An introduction to the European Interoperability Reference Architecture (EIRA©) v2.1.0

EIRA

EUROPEAN
INTEROPERABILITY
REFERENCE
ARCHITECTURE

Change Control

Modification	Details
Version 2.1.0	
ABBs definition update	All the ABBs definitions have been reviewed and now include a synonym to the ABB name and an example of an existing Solution Building Block specializing this ABB.
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.
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
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

Modification	Details
	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. • 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	

Modification	Details
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	

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1 INTRODUCTION

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/asset/eia/description

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.

o **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/
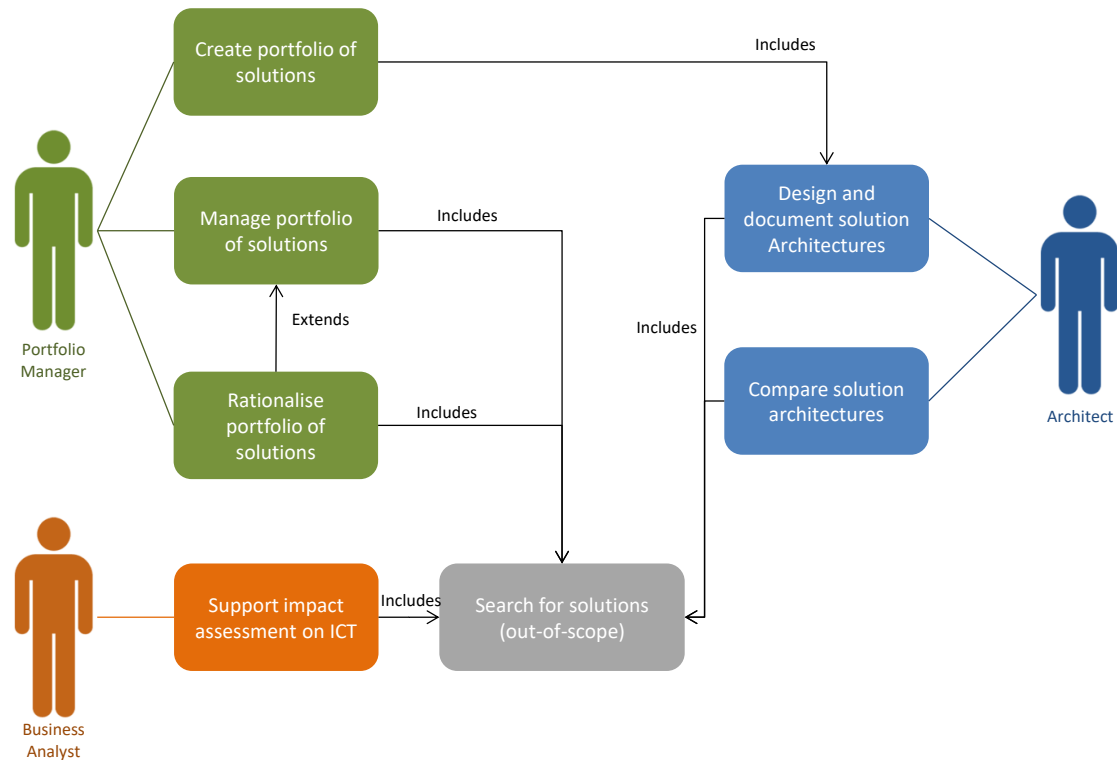
Figure 1 - Target users and their use cases within the EIRA©

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

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

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

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

  - 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.

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

  - Service registry; 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 Exchange readiness Architecture Building Blocks. These ABBs are key interoperability enablers for assessing compatibility. The EIRA© identifies the following key exchange readiness ABBs:

  - Public Policy Formulation and Implementation Instrument; Techniques or means for the development of pertinent and acceptable proposed courses of action for dealing with public problems and carrying out of a policy decision. This ABB is a key interoperability enabler for assessing the compatibility of legal/juridical certainty in exchanged information.

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

  - Representation; the perceptible form of the information carried by a business object. This ABB is a key interoperability enabler for assessing compatible interpretations of Data.

  - 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 compatible interfaces.

  - 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 compatible interfaces.

- Key Interoperability readiness ABBs; an encompassing readiness assessment containing the 'Key Sharing and Reuse readiness Architecture Building Blocks',

the 'Key Exchange readiness Architecture Building Blocks' that were previously mentioned and one final ABB:

- o Interoperability Agreement; 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.

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 (6), Assessment of trans-European systems supporting EU policies (7)) 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
  - o discovery of systems with identical or overlapping functionalities inside the organisation which might be phased out and
  - 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:
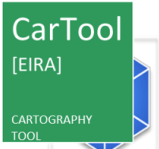
- Legislative proposals
- Non-legislative proposals such as financial programmes and recommendations for the negotiations of international agreements)
- Implementing and delegating acts

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

[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.

	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/asset/eia/description.

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® (5).
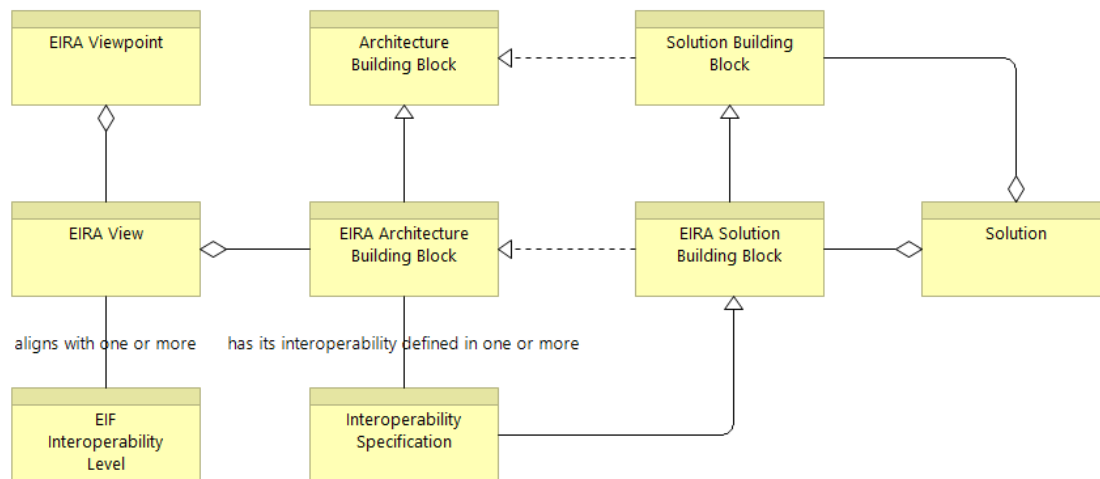
Figure 3 – Key concepts in EIRA©

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 Dimensions

- 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

- An EIRA© Architecture Building Block has its interoperability requirements defined in one or more Interoperability Specifications.

