services without unjustified restrictions, if legally possible." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *XMLGate TRACES Businesses (XTB)* Webservices enabling the management of organisations and cities registered in TRACES. https://circabc.europa.eu/sd/a/dc77e52b-dfba-4dcc-aa39-6a54748db01d/XmlGate%20TRACES%20Businesses%20Manual.doc

Name	Definition
Orchestration Service	DESCRIPTION: Shares the functionality of defining the sequence and conditions in which one service invokes other services in order to realize some useful function. Based on W3C https://www.w3.org/TR/ws-arch/ INTEROPERABILITY SALIENCY: The Orchestration Service ABB is salient for technical interoperability because it provides the functionality of "automated" business processes coordination. The EIF's Conceptual model for integrated EU public services foresees the concept a Coordination for Integrated Service Delivery. The Model comprises an "integrated service delivery" is based on a "coordination function", which is related to SOA principles such as choreography and orchestration, to manage internal business processes in order to remove complexity for the end-user, as stated in the EIF: "The coordination function ensures that needs are identified and appropriate services are invoked and orchestrated to provide a European public service. This function should select the appropriate sources and services and integrate them. Coordination can be automated or manual." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Apache ODE* Apache ODE (Orchestration Director Engine) software executes business processes written following the WS-BPEL standard. It talks to web services, sending and receiving messages, handling data manipulation and error recovery as described by your process definition. It supports both long and short living process executions to orchestrate all the services that are part of your application. http://ode.apache.org/

Name	Definition
Orchestration Component	DESCRIPTION: Implements the functionality of defining the sequence and conditions in which one service invokes other services in order to realize some useful function. Based on W3C https://www.w3.org/TR/ws-arch/ INTEROPERABILITY SALIENCY: The Orchestration Component ABB is salient for technical interoperability because it provides a set of various methods to manage existing business processes or define and establish new ones. BPM components also execute business process documented through accepted modelling techniques, as recommended by the EIF n.28: "Document your business processes using commonly accepted modelling techniques and agree on how these processes should be aligned to deliver a European public service." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Activiti* Activiti is an open-source workflow engine written in Java that can execute business processes described in BPMN 2.0. Activiti supports open standards such as BPMN and DMN with open REST APIs for demanding human- and system-centric processes. It provides business intelligence and audit logs features for free. And with building the solution on business processes, Activiti help to structure the software, think about user tasks, external systems and timers that need to be managed, think about transaction boundaries of the application. Building that kind of features becomes easier when structuring an application around a business process. Managing wait states, timers and asynchronous continuations becomes easier. A business process can express that structure more compact than working with the fundamental instruments that the Java platform offers like JDBC and JMS. Activiti also makes possible to link in Java or scripting for jobs. https://www.activiti.org/

Name	Definition
[Service Discovery Component](#)	DESCRIPTION: Implements the functionality of locating a machine-processable description of a service-related resource that may have been previously unknown and that meets certain functional criteria. It involves matching a set of functional and other criteria with a set of resource descriptions. The goal is to find an appropriate service-related resource. Based on W3C https://www.w3.org/TR/2004/NOTE-ws-gloss-20040211/ INTEROPERABILITY SALIENCY: The Service Discovery Component ABB is salient for technical interoperability because it allows to implement the funcionality of sharing services available for reuse as stated in the EIF recommendation n°36: "Develop a shared infrastructure of reusable services and information sources that can be used by all public administrations". EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Consul* Consul has multiple components, but as a whole, it is a tool for discovering and configuring services in an infrastructure. It provides several key features: • Service Discovery: Clients of Consul can provide a service, such as api or mysql, and other clients can use Consul to discover providers of a given service. Using either DNS or HTTP, applications can easily find the services they depend upon. • Health Checking: Consul clients can provide any number of health checks, either associated with a given service ("is the webserver returning 200 OK"), or with the local node ("is memory utilization below 90%"). This information can be used by an operator to monitor cluster health, and it is used by the service discovery components to route traffic away from unhealthy hosts. • KV Store: Applications can make use of Consul's hierarchical key/value store for any number of purposes, including dynamic configuration, feature flagging, coordination, leader election, and more. The simple HTTP API makes it easy to use. • Multi Datacenter: Consul supports multiple datacenters out of the box. This means users of Consul do not have to worry about building additional layers of abstraction to grow to multiple regions. https://www.consul.io/

Name	Definition
[Service Discovery Service](#)	DESCRIPTION: Shares the functionality of locating a machine-processable description of a service-related resource that may have been previously unknown and that meets certain functional criteria. It involves matching a set of functional and other criteria with a set of resource descriptions. The goal is to find an appropriate service-related resource. Based on W3C https://www.w3.org/TR/2004/NOTE-ws-gloss-20040211/ INTEROPERABILITY SALIENCY: The Service Discovery Service ABB is salient for technical interoperability because it allows to discover service available for reuses as stated in the EIF recommendation n°36: "Develop a shared infrastructure of reusable services and information sources that can be used by all public administrations." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *jUDDI* jUDDI is an open source Java implementation of OASIS the Universal Description, Discovery, and Integration (UDDI) specification for (Web) Services. The jUDDI project includes Scout. Scout is an implementation of the JSR 93 - JavaTM API for XML Registries 1.0 (JAXR). Features: • Platform Independent • Use with any relational database that supports ANSI standard SQL (MySQL, Oracle, DB2, Sybase, Derby etc.) • Deployable on any Java application server that supports the Servlet 2.3 specification • jUDDI registry supports a clustered deployment configuration. • Easy integration with existing authentication systems • Supports InVM embeddable mode jUDDIv3 Services: • UDDI Specification version 3.0.2 compliant • UDDI Specification version 2.0.4 interoperability services (BETA) • Built on JAXB and JAX-WS standardized interfaces, tested on Apache CXF • Built on JPA standardized interfaces, tested with Apache OpenJPA and Hibernate • Pre-configured bundle deployed to Apache Tomcat • Full featured user interface (based on Bootstrap) • User, Administrative and Developer Documentation • Includes extensive predefined tModels, such as Quality of Service Metrics http://juddi.apache.org/

Name	Definition
[Technical Interoperability Agreement](#)	DESCRIPTION: Technical Interoperability Agreement is the means through which Technical Authorities mandate specific Technical Interoperability Specifications, ensuring organisations (operating under different technical frameworks, policies and strategies) are able to work together. Based on EIF: https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf#page=27 INTEROPERABILITY SALIENCY: The Technical Interoperability Specification ABB is a key interoperability enabler because it provides an agreed procedure according to assess the characteristics required of a product to support interoperability solutions. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *ETA* The European Technical Assessment (ETA) is an alternative for construction products not covered by a harmonised standard. It is a document providing information on their performance assessment. The procedure is established in the Construction Products Regulation and offers a way for manufacturers to draw up the Declaration of Performance and affix the CE marking. It contributes to the free movement of construction products and the creation of a strong Single Market. https://ec.europa.eu/growth/sectors/construction/product-regulation/european-assessment_en

Name	Definition
Technical Interoperability Specification	DESCRIPTION: A specification contained in a document which lays down the characteristics required of a product such as levels of quality, performance, safety or dimensions, including the requirements applicable to the product as regards the name under which the product is sold, terminology, symbols, testing and test methods, packaging, marking or labelling and conformity assessment procedures. Source: Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1998L0034:20070101:EN:PDF INTEROPERABILITY SALIENCY: The Technical Interoperability Specification ABB is salient for technical interoperability because it assesses the characteristics required of a product to support interoperability solutions. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *HTTPS specification* HTTP [RFC2616] was originally used in the clear on the Internet. However, increased use of HTTP for sensitive applications has required security measures. SSL, and its successor TLS [RFC2246] were designed to provide channel-oriented security. https://tools.ietf.org/html/rfc2818

Name	Definition
Technical Specification	DESCRIPTION: A document that prescribes technical requirements to be fulfilled by a product, process or service. - Note 1 to entry: A technical specification should indicate, whenever appropriate, the procedure(s) by means of which it may be determined whether the requirements given are fulfilled. - Note 2 to entry: A technical specification may be a standard, a part of a standard or independent of a standard. Source: https://www.iso.org/obp/ui/#iso:std:iso-iec:20944:-1:ed-1:v1:en:term:3.1.3.8] INTEROPERABILITY SALIENCY: The Technical Specification ABB is salient for technical interoperability because it assesses the characteristics required of a product to support technical solutions. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *AS4 Profile specification* The eDelivery AS4 Profile is a modular profile of the ebMS3 and AS4 OASIS specifications. Its core is a mandatory Common Profile that selects, extends and profiles the AS4 ebHandler Conformance Profile and AS4 Additional Features and provides a common Usage Profile. This Common Profile can be implemented using open source or closed source AS4 software implementations. It is aligned with, and corresponds to a subset of, the AS4 profile for TSOs (Transmission System Operators) developed by ENTSOG (the European Network of Transmission System Operators for Gas). In addition to the Common Profile, this specification provides a number of optional Profile Enhancement modules that specify functionality enhancements covering AS4 message exchange in four corner topologies, the use of AS4 in conjunction with the UN/CEFACT Standard Business Document Header (SBDH) specification, and Dynamic Receiver and Dynamic Sender behavior. https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eDelivery+AS4+-+1.13

Name	Definition
Conformance Testing Component	DESCRIPTION: Implements the functionality of allowing a structured and modular approach to implement test automation. Based on ISTQB http://glossary.istqb.org/search/test INTEROPERABILITY SALIENCY: The Conformance Testing Component ABB is salient for technical interoperability because it enables the validation and verification that several solutions at one or more layers of the interoperability stack and they satisfy certain interoperability requirements. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Interoperability Testbed* The Test Bed allows users to execute predefined test cases on their systems. Test results are provided in a standardised, machine-readable format. The Test Bed also offers a test registry and repository (TRR) to store test artefacts (assertions, test cases, validation schemas, etc.) and compile test services (validation services, simulator services, etc.). https://ec.europa.eu/isa2/solutions/interoperability-test-bed_en

Name	Definition
[Conformance Test Report](#)	DESCRIPTION: Data from testing activities and subsequently consolidated in a report to inform stakeholders. Based on ISTQB http://glossary.istqb.org/search/test Syn. Test results INTEROPERABILITY SALIENCY: The Conformance Test Report ABB is salient for technical interoperability because it provides reports of data testing to inform stakeholders. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Jenkins jUnit plug-in* The JUnit plugin provides a publisher that consumes XML test reports generated during the builds and provides some graphical visualization of the historical test results (see JUnit graph for a sample) as well as a web UI for viewing test reports, tracking failures, and so on. Jenkins understands the JUnit test report XML format (which is also used by TestNG). When this option is configured, Jenkins can provide useful information about test results, such as trends. https://wiki.jenkins.io/display/JENKINS/JUnit+Plugin