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

- An Interoperability Specification is a specialisation of an EIRA© 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 (5), 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 (5), 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 (5): "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".
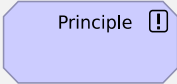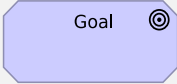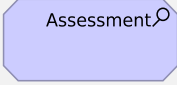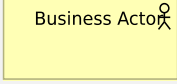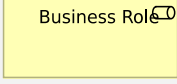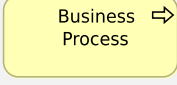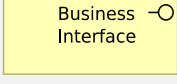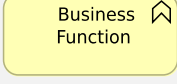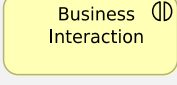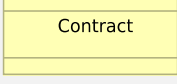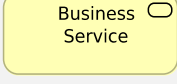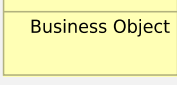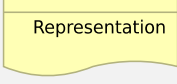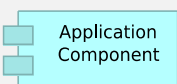
3.2 ArchiMate® notation
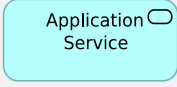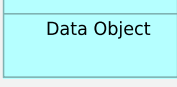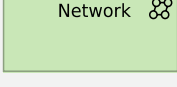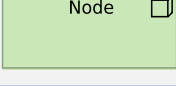
The EIRA© uses the ArchiMate® language as a notation. In fact, the EIRA© can be considered as an *extension* of the ArchiMate® language, using two of the extension mechanisms foreseen by ArchiMate® (1): specialisation (stereotyping) and attributes. This section first provides an overview of the ArchiMate® 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® model concepts (1):
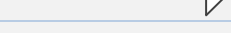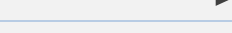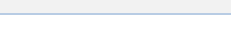
Table 3-1 – ArchiMate® model concepts used in EIRA© (1)

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.
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.
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.

Model concept	Definition
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 behaviors 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 2.0 uses the following ArchiMate® 2.1 relationships:

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

Relationship	Description	Relationship	Description
	Composition		Access
	Aggregation		Specialisation
	Used by		Association
	Realisation		Triggering
	Assignment		

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'.
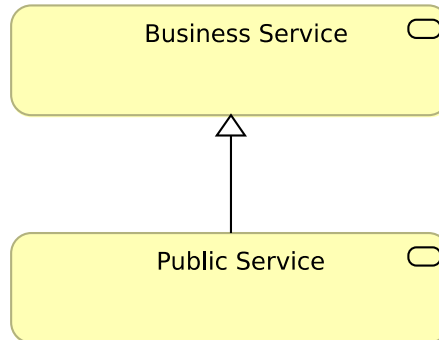
Figure 5 – Specialisation in the EIRA© metamodel

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>>.
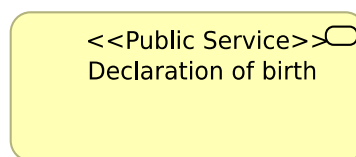
Figure 6 – Example: stereotyping of Solution Building Blocks

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 "Interoperability Specification Viewpoint", the "Governance Viewpoint", the "Integrated Public Service Viewpoint" and the "Security and Privacy 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

  - The Conceptual Model for Integrated Public Service Provisioning viewpoint;

  - The EIRA High-level viewpoint;

  - The Interoperability Specification viewpoint;

  - The Interoperability Governance viewpoint;

  - The Integrated Public Service Governance viewpoint; and

  - The Interoperability Security and Privacy 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 Figure 8.

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.
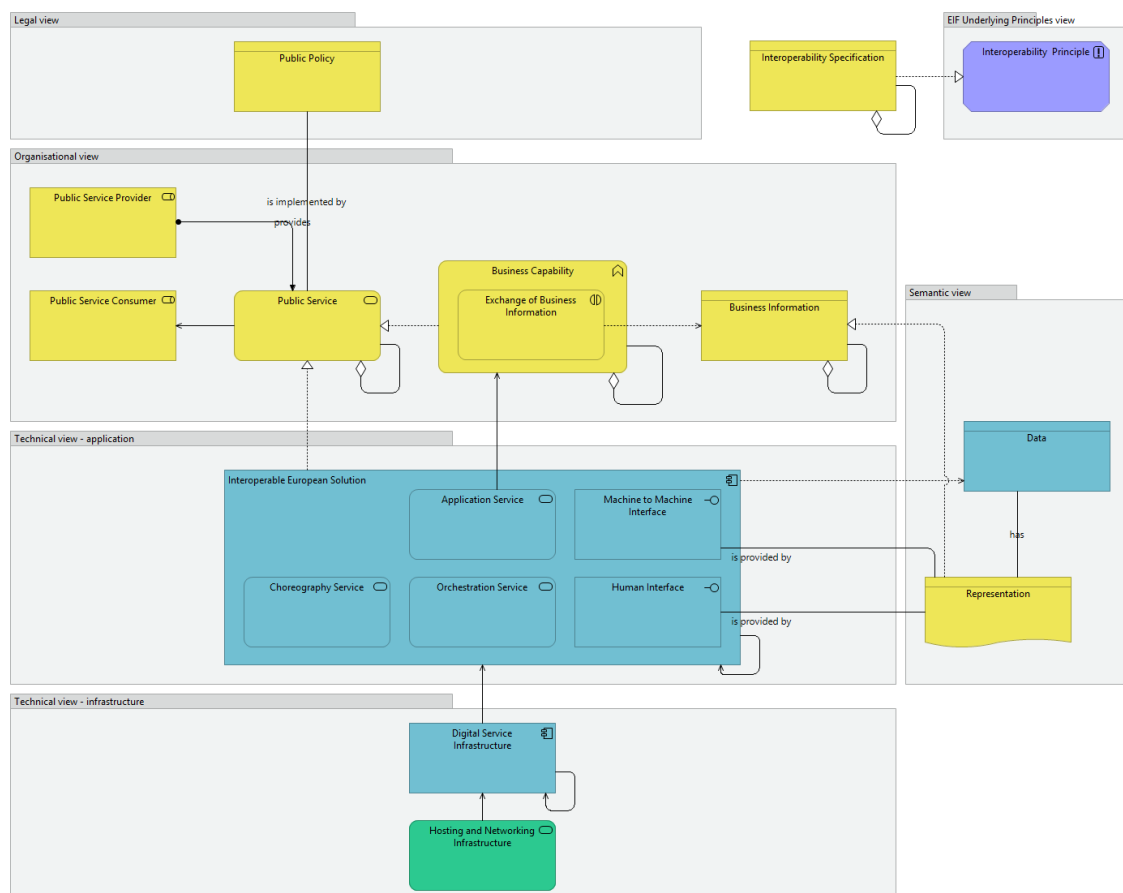
Figure 7 – EIRA© high-level viewpoint (3)