Name	Definition
Conformance Test Scenario	DESCRIPTION: A document specifying a sequence of actions for the execution of a test. Also known as test script or manual test script. Based on ISTQB http://glossary.istqb.org/search/test Syn. Test procedure INTEROPERABILITY SALIENCY: The Conformance Testing Scenario ABB is salient for technical interoperability because it provides a document of a list of activities for the execution of interoperability tests. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *SoapUI* SoapUI is the world's most widely-used open source API testing tool for SOAP and REST APIs. SoapUI offers SOAP Web Services functional testing, REST API functional testing, WSDL coverage, message assertion testing and test refactoring. Scenario-based tests should be directly tied to user stories, which were probably provided by the product owner or some business stakeholder. Under ideal circumstances, these tests should be the user stories, so that business stakeholders can both easily help the tester develop the test cases and understand the results. https://www.soapui.org/testing-dojo/best-practices/scenario-based-testing.html https://www.soapui.org/testing-dojo/world-of-api-testing/test-first.html

Name	Definition
Conformance Testing Service	DESCRIPTION: Shares the functionality of verifying that several solutions can interoperate at one or more layers of the interoperability stack, while conforming to one or more specifications. This type of testing is executed by operating SUTs (System Under Test) and capturing their exchanges. The logistics of interoperability testing is usually more costly (time, coordination, interoperability), and interoperability testing is no substitute for a conformance test suite. Experience shows that interoperability testing is more successful and less costly when conformance of implementations has been tested first. Based on CEN/CENELC GITB https://www.cen.eu/work/areas/ict/ebusiness/pages/ws-gitb.aspx INTEROPERABILITY SALIENCY: The Conformance Testing Services ABB is salient for technical interoperability because it enables the validation and verification that several solutions at one or more layers of the interoperability stack and they satisfy certain interoperability requirements. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Interoperability Testbed* The Test Bed allows users to execute predefined test cases on their systems. Test results are provided in a standardised, machine-readable format. The Test Bed also offers a test registry and repository (TRR) to store test artefacts (assertions, test cases, validation schemas, etc.) and compile test services (validation services, simulator services, etc.). https://ec.europa.eu/isa2/solutions/interoperability-test-bed_en

8.2.5 Table 6-5 Technical view – infrastructure definitions

Name	Definition
Configuration and Solution Cartography Service	DESCRIPTION: Shares the functionality of documenting the configuration and architecture of solutions. Source: ISA2 - EIA Action INTEROPERABILITY SALIENCY: The Configuration and Solution of Cartography Service ABB is salient for technical interoperability because it can be used to document the interoperability features of a solution or a set of solution/services. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Essential* The EA Essential tool provides with a semantically-rich meta-model. This means accurate modelling which allows for sophisticated reporting. Essential can be configured to import data from a wide range of sources such as CMDBs, Business Process Modelling tools, PMO tools, etc. The Essential Import Utility REST API allows to schedule automated imports from external data sources to keep the repository accurate and current. Complex queries can be built on the repository using the query wizard in Essential Open Source. In addition to traditional the Enterprise Architecture assets, Essential also manages information about the entire organization including resources, skills, contracts, risk, security and more. https://www.enterprise-architecture.org/features.php

Name	Definition
Configuration and Solution Cartography Service Component	DESCRIPTION: Implements the functionality of documenting the configuration and architecture of solutions. Source: ISA2 - EIA Action INTEROPERABILITY SALIENCY: The Configuration and Solution of Cartography Component ABB is salient for technical interoperability because it provides the implementation of the functionalities which can be exploited to document the interoperability features of a solution or a set of solution/services. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Essential* The EA Essential tool provides with a semantically-rich meta-model. This means accurate modelling which allows for sophisticated reporting. Essential can be configured to import data from a wide range of sources such as CMDBs, Business Process Modelling tools, PMO tools, etc. The Essential Import Utility REST API allows to schedule automated imports from external data sources to keep the repository accurate and current. Complex queries can be built on the repository using the query wizard in Essential Open Source. In addition to traditional the Enterprise Architecture assets, Essential also manages information about the entire organization including resources, skills, contracts, risk, security and more. https://www.enterprise-architecture.org/features.php

Name	Definition
Data Exchange Service	DESCRIPTION: Shares the functionality that enables the secure exchange of messages, records, forms and other kinds of data between different ICT systems. This includes data routing, except endpoint discovery. Based on EIFv2 http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf INTEROPERABILITY SALIENCY: The Data Exchange Service ABB is salient for technical interoperability because it provides secure and trustworthy data exchange between different ICT systems as stated in the EIF: "Define a common security and privacy framework and establish processes for public services to ensure secure and trustworthy data exchange between public administrations and in interactions with citizens and businesses." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *XMLGate* XMLGate is a Web service application used to validate an XML instance against a well-defined schema. The XML flow is submitted either via a PDF form or by uploading the XML file. https://webgate.ec.europa.eu/sanco-xmlgate/Login.jsp;jsessionid=2MPn_N5Wg9Dar4_W2-yVL_Xg-VlW3kn47PLVbNise9X5Kycx1yLI!-25226473

Name	Definition
Data Exchange Component	DESCRIPTION: Implements the functionality that enables the secure exchange of messages, records, forms and other kinds of data between different ICT systems. This includes data routing, except endpoint discovery. Based on EIFv2 http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf INTEROPERABILITY SALIENCY: The Data Exchange Component ABB is salient for technical interoperability because it provides the implementation of the functionalities to enable a secure and trustworthy data exchange between different ICT systems as stated in the EIF: "Define a common security and privacy framework and establish processes for public services to ensure secure and trustworthy data exchange between public administrations and in interactions with citizens and businesses." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Open e-TrustEx* Open e-TrustEx is a secure document exchange platform. Solution for European public administration that needs to electronically exchange information with other entities in a secure way. Open e-TrustEx is a cross-sector, open source tool that helps administrations to exchange structured and unstructured documents and to connect to pan-European e-delivery infrastructures with reduced investment. For Commission services, DG Informatics operates the e-TrustEx platform for a fee. https://ec.europa.eu/isa2/solutions/open-e-trustex_en

| Data Publication Component | DESCRIPTION:
Implements the functionality of making data available for common use.

Based on DAMA
http://www.dama.org/

INTEROPERABILITY SALIENCY:
The Data Pubblication Component ABB is salient for technical interoperability because it provides the implementation of the functionalities to make public data freely available for use and reuse by others unless restriction aoply as stated in the EIF recommendation n.2: "Publish the data you own as open data unless certain restrictions apply."

EXAMPLES:
The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB):
CKAN
CKAN is a data management system that makes data accessible by providing tools to streamline publishing, sharing, finding and using data.
This is a tool for making open data websites. It helps you manage and publish collections of data. It is used by national and local governments, research institutions, and other organizations who collect a lot of data.
Once your data is published, users can use its faceted search features to browse and find the data they need, and preview it using maps, graphs and tables – whether they are developers, journalists, researchers, NGOs, citizens, or even your own staff.
CKAN is open source and free software, with an active community of contributors who develop and maintain its core technology. CKAN is modified and extended by an even larger community of developers who contribute to a growing library of CKAN extensions.
https://ckan.org/

The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB):

Globus
Globus is a leading provider of research data management software application and platform services.
Globus publication capabilities are delivered through a hosted service. Published data is stored on campus, institutional, and group resources that are often managed and operated by different administrators. To associate storage resources with a data collection simply use Globus shared endpoints and associate them with the data repository to publish.
Published datasets are organized by "communities" and their member "collections". Globus users can create and manage their own communities and collections through the data publication service. A collection enables the submission of datasets with policies regarding access.
A dataset comprises data and metadata. Policies can be set on communities or collections to manage:
-        Metadata (schema, requirements)
-        Access control (user and group based) |

Name	Definition
	- Curation workflow - Submission and distribution licenses - Storage Datasets undergo curation based on a workflow defined by the community that will publish the data. Workflows may be customized by each community to capture their specific metadata and to reflect the community's review process. After the dataset is published, it is discoverable using a faceted search that allows the researcher to progressively filter results and rapidly focus in on the data of interest. The data may then be transferred to a Globus endpoint where the investigator can inspect and further process the data. Data publication is a premium feature available with a Globus Subscription https://www.globus.org/data-publication

Data Publication Service	DESCRIPTION: Shares the functionality of making data available for common use. Based on DAMA http://www.dama.org/ INTEROPERABILITY SALIENCY: The Data Pubblication Service ABB is salient for technical interoperability because it provides the functionalities to make public data freely available for use and reuse by others unless restriction aoply as stated in the EIF recommendation n.2: "Publish the data you own as open data unless certain restrictions apply." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *European Data Portal* The European Data Portal harvests the metadata of Public Sector Information available on public data portals across European countries. Information regarding the provision of data and the benefits of re-using data is also included. What is Open Data? - Open (Government) Data refers to the information collected, produced or paid for by the public bodies (also referred to as Public Sector Information) and made freely available for re-use for any purpose. The licence will specify the terms of use. - Public sector information is information held by the public sector. The Directive on the re-use of public sector information provides a common legal framework for a European market for government-held data. It is built around the key pillars of the internal market: free flow of data, transparency and fair competition. It is important to note that not all of the public sector information is Open Data. Within the Portal, sections are dedicated to: - Searching datasets: Categories have been established to structure the metadata harvested from the various countries. These categories follow the revision of the DCAT Application Profile and have been mapped against the Eurovoc Thesaurus. - Providing Data: This section gives an insight into understanding Open Data from the perspective of a data provider. In addition, instructions are offered for those who wish their data portal to be harvested by the European Data Portal. - Using Data: How Open Data is being used, as well as the economic benefits of Open Data are detailed in this section. - Training and Library: eLearning modules about Open Data as well as training guides and a knowledge base referencing publications around Open Data and featured projects. Portals can be national, regional, local or domain specific. They cover the 28 EU Member States, EEA, countries involved in the EU's neighbourhood policy and Switzerland. https://www.europeandataportal.eu/