The EIRA© embeds this alignment as follows:

On the organisational view, the users consume public services, which can be basic or aggregated public services, via a service delivery model.

An IES, which facilitates the delivery of a public service, has orchestration and choreography services on the technical application view.

On the technical application view, an IES has services for secure communications management and for secure data exchange and management. In addition, it has human or machine-2-machine interfaces to leverage external services.

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[13] https://ec.europa.eu/isa2/actions/assessing-progress-being-made-towards-interoperability_en
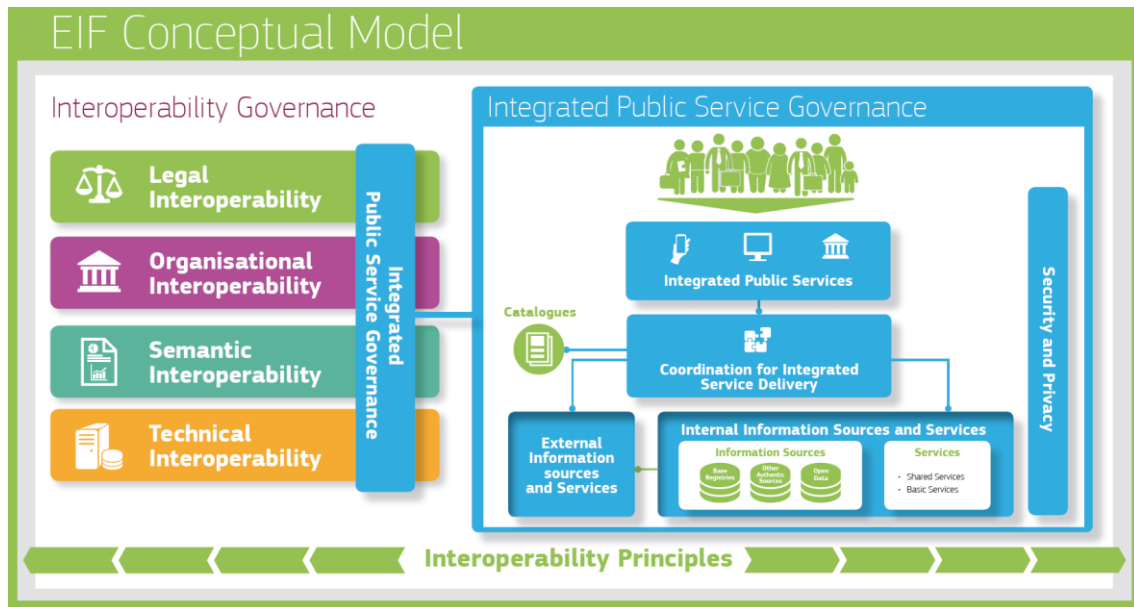
Figure 8 - EIF conceptual model for public services (2)

The overview embeds this conceptual model of a reusable Interoperable European Solution (2), depicted in Figure 9. It is modelled as:

- One or more (integrated) public services;

- One or more software components provide application services that are public service neutral (application component);

- One or more interfaces (human interface or machine-to-machine interface);

- One orchestration service specific to the supported public service;

- One choreography service specific to the supported public service.

- One or more IES services (such as application mediation enablers, workflow enablers) as well as external and internal information sources and services;

- One or more DSI services (such as collaboration enablers and infrastructure mediation enablers); and

- One or more catalogues that document the interoperability solutions.
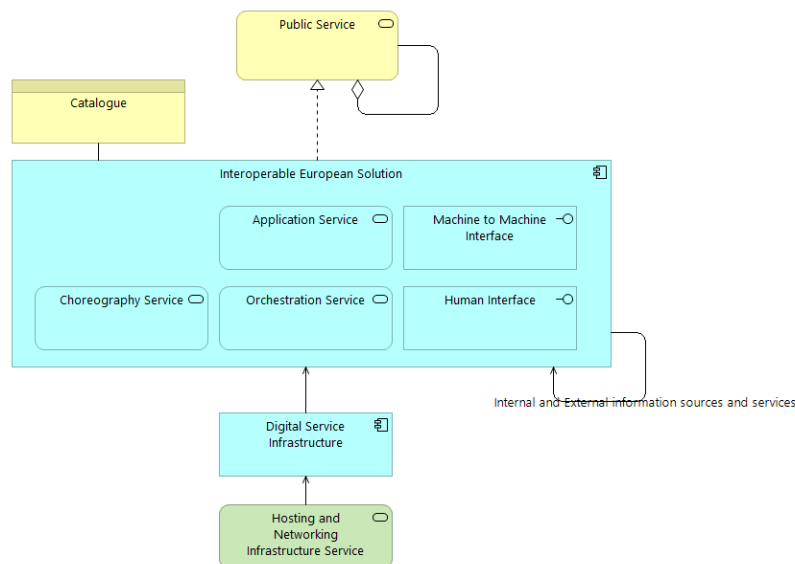
Figure 9 – Conceptual model of a reusable Interoperable European Solution (13)