Name	Definition
	Belgian Data Portal The Belgian Data Portal provides data (more than 6500 datasets), tools and resources. Open Data is a driver for innovation, economic growth, transparency and participation. According to a European study (ref.COM (2011) 882) the cumulative economic benefits arising from the provision of public data would amount to € 40 billion per year in the EU. These data lend themselves to reuse in the context of new products and services and can improve the efficiency of public authorities. Making public sector data accessible makes it possible to involve citizens more in political and social life and to make an active contribution to policy areas such as the environment, mobility, the economy, and so on. The 2014-2018 Belgian government agreement states that the government will focus on opening public sector data (Open Data policy). Open public data is now the rule. Public services make available to citizens, researchers, companies and public authorities the reuse of data already available to them in the framework of their missions. It is more specifically data that: - Public services have collected as part of their data collection missions; - Do not contain (more) privacy-sensitive information that is not protected by intellectual property rights held by third parties; - Are published in a format that is easy to reuse automatically ("machine readable "); - Can be reused for commercial and non-commercial purposes. It is not only a matter of making public service data available, but also of building a community environment around these data. Companies can reuse some data and enrich it with their own information to market new products and services. Citizens benefit from more transparent public authorities and public services can help improve the quality of existing public data and services. http://data.gov.be/en

Name	Definition
Digital Service Infrastructure	DESCRIPTION: Infrastructure which enable networked services to be delivered electronically, typically over the internet, providing trans-European interoperable services of common interest for citizens, businesses and/or public authorities, and which are composed of core service platforms and generic services Source: Regulation (EU) No 283/2014 http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0283&from=EN INTEROPERABILITY SALIENCY: The Digital Infrastructure Service ABB is salient for technical interoperability because it a central element through which interoperability is ensured and by definition, as intended in the EIRA, Digital Service Infrastructure provide trans-European interoperable services. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *CEF Digital Service Infrastructure for eHealth* eHealth refers to tools and services using information and communication technologies (ICTs) that can improve prevention, diagnosis, treatment, monitoring and management. So far the Digital Service Infrastructure for eHealth is planned to support several services: - Cross-border patient summary service - ePrescriptions and eDispensations In the future, two other services, the European Reference Networks and Interoperable Patient registries might be deployed. https://webgate.ec.europa.eu/sanco-xmlgate/Login.jsp

Name	Definition
e-Archiving Component	DESCRIPTION: Shares the functionality of enabling the permanent or long-term storage of selected (by an authority) electronic documents or information for preservation purposes like their enduring research value and memory aid. The EIRA© differentiates between document management, record management and e-archiving as follows: • Document management is primarily about day-to-day use of electronic documents (create/update/delete/versioning) within the operational environment; • Record management is primarily about ensuring that information (e.g. in form of an electronic document or database record) is available for business and legal purposes (e.g. to proof and track the handling of contracts). If an electronic document or information is becoming a record (an authority declares it as a record) that electronic document or information needs to be handled by the record management service (based on specific business or legal reasons (e.g. contract negotiation)). • e-Archiving is primarily about storing records which have been selected (by an authority) for permanent or long-term preservation due to their enduring research value and as a memory aid. An electronic document or information which a) is managed by the document management service or the record management service and b) is no longer needed for business or legal purposes or day-to-day activities, and c) still has value for research purposes or as a memory aid, the electronic document should be managed by the e-archiving service". Source: ISA2 - EIA Action Syn. Preservation Service INTEROPERABILITY SALIENCY: The e-Archiving Component ABB is salient for technical interoperability because it provides the implementation of the functionalities for the long-term or permanent preservation of records and information in electronic form in order to ensure their temporal eligibility, reliability and integrity as stated in the EIF: "Legislation requires that decisions and data are stored and can be accessed for a specified time. This means that records and information in electronic form held by public administrations for the purpose of documenting procedures and decisions must be preserved and be converted, where necessary, to new media when old media become obsolete. The goal is to ensure that records and other forms of information keep their legibility, reliability and integrity and can be accessed as long as needed subject to security and privacy provisions." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *CEF eArchiving* eArchiving provides the core specifications, software, training and knowledge to tackle the challenge of short, medium and long-term data management and reuse in a sustainable, authentic, cost-efficient, manageable and interoperable way. https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eArchiving

[e-Archiving Service](#)	DESCRIPTION: Shares the functionality of enabling the permanent or long-term storage of selected (by an authority) electronic documents or information for preservation purposes like their enduring research value and memory aid. The EIRA(c) differentiates between document management, record management and e-archiving as follows: - Document management is primarily about day-to-day use of electronic documents (create/update/delete/versioning) within the operational environment; - Record management is primarily about ensuring that information (e.g. in form of an electronic document or database record) is available for business and legal purposes (e.g. to proof and track the handling of contracts). If an electronic document or information is becoming a record (an authority declares it as a record) that electronic document or information needs to be handled by the record management service (based on specific business or legal reasons (e.g. contract negotiation)). - e-Archiving is primarily about storing records which have been selected (by an authority) for permanent or long-term preservation due to their enduring research value and as a memory aid. An electronic document or information which a) is managed by the document management service or the record management service and b) is no longer needed for business or legal purposes or day-to-day activities, and c) still has value for research purposes or as a memory aid, the electronic document should be managed by the e-archiving service". Source: ISA2 - EIA Action INTEROPERABILITY SALIENCY: The e-Archiving Service ABB is salient for technical interoperability because it provides and shares the functionality for the long-term or permanent preservation of records and information in electronic form in order to ensure their temporal eligiibility, reliability and integrity as stated in the EIF: "Legislation requires that decisions and data are stored and can be accessed for a specified time. This means that records and information in electronic form held by public administrations for the purpose of documenting procedures and decisions must be preserved and be converted, where necessary, to new media when old media become obsolete. The goal is to ensure that records and other forms of information keep their legibility, reliability and integrity and can be accessed as long as needed subject to security and privacy provisions." EXAMPLES: *CEF eArchiving* eArchiving provides the core specifications, software, training and knowledge to tackle the challenge of short, medium and long-term data management and reuse in a sustainable, authentic, cost-efficient, manageable and interoperable way. https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eArchiving

Name	Definition
e-Payment Component	DESCRIPTION: Implements the functionality of executing payment transactions where the consent of the payer to execute a payment transaction is given by means of any telecommunication, digital or IT device. Source: Directive 2007/64/EC http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32007L0064:EN:NOT INTEROPERABILITY SALIENCY: The e-Payment Component ABB is salient for technical interoperability because it provides the implementation of functionalities of executing payment transactions. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): OpenACH Introducing OpenACH, the world's first free, open-source, secure web-based ACH origination and payment processing platform. ACH stands for "Automated Clearing House" and is a term that can be used very loosely in the banking and business industries. An originator is a business or organization initiating a transaction, either credit or debit. OpenACH is several things: - An open source (GPLv3) ACH payment platform, written in PHP using Postgresql - An easy to use ACH payment gateway, using REST and JSON to put payments on the ACH network - A BYOB (Bring Your Own Bank) ACH processing platform - A third-party ACH originator, processing your payments on your behalf https://openach.com/

Name	Definition
e-Payment Service	DESCRIPTION: Shares the functionality of executing payment transactions where the consent of the payer to execute a payment transaction is given by means of any telecommunication, digital or IT device. Source: Directive 2007/64/EC http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32007L0064:EN:NOT INTEROPERABILITY SALIENCY: The e-Payment Service ABB is salient for technical interoperability because it enables the possibility of executing payment transactions by any means of telecommunication, digital or IT device as stated in the EIF: "Public administrations need to exploit services delivered outside their organisational boundaries by third parties, such as payment services provided by financial institutions or connectivity services provided by telecommunications providers." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): SEPA The single euro payments area (SEPA) harmonises the way cashless euro payments are made across Europe. It allows European consumers, businesses and public administrations to make and receive the following types of transactions under the same basic conditions: - credit transfers - direct debit payments - card payments This makes all cross-border electronic payments in euro as easy as domestic payments. https://ec.europa.eu/info/business-economy-euro/banking-and-finance/consumer-finance-and-payments/payment-services/single-euro-payments-area-sepa_en *UniPay Payment Gateway* The open source payment transactions processing platform UniPay Payment Gateway is a robust, flexible and scalable payment gateway software. The platform has a powerful, processor-agnostic payment gateway at its foundation, which supplies numerous direct-to-processor backend integrations and includes a powerful routing engine configurable through web service calls. With unified API as your entry point (for both credit card transactions and ACH - Automated Clearing House), you gain access to numerous banks and credit card payment processors across the globe. http://opensourcepaymentgateway.com/

| e-Seal Creation Service | Shares the functionality of signing data in electronic forms on behalf of a legal person.
An 'electronic seal' means data in electronic form, which is attached to or logically associated with other data in electronic form to ensure the latter's origin and integrity. The 'creator of a seal' is a legal person who creates an electronic seal.

Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.
http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG

The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB):

CEF eSignature DSS
DSS (Digital Signature Services) is an open-source software library for electronic signature creation and validation. DSS supports the creation and verification of interoperable and secure electronic signatures in line with European legislation. In particular, DSS aims to follow the eIDAS Regulation and related standards closely.
DSS can be re-used in an IT solution for electronic signatures to ensure that signatures are created and verified in line with European legislation and standards. DSS allows re-use in a variety of different ways: in an applet, in a stand-alone application or in a server application. DSS can also be used as a reference implementation for IT solutions which do not directly re-use it.
CEF eSignature's DSS open-source library delivers the following benefits to its users:
• Open-source software under LGPL 2.1, a non-viral open source license;
• Interoperability of the e-signatures;
• Supports both e-signatures and e-seals;
• Validation of countersignatures and multiple signatures;
• Alignment with the eIDAS Regulation and related standards;
• Supports EU standards on:
  o Signature formats and packaging methods;
  o Signature validation procedures;
• Validation relying on Member States' trusted lists:
  o Status of trust service providers/trust service, compensation of information, path validation.
https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eSignaturefile:///C:/Users/bocquilp/Downloads/DSS(ServiceOfferingDescription)%20(v0.03)%20(5).pdf |

e-Seal Preservation Service	DESCRIPTION: Shares the functionality of extending the trustworthiness of the qualified electronic signature beyond the technological validity period. An 'electronic seal' means data in electronic form, which is attached to or logically associated with other data in electronic form to ensure the latter's origin and integrity. The 'creator of a seal' is a legal person who creates an electronic seal. Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG Syn. e-Seal Archiving Service INTEROPERABILITY SALIENCY: The e-Seal Preservation Service ABB is salient for technical interoperability because it provides the functionalities required for e-seal preservation service. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *CEF eSignature DSS* DSS (Digital Signature Services) is an open-source software library for electronic signature creation and validation. DSS supports the creation and verification of interoperable and secure electronic signatures in line with European legislation. In particular, DSS aims to follow the eIDAS Regulation and related standards closely. DSS can be re-used in an IT solution for electronic signatures to ensure that signatures are created and verified in line with European legislation and standards. DSS allows re-use in a variety of different ways: in an applet, in a stand-alone application or in a server application. DSS can also be used as a reference implementation for IT solutions which do not directly re-use it. CEF eSignature's DSS open-source library delivers the following benefits to its users: • Open-source software under LGPL 2.1, a non-viral open source license; • Interoperability of the e-signatures; • Supports both e-signatures and e-seals; • Validation of countersignatures and multiple signatures; • Alignment with the eIDAS Regulation and related standards; • Supports EU standards on: o Signature formats and packaging methods; o Signature validation procedures; • Validation relying on Member States' trusted lists: o Status of trust service providers/trust service, compensation of information, path validation.