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 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.
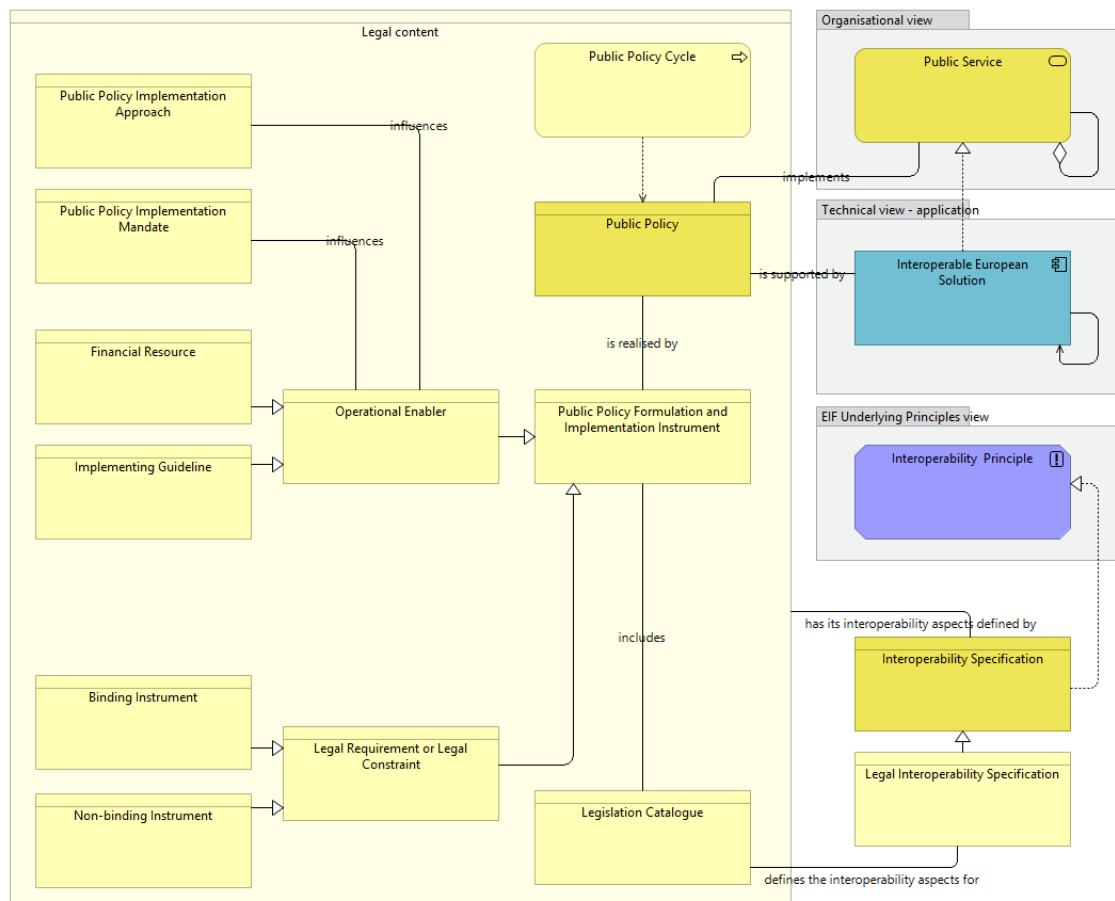
Figure 10 – Legal view of the EIRA© (3)

Narrative: A [Public Policy] is the outcome of a specific [Public Policy Cycle] that aims at addressing the needs of a group of stakeholders. The policy is formulated and implemented with the help of [Public Policy Formulation and Implementation Instruments] such as [Legal Requirements or Constraints] in the form of either [Binding Instruments] or [Non-Binding Instruments], or [Operational Enablers], such as [Financial Resources] or [Implementing Guidelines]. The [Operational Enablers] are influenced by [Public Policy Implementation Mandates] and/or [Public Policy Implementation Approaches]. The [Public Policy Formulation and Implementation Instruments] are included in a [Legislation Catalogue].

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

Focal Architecture Building Block: Public Policy and 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).

- 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[15]).

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

[15] https://joinup.ec.europa.eu/asset/eia/document/how-does-eira-support-interoperability

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.
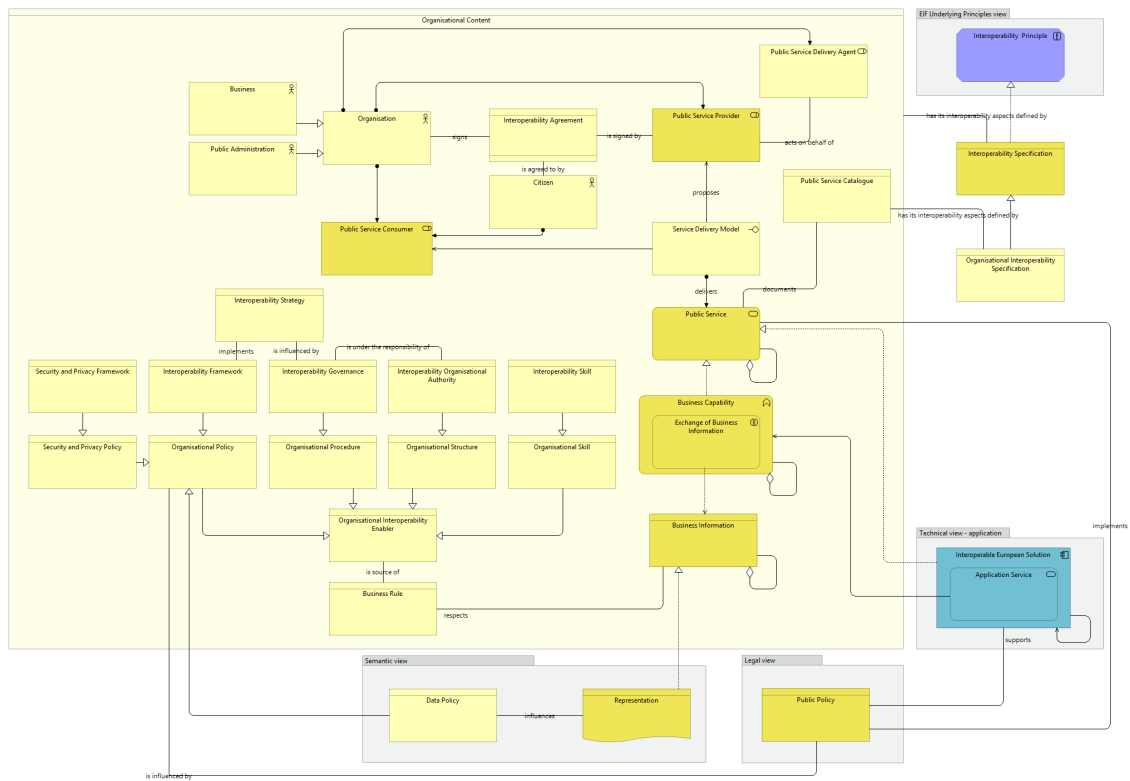
Figure 11 – Organisational view of the EIRA© [4]

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** represents the business facts, data, or opinions, in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audio-visual forms that the capability exchanges with other capabilities to support the execution of value streams (Based on the TOGAF© definition of Business Capability).