Name	Definition
	https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eSignaturefile:///C:/Users/bocquilp/Downloads/DSS(ServiceOfferingDescription)%20(v0.03)%20(5).pdf

| e-Seal Verification and Validation Service | DESCRIPTION:
Shares the functionality of the verification of documents that are signed electronically.
An 'electronic seal' means data in electronic form, which is attached to or logically associated with other data in electronic form to ensure the latter's origin and integrity. The 'creator of a seal' is a legal person who creates an electronic seal.

Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.
http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG

INTEROPERABILITY SALIENCY:
The e-Seal Verification and Validation Service ABB is salient for technical interoperability because it provides the functionalities required for e-seal verification and validation service.

EXAMPLES:
The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB):

CEF eSignature DSS
DSS (Digital Signature Services) is an open-source software library for electronic signature creation and validation. DSS supports the creation and verification of interoperable and secure electronic signatures in line with European legislation. In particular, DSS aims to follow the eIDAS Regulation and related standards closely.
DSS can be re-used in an IT solution for electronic signatures to ensure that signatures are created and verified in line with European legislation and standards. DSS allows re-use in a variety of different ways: in an applet, in a stand-alone application or in a server application. DSS can also be used as a reference implementation for IT solutions which do not directly re-use it.
CEF eSignature's DSS open-source library delivers the following benefits to its users:
• Open-source software under LGPL 2.1, a non-viral open source license;
• Interoperability of the e-signatures;
• Supports both e-signatures and e-seals;
• Validation of countersignatures and multiple signatures;
• Alignment with the eIDAS Regulation and related standards;
• Supports EU standards on:
o Signature formats and packaging methods;
o Signature validation procedures;
• Validation relying on Member States' trusted lists:
o Status of trust service providers/trust service, compensation of information, path validation.
https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eSignaturefile:///C:/Users/bocquilp/Downloads/DSS(ServiceOfferingDescription)%20(v0.03)%20(5).pdf |

Name	Definition
e-Signature Creation Service	DESCRIPTION: Shares the functionality of signing data in electronic form by a natural person. An 'electronic signature' means data in electronic form which is attached to or logically associated with other data in electronic form and which is used by the signatory to sign. Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG INTEROPERABILITY SALIENCY: The e-Signature Creation Service ABB is salient for technical interoperability because it provides the functionalities required for e-signature creation service. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *CEF eSignature DSS* DSS (Digital Signature Services) is an open-source software library for electronic signature creation and validation. DSS supports the creation and verification of interoperable and secure electronic signatures in line with European legislation. In particular, DSS aims to follow the eIDAS Regulation and related standards closely. DSS can be re-used in an IT solution for electronic signatures to ensure that signatures are created and verified in line with European legislation and standards. DSS allows re-use in a variety of different ways: in an applet, in a stand-alone application or in a server application. DSS can also be used as a reference implementation for IT solutions which do not directly re-use it. CEF eSignature's DSS open-source library delivers the following benefits to its users: • Open-source software under LGPL 2.1, a non-viral open source license; • Interoperability of the e-signatures; • Supports both e-signatures and e-seals; • Validation of countersignatures and multiple signatures; • Alignment with the eIDAS Regulation and related standards; • Supports EU standards on: o Signature formats and packaging methods; o Signature validation procedures; • Validation relying on Member States' trusted lists: o Status of trust service providers/trust service, compensation of information, path validation. https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eSignature

Name	Definition
e-Signature Preservation Service	DESCRIPTION: Shares the functionality of extending the trustworthiness of the qualified electronic signature beyond the technological validity period. An 'electronic signature' means data in electronic form which is attached to or logically associated with other data in electronic form and which is used by the signatory to sign. Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG Syn. e-Signature Archiving Service INTEROPERABILITY SALIENCY: The e-Signature Preservation Service ABB is salient for technical interoperability because it provides the functionalities required for e-signature preservation service. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Namirial Spa Long term archiving solution* Namirial is a Trust Service Provider, focused on addressing the fast growing market of Digital Transaction Management (DTM), which includes legally compliant electronic signatures, managing and tracking documents flows, conducting secure transactions and ensuring secure storage of data. It provides a long term archiving: • Protect and preserve all documents generated while performing digital business transactions • Make those documents easily searchable • Accredited for Long-Term Archiving/Digital Preservation Services • SaaS, high-availability, multi-company solution built to archive large volumes of documents https://www.xyzmo.com/digital-signature/e-signature-products

Name	Definition
e-Signature Verification and Validation Service	DESCRIPTION: Shares the functionality of the verification of documents that are signed electronically. An 'electronic signature' means data in electronic form which is attached to or logically associated with other data in electronic form and which is used by the signatory to sign. 'validation' means the process of verifying and confirming that an electronic signature or a seal is valid. Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG INTEROPERABILITY SALIENCY: The e-Signature Verification and Validation Service ABB is salient for technical interoperability because it provides the functionalities required for e-signature verification and validation service. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): CEF eSignature DSS DSS (Digital Signature Services) is an open-source software library for electronic signature creation and validation. DSS supports the creation and verification of interoperable and secure electronic signatures in line with European legislation. In particular, DSS aims to follow the eIDAS Regulation and related standards closely. DSS can be re-used in an IT solution for electronic signatures to ensure that signatures are created and verified in line with European legislation and standards. DSS allows re-use in a variety of different ways: in an applet, in a stand-alone application or in a server application. DSS can also be used as a reference implementation for IT solutions which do not directly re-use it. CEF eSignature's DSS open-source library delivers the following benefits to its users: • Open-source software under LGPL 2.1, a non-viral open source license; • Interoperability of the e-signatures; • Supports both e-signatures and e-seals; • Validation of countersignatures and multiple signatures; • Alignment with the eIDAS Regulation and related standards; • Supports EU standards on: o Signature formats and packaging methods; o Signature validation procedures; • Validation relying on Member States' trusted lists: o Status of trust service providers/trust service, compensation of information, path validation. https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eSignature

| e-Timestamp Creation Service | DESCRIPTION:
Shares the functionality of the verification of timestamps used for establishing evidence that a give piece of data existed at a given point in time.
An 'electronic time stamp' means data in electronic form which binds other data in electronic form to a particular time establishing evidence that the latter data existed at that time.

Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.
http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG

Syn. eTS Creation Service

INTEROPERABILITY SALIENCY:
The e-Timestamp Creation Service ABB is salient for technical interoperability because it provides the functionalities required for e-Timestamp creation service.

EXAMPLES:
The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB):

DigiStamp eTimeStamp®
DigiStamp eTimeStamp® protects the intellectual property in any computer file:
•   Use Desktop and Web applications for on-demand protection
•   Plug the Timestamp Authority into the automated systems
Plug-in rigorous implementation of US & EU standards:
•   Secure, reliable, RFC 3161 timestamp cloud service
•   Archiving and Hash Chaining keyless security
•   Elliptic Curve Upgrade
Implementation of the Internet Engineering Task Force's RFC 3161 means DigiStamp timestamps are understood by data validation systems the world over:
•   Implementation of ANSI X9.95 further increases the compatibility of our timestamps.
•   Compliance with IETF RFC 3628 gives credence to the trustworthiness of our Time Stamp Authorities.
•   Conformance to IETF RFC 3126 makes our timestamps usable for long-term, legally binding agreements.
https://www.digistamp.com/

freeTSA.org offers free NTP and DNSCRYPT services
freeTSA.org provides a free Time Stamp Authority. Adding a trusted timestamp to code or to an electronic signature provides a digital seal of data integrity and a trusted date and time of when the transaction took place.
Trusted timestamping is the process of securely keeping track of the creation and modification times of a document. Security here means that no one - not even the owner of the document - should be able to change it once it has been |

Name	Definition
	recorded provided that the timestamper's integrity is never compromised. FreeTSA trusted timestamping Software as a Service (SaaS) provides an easy method to apply RFC 3161 trusted timestamps to time-sensitive transactions through independently verified and auditable date and UTC (Coordinated Universal Time) sources. https://www.freetsa.org/index_en.php

Name	Definition
e-Timestamp Verification and Validation Service	DESCRIPTION: Shares the functionality of the verification of timestamps used for establishing evidence that a give piece of data existed at a given point in time. An 'electronic time stamp' means data in electronic form which binds other data in electronic form to a particular time establishing evidence that the latter data existed at that time. Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG Syn. eTS Verification and Validation Service INTEROPERABILITY SALIENCY: The e-Timestamp Verification and Validation Service ABB is salient for technical interoperability because it provides the functionalities required for e-timestamp verification and validation service. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *OpenSSL timestamp verification* OpenSSL is an open-source tool that can be used to retrieve and verify digital timestamps. https://wiki.openssl.org/index.php/Manual:Ts(1) https://www.digistamp.com/technical/software-alternatives/using-openssl-to-request-timestamps/

Name	Definition
Forms Management Component	DESCRIPTION: Implements the functionalities of i) dynamic creation, ii) distribution and ii) analysis of forms and online surveys. Source: ISA2 - EIA Action Syn. e-Forms Component INTEROPERABILITY SALIENCY: The Forms Management Component ABB is salient for technical interoperability because it provides the implementation of the functionalities of dynamic creation, distribution and analysis of forms and online surveys as stated in the EIF: " Catalogues help others to find reusable resources (e.g. services, data, software, data models). Various types of catalogue exist, e.g. directories of services, libraries of software components, open data portals, registries of base registries, metadata catalogues, catalogues of standards, specifications and guidelines. Commonly agreed descriptions of the services, data, registries and interoperable solutions published in catalogues are needed to enable interoperability between catalogues." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Form Tools* Form Tools is a forms framework written in PHP and MySQL. You download and install the script on your own website. At its heart, Form Tools is a web form creator, processor, data storage and access script. It was originally designed to work with any existing web form, but has since been expanded to create forms automatically as well. Form Tools is extremely versatile in how it integrates with your forms. You can use the bundled Form Builder module to create the forms automatically on your website (no programming or HTML skills necessary); you can use the PHP API to integrate your own custom form with the script; or you can simply POST your form to Form Tools, and just use it to store the form data. Anything goes! You can read about the different integration methods / form creation methods here. Form Tools works by creating custom database tables to store your unique form data. It provides a range of functionality customized to your data set, such as allowing you to view, update, cross-reference and export your submission data, create subsets of your data for viewing/editing by client accounts, data visualizations, and much more. https://formtools.org/

Name	Definition
Forms Management Service	DESCRIPTION: Shares the functionalities of i) dynamic creation, ii) distribution and ii) analysis of forms and online surveys. Source: ISA2 - EIA Action Syn. e-Forms Service INTEROPERABILITY SALIENCY: The Forms Management Service ABB is salient for technical interoperability because it provides and shares the functionalities of dynamic creation, distribution and analysis of forms and online surveys as stated in the EIF: " Catalogues help others to find reusable resources (e.g. services, data, software, data models). Various types of catalogue exist, e.g. directories of services, libraries of software components, open data portals, registries of base registries, metadata catalogues, catalogues of standards, specifications and guidelines. Commonly agreed descriptions of the services, data, registries and interoperable solutions published in catalogues are needed to enable interoperability between catalogues." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): EACEA e-Forms Electronic Application Forms - eForms This page contains the resources and information required by applicants who wish to complete and submit an electronic application form (eForm) for a funding opportunity or for an accreditation. The programmes and actions are listed for which electronic application forms are currently available. The Application eForm homepage is where applicants for funding and applicants for accreditation must follow a series of steps in order to create their new application. https://eacea.ec.europa.eu/about-eacea/electronic-application-forms-eforms_en

Name	Definition
Hosting and Networking Infrastructure	DESCRIPTION: Shares the functionalities for i) hosting Interoperable European Solutions and ii) providing the necessary networks for operating these solutions. Source: ISA2 - EIA Action INTEROPERABILITY SALIENCY: The Hosting and Infrastructure ABB is salient for technical interoperability because it provides all the functionalities to host the Interoperable European Solutions (high availability and high performance hosting infrastructure) and the network where can operate these solutions (public and private network). Hosting and networking represent the lower level of the technical layer, but to be taken into account when design an interoperable solution, as it can create interoperability barriers. Interoperability technical specifications need to be used at this level to ensure interoperability of the levels above. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *DIGIT Hosting and Networking Infrastructure Service* The mission of the Directorate General for Informatics (DIGIT) is to deliver digital services to enable EU policies and to support the Commission's internal administration. Mission statement With this goal in mind, DIGIT as trusted partner has the responsibility to: • Provide the EC, and whenever appropriate other European Institutions and bodies, with high quality and innovative: o Workplace solutions – creating new ways of working and collaboration for staff; o Business solutions – delivering information systems supporting rationalised business processes within the framework of the corporate IT Governance strategy; o Infrastructure solutions – providing reliable, cost-effective and secure infrastructure and services; o Effective solutions – aligning IT investments with business priorities, facilitating relationships with our strategic partners, balancing risk with business value for the Institution. • Support the modernisation of public administrations by promoting and facilitating interoperability so that European public administrations can work seamlessly together and with businesses and citizens across boundaries. https://ec.europa.eu/info/sites/info/files/strategic-plan-2016-2020-dg-digit_march2016_en.pdf

Name	Definition
Hosting Facility	DESCRIPTION: The equipment supporting the hosting of Interoperable European Solutions and their components, usually embodied in a building. Based on DIGIT C Infrastructure Services Provision http://ec.europa.eu/ipg/build/infrastructure/index_en.htm INTEROPERABILITY SALIENCY: The Hosting Facility ABB is salient for technical interoperability because it provides all the equipment supporting the hosting of interoperable solutions and their components. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *DIGIT/C Hosting Facility* DIGIT/C offers a high availability and high performance hosting infrastructure that is being comprised, among other elements, of back-end web server instances and application servers for hosting and serving both static and dynamic sites. The dynamic sites supported by the standard Apache web servers are mainly sites based on Coldfusion and in some cases also sites using CGI scripts. Dynamic sites based on particular technologies (i.e. Weblogic) are being hosted on individual application servers and are being integrated with the other related sites using reverse proxy mappings. Direct HTTP access to the back-end web servers hosting the static sites is denied by the standard web server configuration. http://ec.europa.eu/ipg/build/infrastructure/index_en.htm

Name	Definition
Hosting Service	DESCRIPTION: Shares the functionalities of a hosting provider, typically a high availability and high performance hosting infrastructure that is being comprised, among other elements, of back-end web server instances and application servers for hosting and serving both static and dynamic sites. Based on DIGIT C Infrastructure Services Provision http://ec.europa.eu/ipg/build/infrastructure/index_en.htm INTEROPERABILITY SALIENCY: The Hosting Service ABB is salient for technical interoperability because it provides all the functionalities to host the Interoperable European Solutions (high availability and high performance hosting infrastructure). EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *DIGIT/C Hosting Service* DIGIT/C offers a high availability and high performance hosting infrastructure that is being comprised, among other elements, of back-end web server instances and application servers for hosting and serving both static and dynamic sites. http://ec.europa.eu/ipg/build/infrastructure/index_en.htm

Name	Definition
Identity Management Component	DESCRIPTION: Implements the functionality of user authentication. 'Electronic identification' means the process of using person identification data in electronic form uniquely representing either a natural or legal person, or a natural person representing a legal person; 'Authentication' means an electronic process that enables the electronic identification of a natural or legal person, or the origin and integrity of data in electronic form to be confirmed; Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG Syn. Authentication Component, eID INTEROPERABILITY SALIENCY: The Identity Management Component ABB is salient for technical interoperability because it provides the functionalities of user authentication. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *OpenIAM Identity Manager* The OpenIAM Identity Manager automates the task of managing identities across the various devices and applications used by the enterprise. This includes applications within the enterprise such as Active Directory and Exchange, and cloud based applications such as Google Apps. OpenIAM Identity Manager provides capabilities such as: • Provisioning, De-provisioning, Workflow • Password Management, Password Policies, Synchronization • Self-Service, allowing locked users to reset their accounts, manage their profiles, challenge response security questions • Audit, Attestation, Reporting • Delegated Administration http://www.openiam.com/products/identity-manager/idm-overview/

| Identity Management Service | DESCRIPTION:
Shares the functionality of user authentication.
'Electronic identification' means the process of using person identification data in electronic form uniquely representing either a natural or legal person, or a natural person representing a legal person;
'Authentication' means an electronic process that enables the electronic identification of a natural or legal person, or the origin and integrity of data in electronic form to be confirmed;

Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.
http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG

Syn. Authentication Service, eID

INTEROPERABILITY SALIENCY:
The Identity Management Service ABB is salient for technical interoperability because it provides the functionalities of user authentication.

EXAMPLES:
The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB):

EU Login
EU Login is the European Commission's user authentication service. It allows authorised users to access a wide range of Commission web services. EU Login is the entry gate to sign in to different European Commission services and/or other systems. EU Login verifies your identity and allows recovering your personal settings, history and access rights in a secure way. You can sign in using social media accounts or the EU Login account.
EU Login supports a variety of verification methods:
• Password;
• ECAS Mobile App PIN code;
• ECAS Mobile App QR code;
• On mobile authentication;
• Mobile phone + SMS;
• Token and Token CRAM.
https://webgate.ec.europa.eu/cas/about.html
https://webgate.ec.europa.eu/cas/manuals/EU_Login_Tutorial_1.1.pdf

Federal Public Service Policy and Support - Federal Authentication Service (FAS)
Via the Federal Authentication Service (FAS) individuals are authenticated so that they can access secure online government applications.
Characteristics: |

Name	Definition
	• Three different security levels depending on the sensitivity of the information: user name and password; user name, password and token; electronic identity card with associated PIN code. • Authentication when connecting to an application • Support with the implementation of the service • Support while the service is being used Attribute Publication Service: • Collecting a user´s attributes from one or more reliable sources that are located in other government institutions (i.e., National Register, Crossroads Bank for Social Security and Crossroads Bank for Enterprises) • Sending of the requested attributes to the requesting government application within the framework of a successful authentication Users: • All public services and institutions that want a secure authentication process for their applications: Federal public services and institutions; Communities and Regions; Provinces, municipalities and local public social welfare centres; businesses or persons implementing government contracts Requirements: • Application with Fedict Service Desk and signing up to a user agreement http://www.fedict.belgium.be/en/identificatie_beveiliging/federal_authentication_service

Name	Definition
Machine Translation Component	DESCRIPTION: Implements the functionality of serving any current or future Digital Service Infrastructure (DSI) requiring cross-lingual functionality. The main functionality is automated translation of text, metadata and concept classes or nomenclatures. Based on CEF Automated Translation https://ec.europa.eu/digital-single-market/en/news/tools-and-resources-cef-automated-translation INTEROPERABILITY SALIENCY: The Machine Translation Component ABB is salient for technical interoperability because it provides the implementation of functionalities for cross-lingual functionality by providing automated translation of text, metadata and concept classes or nomenclatures as stated in the EIF recommendation n°16: "Use information systems and technical architectures that cater for multilingualism when establishing a European public service. Decide on the level of multilingualism support based on the needs of the expected users." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *"CEF Digital - eTranslation building block"* eTranslation is a Connecting Europe Facility (CEF) building block provided by the European Commission (EC). eTranslation provides a web-user interface for direct use by individuals (human-to-machine). https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eTranslation "

Name	Definition
Machine Translation Service	DESCRIPTION: Shares the functionality of serving any current or future Digital Service Infrastructure (DSI) requiring cross-lingual functionality. The main functionality is automated translation of text, metadata and concept classes or nomenclatures. Based on CEF Automated Translation https://ec.europa.eu/digital-single-market/en/news/tools-and-resources-cef-automated-translation INTEROPERABILITY SALIENCY: The Machine Translation Service ABB is salient for technical interoperability because it enables cross-lingual functionality by providing automated translation of text, metadata and concept classes or nomenclatures as stated in the EIF recommendation n°16: "Use information systems and technical architectures that cater for multilingualism when establishing a European public service. Decide on the level of multilingualism support based on the needs of the expected users." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *CEF Digital - eTranslation building block* eTranslation is a Connecting Europe Facility (CEF) building block provided by the European Commission (EC). eTranslation provides an online machine translation service. https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eTranslation "