- 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).

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.
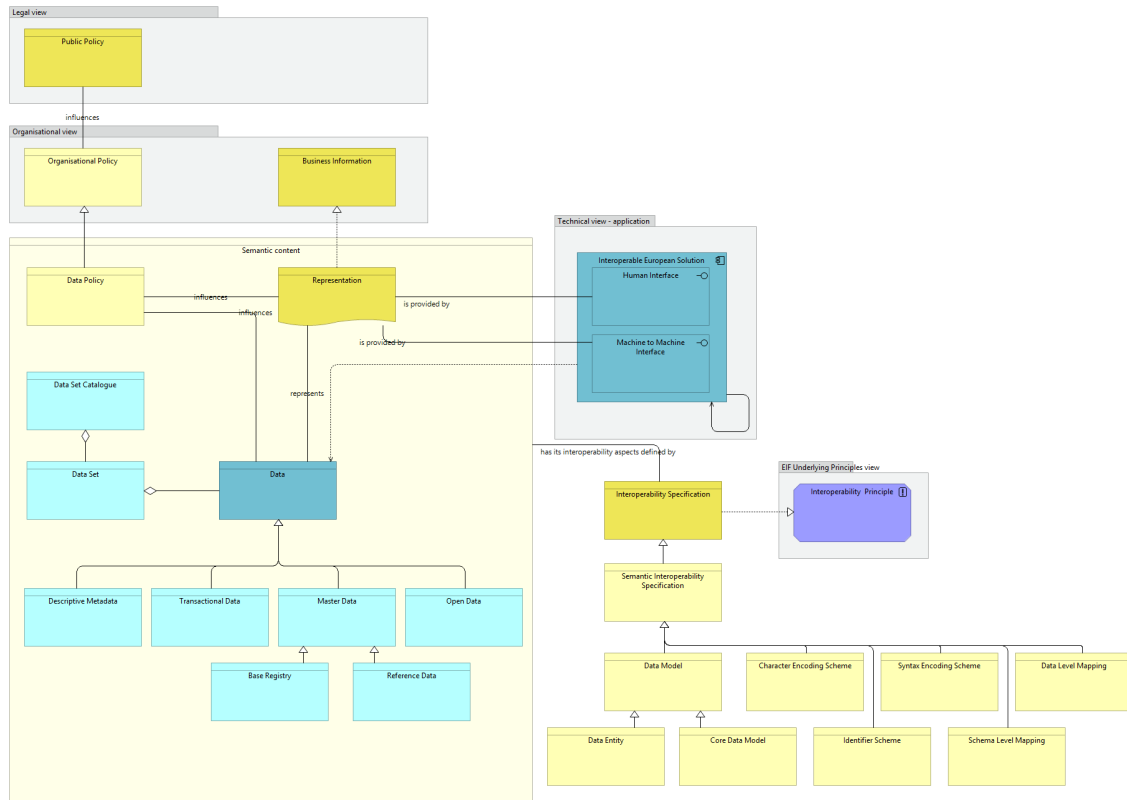
Figure 12 - Semantic view of the EIRA© (3)

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]. [Master Data], [Transactional Data], [Open Data], [Descriptive Metadata] are specialisations of [Data]. [Reference Data] and [Base Registry] are specialisations of [Master Data]. [Representation] and [Data] are influenced by [Data Policies], which are [Organisational Policies], which is in turn are influenced by [Public Policies].

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 identified: [Core Data Model] and [Data Entities] which are a specialisation of [Data Models], [Character Encoding Scheme], [Syntax Encoding Scheme], [Data Level Mapping], [Schema Level Mapping] or [Identifier Scheme].

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

- **Representation** is the perceptible form of information carried by a business object (Source: ArchiMate®).

- A **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** is facts represented as text, numbers, graphics, images, sound, or video. Data is the raw material used to represent information, or from which information can be derived (Based on DAMA)

- 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).

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.
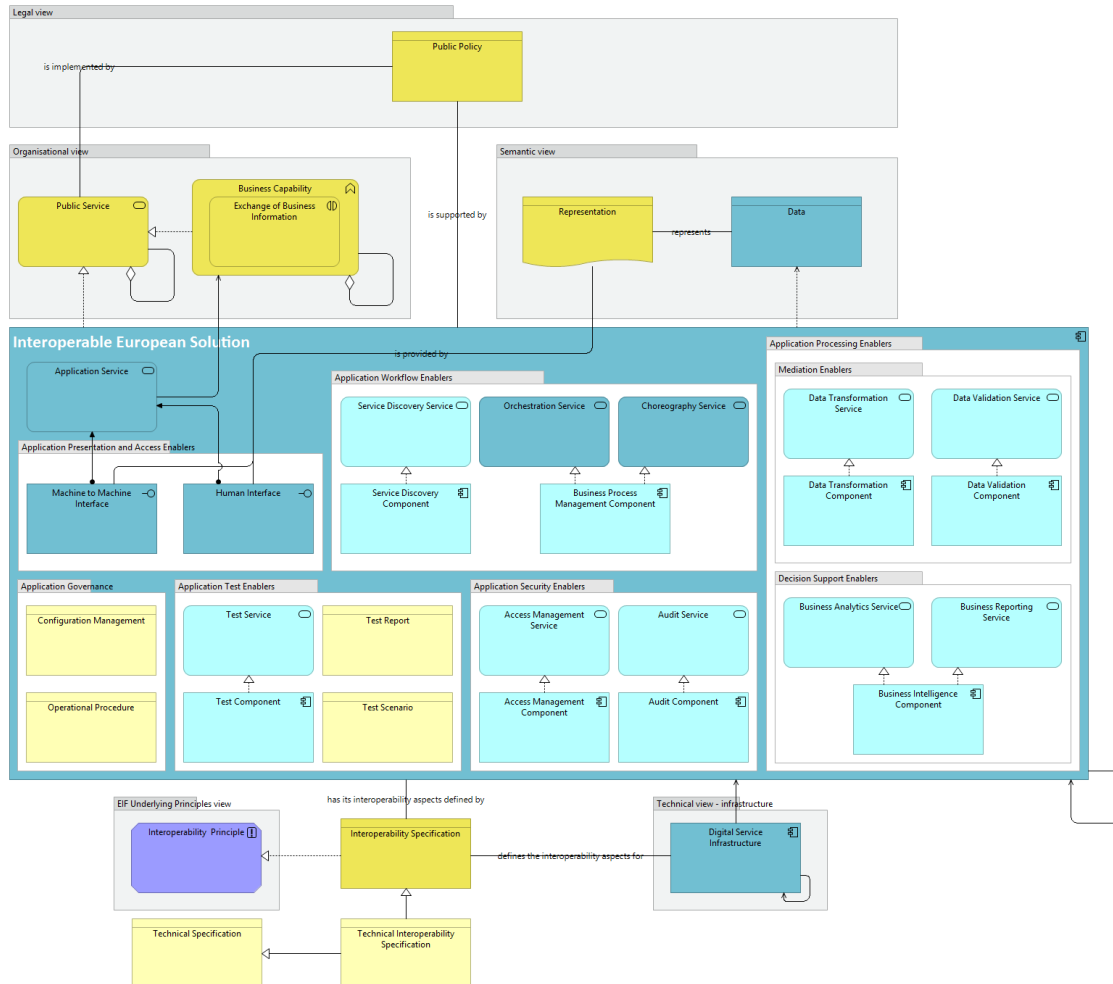
Figure 13 - Technical - application view of the EIRA© (3)

Narrative: An [Interoperable European Solution] implements [Public Service] and is supporting a [Public Policy]. An [Interoperable European Solution] can be accessed through [Machine to Machine Interfaces] or [Human Interfaces] in the [Application Presentation and Access Enablers] assigned to [Application Services]. The [Interoperable European Solution] documents its governance via [Configuration Management] and [Operational Procedures] and is tested through the use of [Application Test Enablers]. Data can be exchanged, cross-border and cross-sector, with the support of [Application Processing Enablers] composed of [Mediation Enablers] containing the logic for data transfer and validation, and [Decision Support Enablers] to include business logic in the application. [Interoperable European Solutions] 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.

Focal Architecture Building Blocks: Human Interface and Machine to Machine Interface, Interoperable European Solution, Application Service, Choreography Service, Orchestration Service and 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 **Application Service** represents an explicitly defined shared application behavior. (Based on ArchiMate®).

- A **Choreography Service** shares the functionality of modelling a sequence of operations, states, and conditions that control the interactions involved in the participating services. The interaction prescribed by a choreography results in the completion of some useful function. A choreography can be distinguished from an orchestration. An orchestration defines the sequence and conditions in which one service invokes other services in order to realize some useful function (Based on W3C).

- 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).

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 14 - 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], [Document Management Services], or [Content Management Services]. 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]. 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.

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).

4.7 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).
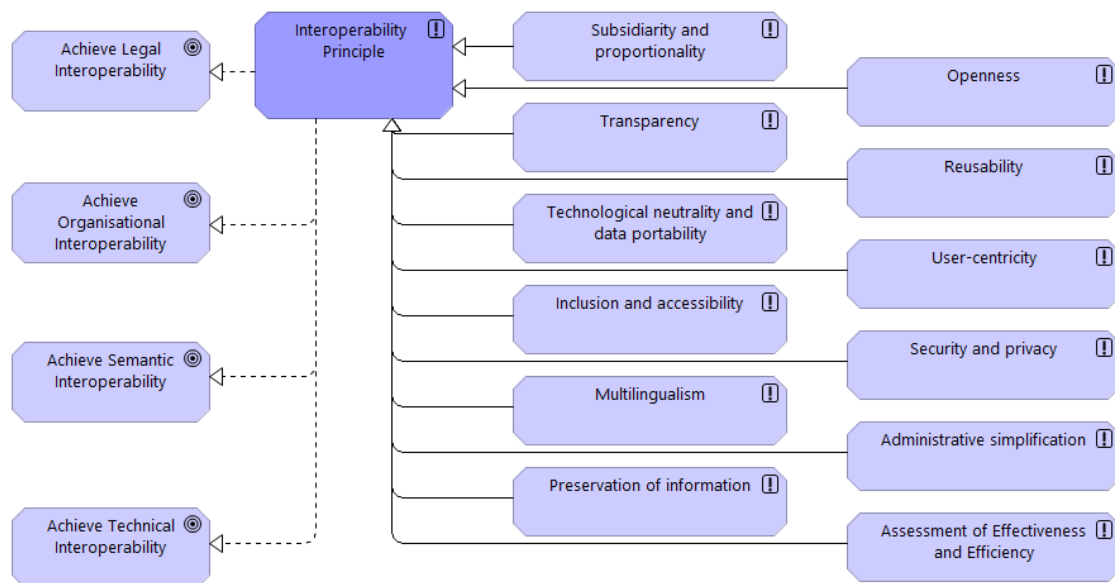
Figure 15 - EIF Underlying Principles view

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)

4.8 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.
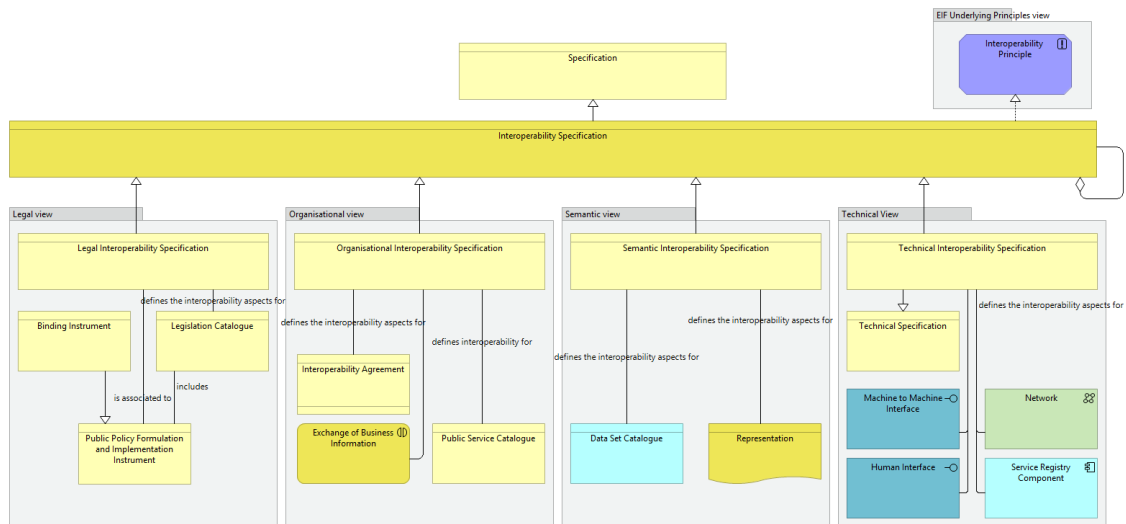
Figure 16 - Interoperability Specification viewpoint