Name	Definition
Metadata Management Component	DESCRIPTION: Implements the functionalities for the i) creation, ii) storage, iii) categorisation and iv) retrieval of metadata. Based on DAMA http://www.dama.org/ INTEROPERABILITY SALIENCY: The Metadata management Component ABB is salient for interoperability because it provides the implementation of the functionalities to manage metadata. EIF recommends to prioritise it: "Put in place an information management strategy at the highest possible level to avoid fragmentation and duplication. Management of metadata, master data and reference data should be prioritised." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Eurostat SDMX repository* The Euro SDMX Registry is Eurostat's implementation of an SDMX registry to facilitate the exchange of statistical data and metadata by serving as a metadata repository. It stores the SDMX artefacts needed for the parties to access and interpret the content of the exchanged statistical data and metadata sets. http://ec.europa.eu/eurostat/web/sdmx-infospace/sdmx-it-tools/sdmx-registry

Name	Definition
Metadata Management Service	DESCRIPTION: Shares the functionalities for the i) creation, ii) storage, iii) categorisation and iv) retrieval of metadata. Based on DAMA http://www.dama.org/ INTEROPERABILITY SALIENCY: The Metadata management Service ABB is salient for interoperability because it provides and shares the functionalities to manage metadata. EIF recommends to prioritise it: "Put in place an information management strategy at the highest possible level to avoid fragmentation and duplication. Management of metadata, master data and reference data should be prioritised". EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Eurostat SDMX repository* The Euro SDMX Registry is Eurostat's implementation of an SDMX registry to facilitate the exchange of statistical data and metadata by serving as a metadata repository. It stores the SDMX artefacts needed for the parties to access and interpret the content of the exchanged statistical data and metadata sets. http://ec.europa.eu/eurostat/web/sdmx-infospace/sdmx-it-tools/sdmx-registry

Name	Definition
Network	DESCRIPTION: Transmission systems and, where applicable, switching or routing equipment and other resources which permit the conveyance of signals by wire, by radio, by optical or by other electromagnetic means, including satellite networks, fixed (circuit- and packet- switched, including Internet) and mobile terrestrial networks, electricity cable systems, to the extent that they are used for the purpose of transmitting signals, networks used for radio and television broadcasting, and cable television networks, irrespective of the type of information conveyed. Source: DIRECTIVE 2002/21/EC on a common regulatory framework for electronic communications networks and services http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0021&from=EN INTEROPERABILITY SALIENCY: The Network ABB is salient for technical interoperability because it provides the network where can operate interoperable solutions (both public and private network). EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *sTESTA* The TESTA network service – which stands for Trans European Services for Telematics between Administrations – provides a European backbone network for data exchange between a wide variety of public administrations. The network uses the Internet Protocols (IP) to ensure universal reach, but is operated by the EU Commission separately from the Internet. It provides guaranteed performance and a high level of security and has connections with all the EU Institutions and national networks. It caters for the exchange of both unclassified and classified information. https://ec.europa.eu/isa2/solutions/testa_en

Name	Definition
Networking Service	DESCRIPTION: Shares the functionalities provided by a network provider which is the combination of transmission systems and, where applicable, switching or routing equipment and other resources which permit the conveyance of signals by wire, by radio, by optical or by other electromagnetic means, including satellite networks, fixed (circuit- and packet- switched, including Internet) and mobile terrestrial networks, electricity cable systems, to the extent that they are used for the purpose of transmitting signals, networks used for radio and television broadcasting, and cable television networks, irrespective of the type of information conveyed. Based on DIRECTIVE 2002/21/EC on a common regulatory framework for electronic communications networks and services http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0021&from=EN INTEROPERABILITY SALIENCY: The Networking Service ABB is salient for technical interoperability because it provides all the required functionalities in order to create the suitable network underlayer where can operate interoperable solutions. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *sTESTA* The TESTA network service – which stands for Trans European Services for Telematics between Administrations – provides a European backbone network for data exchange between a wide variety of public administrations. The network uses the Internet Protocols (IP) to ensure universal reach, but is operated by the EU Commission separately from the Internet. It provides guaranteed performance and a high level of security and has connections with all the EU Institutions and national networks. It caters for the exchange of both unclassified and classified information. https://ec.europa.eu/isa2/solutions/testa_en

Name	Definition
Private Hosting Facility	DESCRIPTION: A Hosting Facility, meaning the equipment supporting the hosting of Interoperable European Solutions and their components, usually embodied in a build-in, which is owned by or dedicated to one organization (e.g. data centre or private cloud). Based on DIGIT C Infrastructure Services Provision http://ec.europa.eu/ipg/build/infrastructure/index_en.htm INTEROPERABILITY SALIENCY: The Private Hosting Facility ABB is salient for technical interoperability because it provides all the equipment, dedicated to one organization, supporting the hosting of interoperable solutions and their components. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *DG TAXUD Surveillance3 IES Datawarehouse servers hosted in DG TAXUD Data Centre* The Surveillance3 Data Warehouse plays multiple roles: • The role of 'hub-and-spoke' within the Surveillance3 system where data from different systems are integrated and linked and made available for report & analytics as well as the central place from which other systems are fed with the correct information. • The role of reporting environment offering all the required reporting, data analysis & discovery and data mining functionality. https://ec.europa.eu/assets/taxud/taxation_customs/tenders/2016ao02_a2_technical_en.pdf

Name	Definition
Private Network	DESCRIPTION: A network that is used for the only purpose of realising the physical communication among Interoperable European Solution (e.g. sTESTA), and cannot be accessed by the public. Source: ISA2 - EIA Action INTEROPERABILITY SALIENCY: The Private Network ABB is salient for technical interoperability because it provides the private network where can operate interoperable solutions. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Any private network* Hosts within enterprises that use IP can be partitioned into two categories: Category 1: hosts that do not require access to hosts in other enterprises or the Internet at large; hosts within this category may use IP addresses that are unambiguous within an enterprise, but may be ambiguous between enterprises. Category 2: hosts that need access to a limited set of outside services (e.g., E-mail, FTP, netnews, remote login) which can be handled by mediating gateways (e.g., application layer gateways). For any hosts in this category an unrestricted external access (provided via IP connectivity) may be unnecessary and even undesirable for privacy/security reasons. Just like hosts within the first category, such hosts may use IP addresses that are unambiguous within an enterprise, but may be ambiguous between enterprises. A third category is what is called a 'public network' and consist of the following: Category 3: hosts that need network layer access outside the enterprise (provided via IP connectivity); hosts in the last category require IP addresses that are globally unambiguous. https://tools.ietf.org/html/rfc1918

Name	Definition
Public Hosting Facility	DESCRIPTION: The equipment supporting the hosting of Interoperable European Solutions and their components, usually embodied in a building, which is owned by a third party and shared between organizations (e.g. cloud services). Based on DIGIT C Infrastructure Services Provision http://ec.europa.eu/ipg/build/infrastructure/index_en.htm INTEROPERABILITY SALIENCY: The Public Hosting Facility ABB is salient for technical interoperability because it provides all the equipment, shared between organizations, supporting the hosting of interoperable solutions and their components. EXAMPLES: *Amazon Web Services (AWS)* AWS provides a comprehensive suite of services and solutions to run sophisticated and scalable applications to help achieve better business outcomes. Running your applications in the AWS Cloud can help you move faster, operate more securely, and save substantial costs; all while benefitting from the agility, scale and performance of the cloud. https://aws.amazon.com/solutions/?nc2=h_ql_sol

Public Network	DESCRIPTION: A network that can be accessed by the public (public administrations, businesses and citizens) without specific authorisations. Interoperable European Solutions can rely on Public Networks (e.g. the Internet) to realise the physical communication between nodes. Source: ISA2 - EIA Action INTEROPERABILITY SALIENCY: The Public Network ABB is salient for technical interoperability because it provides the public network where can operate interoperable solutions. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *World-Wide-Web (WWW)* The WorldWideWeb (W3) is a wide-area hypermedia information retrieval initiative aiming to give universal access to a large universe of documents. http://info.cern.ch/hypertext/WWW/TheProject.html

Name	Definition
Registered Electronic Delivery Service	DESCRIPTION: Shares the functionalities that i) makes it possible to transmit data between third parties by electronic means and ii) provides evidence relating to the handling of the transmitted data, including proof of sending and receiving the data, and iii) that protects transmitted data against the risk of loss, theft, damage or any unauthorised alterations; Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG INTEROPERABILITY SALIENCY: The Registered Electronic Delivery Service ABB is salient for technical interoperability because it provides the functionalities related to the handling of data transmission. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Qualified electronic registered delivery services listed with CEF Trusted List Browser tool* Qualified electronic registered delivery services are listed on https://webgate.ec.europa.eu/tl-browser/#/search/1 https://webgate.ec.europa.eu/tl-browser/#/search/1

Name	Definition
Service Registration Service	DESCRIPTION: Shares the functionality of registering the system service within a catalogue to be discovered by other services. Source ISA2 - EIA Action Syn. Service Catalogue Service INTEROPERABILITY SALIENCY: The Service Registration Service ABB is salient for interoperability because it enables the registration of services in a catalogue with commonly agreed descriptions as stated in the EIF recommendation n°44: "Put in place catalogues of public services, public data, and interoperability solutions and use common models for describing them." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Apache ZooKeeper* Apache ZooKeeper is an effort to develop and maintain an open-source server which enables highly reliable distributed coordination. ZooKeeper is a centralized service for maintaining configuration information, naming, providing distributed synchronization, and providing group services. All of these kinds of services are used in some form or another by distributed applications. Each time they are implemented there is a lot of work that goes into fixing the bugs and race conditions that are inevitable. Because of the difficulty of implementing these kinds of services, applications initially usually skimp on them, which make them brittle in the presence of change and difficult to manage. Even when done correctly, different implementations of these services lead to management complexity when the applications are deployed. ZooKeeper aims at distilling the essence of these different services into a very simple interface to a centralized coordination service. The service itself is distributed and highly reliable. Consensus, group management, and presence protocols will be implemented by the service so that the applications do not need to implement them on their own. Application specific uses of these will consist of a mixture of specific components of Zoo Keeper and application specific conventions. ZooKeeper Recipes shows how this simple service can be used to build much more powerful abstractions. Apache have Java and C interfaces to Zoo Keeper for the applications themselves. A variety of client bindings is available for a number of languages including Python, Ruby and Go. https://cwiki.apache.org/confluence/display/ZOOKEEPER/Index