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] is a [Specification] and 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] is associated to a [Public Policy Formulation and Implementation Instrument], of which a [Binding Instrument] is a specialisation, and defines the interoperability aspects for a [Legislation Catalogue].
2. The selected Architecture Building Blocks of the Organisational view shows that an [Organisational Interoperability Specification] describes the interoperability aspects for an [Interoperability Agreement], a [Public Service Catalogue] and/or the [Exchange of Business Information].
3. The selected Architecture Building Blocks of the semantic view shows that a [Semantic Interoperability Specification] defines the interoperability aspects for [Data Set Catalogues] as well as the interoperability aspects for [Representations].

4. The selected Architecture Building Blocks of the Technical view shows that a [Technical Interoperability Specification] is a [Technical Specification], it defines the interoperability aspects of a [Machine to Machine Interface], a [Human Interface], a [Network] and/or a [Service Registry Component]. The [Service Registry Component] provides a mechanism to register technical services within a catalogue to be discovered by others.

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.

4.9 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.
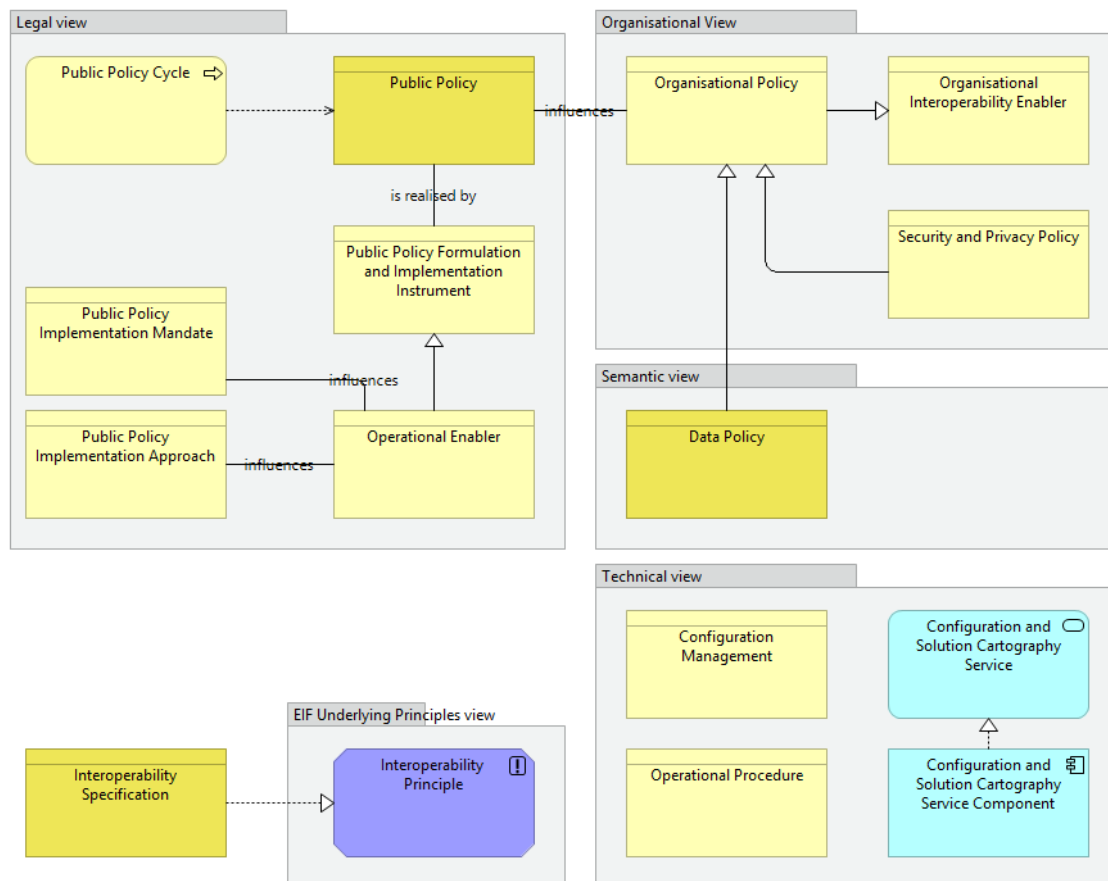
Figure 17 - Interoperability Governance viewpoint

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. An [Operational enabler], influenced by a [Public Policy Implementation Mandate] and a [Public Policy Implementation Approach], is a specialisation of a [Public Policy and Implementation Instrument], which realises a [Public Policy].

2. The selected Architecture Building Blocks of the organisational view show that the [Public Policy] influences an [Organisational Policy] which is a specialisation of an [Organisational Interoperability Enabler]. The [Security and Privacy Policy] is a specialisation of an [Organisational Policy].

3. The selected Architecture Building Blocks of the semantic view that [Data Policies] are specialisations of [Organisational Policies].

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]. An [Operational procedure] defines a process for operating a solution and [Configuration Management] is used in order to manage the technology stack of an organisation.

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.