Name	Definition
Service Registry Component	DESCRIPTION: Implements the functionality of registering the system service within a catalogue to be discovered by other services. This ABB is a key interoperability enabler (*) for sharing/PROVISIONING and reusing/CONSUMING back-office services. Source ISA2 - EIA Action (*)DECISION (EU) 2015/2240 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 establishing a programme on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector. Syn. Service Catalogue Component INTEROPERABILITY SALIENCY: The Service Registration Component ABB is a key interoperability enabler because it supports to achieve technical interoperability by provisioning and consuming back-office services as stated in the EIF recommendation n°44: "Put in place catalogues of public services, public data, and interoperability solutions and use common models for describing them." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *jUDDI* jUDDI is an open source Java implementation of OASIS Universal Description, Discovery, and Integration (UDDI) specification for (Web) Services. https://juddi.apache.org/

Name	Definition
Technical Interoperability Specification	DESCRIPTION: A specification contained in a document which lays down the characteristics required of a product such as levels of quality, performance, safety or dimensions, including the requirements applicable to the product as regards the name under which the product is sold, terminology, symbols, testing and test methods, packaging, marking or labelling and conformity assessment procedures. Source: Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1998L0034:20070101:EN:PDF INTEROPERABILITY SALIENCY: The Technical Interoperability Specification ABB is salient for technical interoperability because it assesses the characteristics required of a product to support interoperability solutions. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *HTTPS specification* HTTP [RFC2616] was originally used in the clear on the Internet. However, increased use of HTTP for sensitive applications has required security measures. SSL, and its successor TLS [RFC2246] were designed to provide channel-oriented security. https://tools.ietf.org/html/rfc2818

Name	Definition
Technical Specification	DESCRIPTION: A document that prescribes technical requirements to be fulfilled by a product, process or service. - Note 1 to entry: A technical specification should indicate, whenever appropriate, the procedure(s) by means of which it may be determined whether the requirements given are fulfilled. - Note 2 to entry: A technical specification may be a standard, a part of a standard or independent of a standard. Source: https://www.iso.org/obp/ui/#iso:std:iso-iec:20944:-1:ed-1:v1:en:term:3.1.3.8] INTEROPERABILITY SALIENCY: The Technical Specification ABB is salient for technical interoperability because it assesses the characteristics required of a product to support technical solutions. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *AS4 Profile specification* The eDelivery AS4 Profile is a modular profile of the ebMS3 and AS4 OASIS specifications. Its core is a mandatory Common Profile that selects, extends and profiles the AS4 ebHandler Conformance Profile and AS4 Additional Features and provides a common Usage Profile. This Common Profile can be implemented using open source or closed source AS4 software implementations. It is aligned with, and corresponds to a subset of, the AS4 profile for TSOs (Transmission System Operators) developed by ENTSOG (the European Network of Transmission System Operators for Gas). In addition to the Common Profile, this specification provides a number of optional Profile Enhancement modules that specify functionality enhancements covering AS4 message exchange in four corner topologies, the use of AS4 in conjunction with the UN/CEFACT Standard Business Document Header (SBDH) specification, and Dynamic Receiver and Dynamic Sender behavior. https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eDelivery+AS4+-+1.13

Trust Registry Component	DESCRIPTION: Implements the functionality of the discovery of essential information about e.g. supervised/accredited trust service providers issuing certificates for electronic signatures, for electronic seals or for website authentication; supervised/accredited trust services for eSignature, eSeal or TimeStamp creation and validation; supervised/accredited trust services for eSignature or eSeal preservation; supervised/accredited trust services for electronic registered delivery. Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG Syn. Trusted List Component INTEROPERABILITY SALIENCY The Trust Registry Component ABB is salient for technical interoperability because it implements the functionalities of the discovery of essential information about accredited service providers. EXAMPLES The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Trusted lists of all EU Member States* EU Member States have the obligation to establish, maintain and publish trusted lists of qualified trust service providers and the qualified trust services provided by them. Under the Regulation (EC) No 910/2014/EU (eIDAS Regulation), national Trusted Lists have a constitutive effect. In other words, a trust service provider and the trust services it provides will be qualified only if it appears in the Trusted Lists. Consequently, the users (citizens, businesses or public administrations) will benefit from the legal effect associated with a given qualified trust service only if the latter is listed (as qualified) in the Trusted Lists. Article 22 of the eIDAS Regulation provides indeed the obligation for Member States to establish, maintain and publish trusted lists, including information related to the qualified trust service providers for which they are responsible, together with information related to the qualified trust services provided by them. The lists are to be published in a secured manner, electronically signed or sealed in a form suitable for automated processing. Trusted Lists are therefore essential in ensuring certainty and building trust among market operators as they indicate the status of the service provider and of the service at the moment of supervision, while aiming at fostering interoperability of qualified trust services by facilitating the validation of, among others, eSignatures and eSeals. Member States may add trust services other than the qualified ones in the trusted lists, on a voluntary basis, at national level, provided that it is clearly indicated that they are not qualified according to Regulation (EU) No 910/2014. In order to allow access to the trusted lists of all Member States, the Commission makes them available to the public, through a secure channel to an authenticated web server, the trusted lists as notified by Member States, in a signed or sealed form suitable for automated processing.

Name	Definition
	https://ec.europa.eu/digital-single-market/en/eu-trusted-lists-trust-service-providers https://ec.europa.eu/information_society/policy/esignature/trusted-list/tl-mp.xml

Name	Definition
Trust Registry Service	DESCRIPTION: Shares the functionality of the discovery of essential information about e.g. supervised/accredited trust service providers issuing certificates for electronic signatures, for electronic seals or for website authentication; supervised/accredited trust services for eSignature, eSeal or TimeStamp creation and validation; supervised/accredited trust services for eSignature or eSeal preservation; supervised/accredited trust services for electronic registered delivery. Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG Syn. Trusted List Service INTEROPERABILITY SALIENCY: The Trust Registry Service ABB is salient for technical interoperability because it provides the functionalities of the discovery of essential information about accredited service providers. EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): BE:Trusted BE:Trusted list including information related to the qualified trust service providers which are supervised by the issuing Member State, together with information related to the qualified trust services provided by them, in accordance with the relevant provisions laid down in Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market. https://tsl.belgium.be/archive/TSL-BE-2016-T3_vi5_sn27%20SPF%20Economie_signed.pdf

Name	Definition
Trust Service Provisioning Component	DESCRIPTION: Implements the functionalities encapsulating the trust services functionalities. A 'trust service' means an electronic service normally provided for remuneration which consists of these functionalities: i) the creation, verification, and validation of electronic signatures, electronic seals or electronic time stamps, electronic registered delivery services and certificates related to those services, or ii) the creation, verification and validation of certificates for website authentication; or iii) the preservation of electronic signatures, seals or certificates related to those services. Based on eIDAS - REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG INTEROPERABILITY SALIENCY: The Trust Service Provisioning Component ABB is salient for technical interoperability because it provides the implementation of the functionalities of information exchange between between administrations, businesses and citizens (e-signature and e-seal creation, verification, validation and preservation, timestamping, creation, verification and validation, identity management, etc.) as stated in the EIF recommendation n°47: "Use trust services according to the Regulation on eID and Trust Services as mechanisms that ensure secure and protected data exchange in public services." EXAMPLES: The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *e-TrustEx* Open e-TrustEx is a platform offered by the Directorate-General for Informatics of the European Commission to Public Administrations at European, national and regional level to set up secure exchange of natively digital documents from system to system via standardized interfaces. Open e-TrustEx provides a set of generic web services, which Public Administrations can use to connect heterogeneous applications, removing the need for complex point-to-point connections. http://eur-lex.europa.eu/legal-content/DE/TXT/?uri=CELEX%3A52016SC0279 https://joinup.ec.europa.eu/solution/open-e-trustex

8.2.6 Table 6-6 EIF Underlying Principles view

Name	Definition
Achieve Legal Interoperability	For the purpose of the EIF, interoperability is the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business processes they support, by means of the exchange of data between their ICT systems. The interoperability model which is applicable to all digital public services and may also be considered as an integral element of the interoperability-by-design paradigm. It includes: four layers of interoperability: legal, organisational, semantic and technical. Legal interoperability is about ensuring that organisations operating under different legal frameworks, policies and strategies are able to work together. Based on the New EIF https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf
Achieve Organisational Interoperability	For the purpose of the EIF, interoperability is the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business processes they support, by means of the exchange of data between their ICT systems. The interoperability model which is applicable to all digital public services and may also be considered as an integral element of the interoperability-by-design paradigm. It includes: four layers of interoperability: legal, organisational, semantic and technical. Organisational interoperability refers to the way in which public administrations align their business processes, responsibilities and expectations to achieve commonly agreed and mutually beneficial goals. In practice, organisational interoperability means documenting and integrating or aligning business processes and relevant information exchanged. Organisational interoperability also aims to meet the requirements of the user community by making services available, easily identifiable, accessible and user-focused. Based on the New EIF https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf

Name	Definition
Achieve Semantic Interoperability	For the purpose of the EIF, interoperability is the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business processes they support, by means of the exchange of data between their ICT systems. The interoperability model which is applicable to all digital public services and may also be considered as an integral element of the interoperability-by-design paradigm. It includes: four layers of interoperability: legal, organisational, semantic and technical.

Semantic interoperability ensures that the precise format and meaning of exchanged data and information is preserved and understood throughout exchanges between parties, in other words 'what is sent is what is understood'. In the EIF, semantic interoperability covers both semantic and syntactic aspects.

Based on the New EIF
https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf |
| Achieve Technical Interoperability | For the purpose of the EIF, interoperability is the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between these organisations, through the business processes they support, by means of the exchange of data between their ICT systems. The interoperability model which is applicable to all digital public services and may also be considered as an integral element of the interoperability-by-design paradigm. It includes: four layers of interoperability: legal, organisational, semantic and technical.

Technical interoperability covers the applications and infrastructures linking systems and services. Aspects of technical interoperability include interface specifications, interconnection services, data integration services, data presentation and exchange, and secure communication protocols

Based on the New EIF
https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf |

Name	Definition
Administrative simplification	EIF Underlying principle 10: administrative simplification Where possible, public administrations should seek to streamline and simplify their administrative processes by improving them or eliminating any that does not provide public value. Administrative simplification can help businesses and citizens to reduce the administrative burden of complying with EU legislation or national obligations. Likewise, public administrations should introduce European public services supported by electronic means, including their interactions with other public administrations, citizens and businesses. Digitisation of public services should take place in accordance with the following concepts: • digital-by-default, whenever appropriate, so that there is at least one digital channel available for accessing and using a given European public service; • digital-first which means that priority is given to using public services via digital channels while applying the multi-channel delivery concept and the no-wrong-door policy, i.e. physical and digital channels co-exist. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.
Assessment of Effectiveness and Efficiency	EIF Underlying principle 12: assessment of effectiveness and efficiency There are many ways to take stock of the value of interoperable European public services, including considerations such as return on investment, total cost of ownership, level of flexibility and adaptability, reduced administrative burden, efficiency, reduced risk, transparency, simplification, improved working methods, and level of user satisfaction. Various technological solutions should be evaluated when striving to ensure the effectiveness and efficiency of a European public service. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.

Name	Definition
Inclusion and accessibility	EIF Underlying principle 7: inclusion and accessibility Inclusion is about enabling everyone to take full advantage of the opportunities offered by new technologies to access and make use of European public services, overcoming social and economic divides and exclusion. Accessibility ensures that people with disabilities, the elderly and other disadvantaged groups can use public services at service levels comparable to those provided to other citizens. Inclusion and accessibility must be part of the whole development lifecycle of a European public service in terms of design, information content and delivery. It should comply with e-accessibility specifications widely recognised at European or international level. Inclusion and accessibility usually involve multi-channel delivery. Traditional paper-based or face-to-face service delivery may need to co-exist with electronic delivery. Inclusion and accessibility can also be improved by an information system's ability to allow third parties to act on behalf of citizens who are unable, either permanently or temporarily, to make direct use of public services. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.
Interoperability Principle	The interoperability principles are fundamental behavioural aspects to drive interoperability actions. They describe the context in which European public services are designed and implemented. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.

Name	Definition
Multilingualism	EIF Underlying principle 9: multilingualism

European public services can potentially be used by anyone in any Member State. So multilingualism needs to be carefully considered when designing them. Citizens across Europe often have problems in accessing and using digital public services if these are not available in the languages they speak.

A balance needs to be found between the expectations of citizens and businesses to be served in their own language(s) or their preferred language(s) and the ability of Member States' public administrations to offer services in all official EU languages.
A suitable balance could be that European public services are available in the languages of the expected end-users, i.e. the number of languages is decided on the basis of users' needs, such as the level to which the service is critical for the implementation of the digital single market or national policies, or the size of the relevant audience.

Multilingualism comes into play not just in the user interface, but at all levels in the design of European public services. For example, the choices made on data representation in an electronic database should not limit its ability to support different languages.

The multilingual aspect of interoperability becomes also relevant when a public service requires exchanges between information systems across language boundaries, as the meaning of the information exchanged must be preserved.

Source: The New EIF. https://ec.europa.eu/isa2/eif_en
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Openness	EIF Underlying principle 2: openness
	In the context of interoperable public services, the concept of openness mainly relates to data, specifications and software.
	Open government data (here simply referred 'open data') refers to the idea that all public data should be freely available for use and reuse by others, unless restrictions apply e.g. for protection of personal data, confidentiality, or intellectual property rights. Public administrations collect and generate huge amounts of data. The Directive on the reuse of public sector information (PSI)7 encourages Member States to make public information available for access and reuse as open data. The INSPIRE Directive8 requires, in addition, sharing of spatial datasets and services between public authorities with no restrictions or practical obstacles to its reuse. This data should be published with as few restrictions as possible and clear licences for its use to allow better scrutiny of administrations' decision-making processes and realise transparency in practice.
	The use of open source software technologies and products can help save development cost, avoid a lock-in effect and allow fast adaptation to specific business needs because the developer communities that support them are constantly adapting them. Public administrations should not only use open source software but whenever possible contribute to the pertinent developer communities. Open source is an enabler of the underlying EIF principle on reusability.
	The level of openness of a specification/standard is decisive for the reuse of software components implementing that specification. This also applies when such components are used to introduce new European public services. If the openness principle applies in full: • all stakeholders have the opportunity to contribute to the development of the specification and a public review is part of the decision-making process; • the specification is available for everyone to study; • intellectual property rights to the specification are licensed on FRAND9 terms, in a way that allows implementation in both proprietary and open source software10, and preferably on a royalty-free basis.
	Due to their positive effect on interoperability, the use of open specifications has been promoted in many policy statements and is encouraged for European public service delivery. The positive effect of open specifications is demonstrated by the internet ecosystem. However, public administrations may decide to use less open specifications if open ones do not exist or do not meet functional needs. In all cases, specifications should be mature and sufficiently supported by the market, unless they are being used to create innovative solutions.
	Lastly, openness also means empowering citizens and businesses to get involved in the design of new services, to contribute to service improvement and to give feedback about the quality of the existing public services.

Name	Definition
	Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.

Name	Definition
Preservation of information	EIF Underlying principle 11: preservation of information Legislation requires that decisions and data are stored and can be accessed for a specified time. This means that records18 and information in electronic form held by public administrations for the purpose of documenting procedures and decisions must be preserved and be converted, where necessary, to new media when old media become obsolete. The goal is to ensure that records and other forms of information keep their legibility, reliability and integrity and can be accessed as long as needed subject to security and privacy provisions. To guarantee the long-term preservation of electronic records and other kinds of information, formats should be chosen to ensure long-term accessibility, including preservation of associated electronic signatures or seals. In this regard, the use of qualified preservation services, in line with Regulation (EU) 910/2014, can ensure the long-term preservation of information. For information sources owned and managed by national administrations, preservation is a purely national matter. For information that is not strictly national, preservation becomes a European issue. In that case, an appropriate 'preservation policy' should be applied by the Member States concerned, to cope with any difficulties arising if the relevant information is used under different jurisdictions. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.

Name	Definition
Reusability	EIF Underlying principle 4: reusability Reuse means that public administrations confronted with a specific problem seek to benefit from the work of others by looking at what is available, assessing its usefulness or relevance to the problem at hand, and where appropriate, adopting solutions that have proven their value elsewhere. This requires the public administration to be open to sharing its interoperability solutions, concepts, frameworks, specifications, tools and components with others. Reusability of IT solutions (e.g. software components, Application Programming Interfaces, standards), information and data, is an enabler of interoperability and improves quality because it extends operational use, as well as saving money and time. This makes it a major contributor to the development of a digital single market in the EU. Some EU standards and specifications also exist in the DIFs and should be applied more widely. For example, the INSPIRE Directive sets out interoperability standards for addresses, cadastres, roads and many other data topics of relevance to many public administrations. These existing standards and specifications can and should be used more widely beyond the domain for which they were originally developed. Several public administrations and governments across the EU already promote sharing and reuse of IT solutions by adopting new business models, promoting the use of open source software for key ICT services and when deploying digital service infrastructure. There are some key challenges that limit the sharing and reuse of IT solutions, at technical, organisational, legal and communication levels. The ISA² sharing and reuse framework for IT solutions12 provides recommendations for public administrations to help them overcome these challenges and share/reuse common IT solutions. Reuse and sharing can be effectively supported by collaborative platforms. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.

Name	Definition
Security and privacy	EIF Underlying principle 8: security and privacy Citizens and businesses must be confident that when they interact with public authorities they are doing so in a secure and trustworthy environment and in full compliance with relevant regulations, e.g. the Regulation and Directive on data protection, and the Regulation on electronic identification and trust services. Public administrations must guarantee the citizens' privacy, and the confidentiality, authenticity, integrity and non-repudiation of information provided by citizens and businesses. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.
Subsidiarity and proportionality	EIF Underlying principle 1: subsidiarity and proportionality The subsidiarity principle requires EU decisions to be taken as closely as possible to the citizen. In other words, the EU does not take action unless this is more effective than the same action taken at national level. The proportionality principle limits EU actions to what is necessary to achieve the objectives of the Treaties. Concerning interoperability, a European framework is justified to overcome differences in policies that result in heterogeneity and lack of interoperability and that put at risk the digital single market. The EIF is envisaged as the 'common denominator' of interoperability policies in Member States. Member States should enjoy sufficient freedom to develop their NIFs with respect to EIF recommendations. NIFs are expected to be tailored and extended in such a way that national specificities are properly addressed. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.

Name	Definition
Technological neutrality and data portability	EIF Underlying principle 5: technological neutrality and data portability When establishing European public services, public administrations should focus on functional needs and defer decisions on technology as long as possible in order to minimise technological dependencies, to avoid imposing specific technical implementations or products on their constituents and to be able to adapt to the rapidly evolving technological environment. Public administrations should provide for access and reuse of their public services and data irrespective of specific technologies or products. The functioning of the digital single market requires data to be easily transferable among different systems to avoid lock-in, support the free movement of data. This requirement relates to data portability - the ability to move and reuse data easily among different applications and systems, which becomes even more challenging in cross-border scenarios. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.
Transparency	EIF Underlying principle 3: transparency Transparency in the EIF context refers to: 1. Enabling visibility inside the administrative environment of a public administration. This is about allowing other public administrations, citizens and businesses to view and understand administrative rules, processes11, data, services and decision-making. 2. Ensuring availability of interfaces with internal information systems. Public administrations operate a large number of what are often heterogeneous and disparate information systems in support of their internal processes. Interoperability depends on ensuring the availability of interfaces to these systems and the data they handle. In turn, interoperability facilitates reuse of systems and data, and enables these to be integrated into larger systems. 3. Securing the right to the protection of personal data, by respecting the applicable legal framework for the large volumes of personal data of citizens, held and managed by Public administrations. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.

Name	Definition
User-centricity	EIF Underlying principle 6: user-centricity Users of European public services are meant to be any public administration, citizen or businesses accessing and benefiting from the use of these services. Users' needs should be considered when determining which public services should be provided and how they should be delivered. Therefore, as far as possible, user needs and requirements should guide the design and development of public services, in accordance with the following expectations: • A multi-channel service delivery approach, meaning the availability of alternative channels, physical and digital, to access a service, is an important part of public service design, as users may prefer different channels depending on the circumstances and their needs; • A single point of contact should be made available to users, to hide internal administrative complexity and facilitate access to public services, e.g. when multiple bodies have to work together to provide a public service; • Users' feedback should be systematically collected, assessed and used to design new public services and to further improve existing ones; • As far as possible, under the legislation in force, users should be able to provide data once only, and administrations should be able to retrieve and share this data to serve the user, in accordance with data protection rules; • Users should be asked to provide only the information that is absolutely necessary to obtain a given public service. Source: The New EIF. https://ec.europa.eu/isa2/eif_en The new European Interoperability Framework (EIF) is part of the Communication (COM(2017)134) from the European Commission adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services.