4.10 Integrated Public Service Governance viewpoint

The Integrated Public Service Governance viewpoint models the most salient key interoperability enablers[16]. 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'.
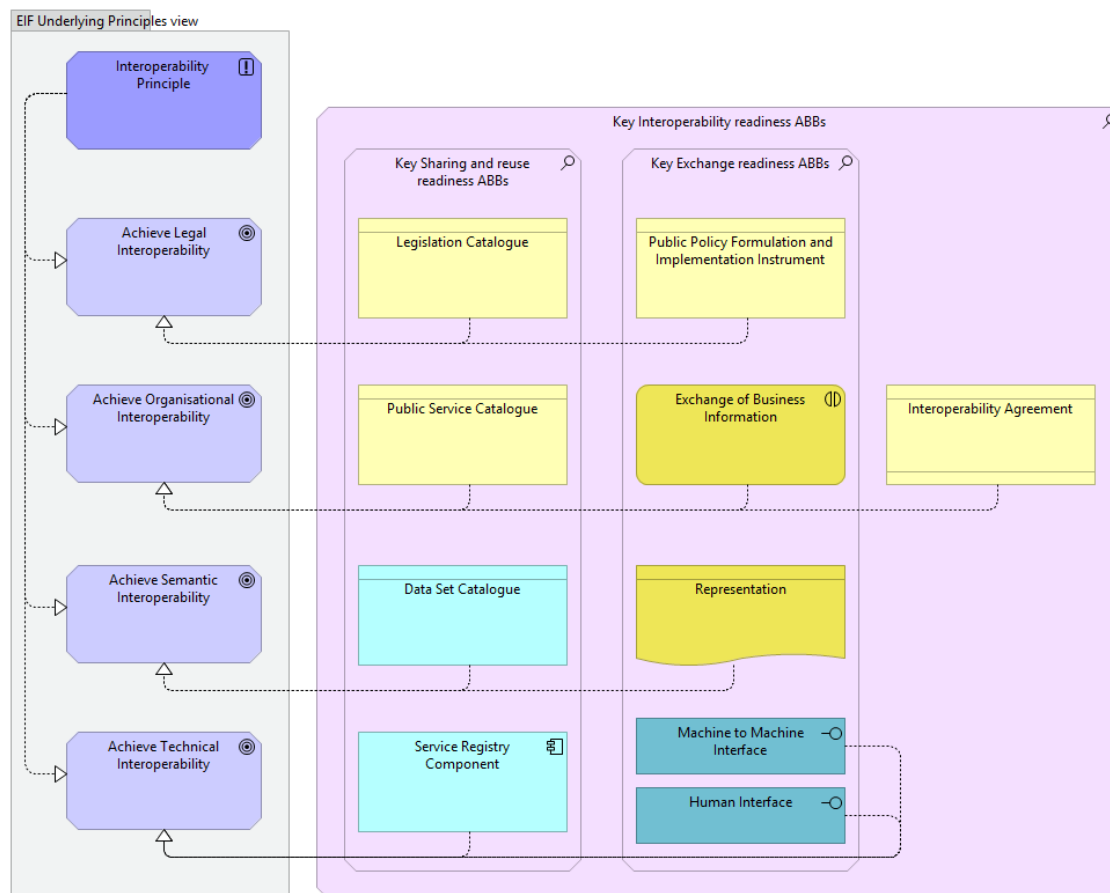
Figure 18 - Integrated Public Service Governance viewpoint

Integrated Public Service Governance viewpoint should cover all layers: legal, organisational, semantic and technical. Ensuring interoperability when preparing legal instruments, organisation business processes, information exchange, services

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[16] 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.

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 Interoperability Integrated Public Service Governance:

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 and by [Public Policy Formulation and Implementation Instruments] that are used to ensure compatible legal/juridical certainty.

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 [Exchange of Business Information] that are used to ensure compatible interaction and by [Interoperability Agreements] that define the operational terms/conditions for "sharing and 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 and by [Representations] that are used to ensure a compatible interpretation.

5. Particularly, the goal of [Achieving Technical Interoperability] is realised by [Service Registry Components] that are used for provisioning/consuming back-office services and by [Machine to Machine Interfaces] or [Human Interfaces] that are used to ensure compatible interfaces.

4.11 Interoperability Security and Privacy viewpoint

The Interoperability Security and Privacy viewpoint models the most salient Architecture Building Blocks related to both security and privacy 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 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.
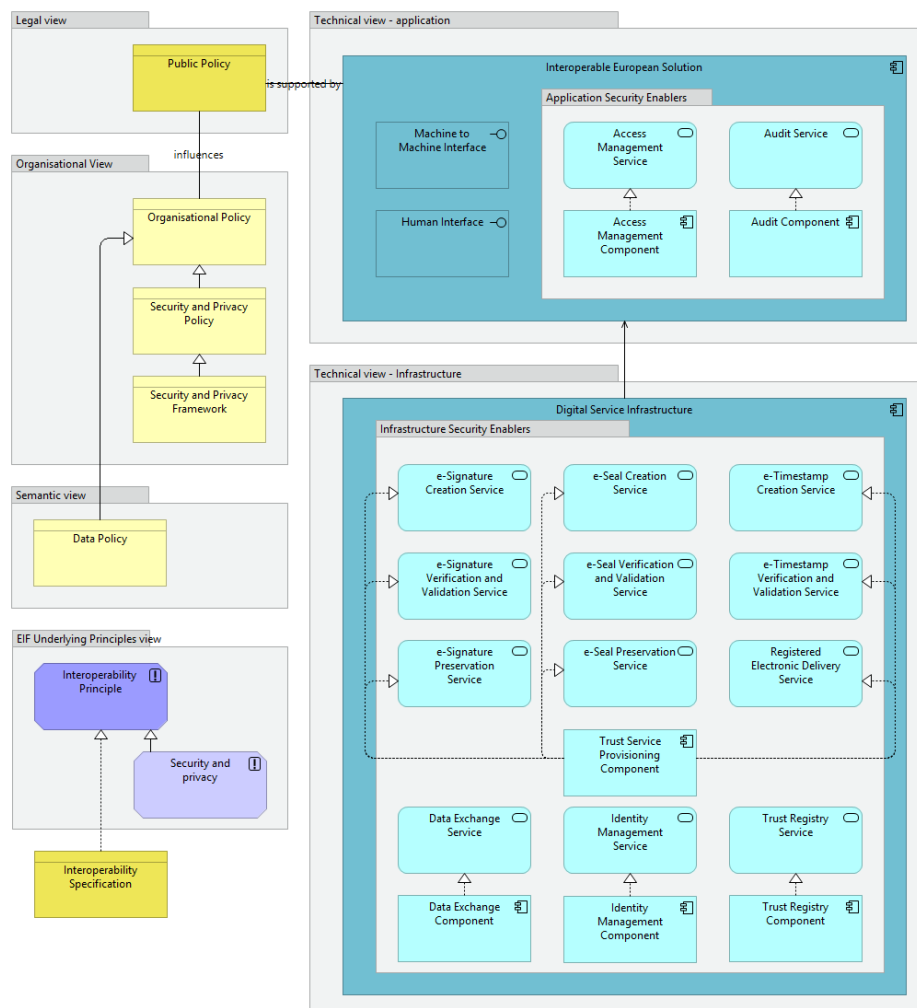
Figure 19 - Interoperability Security and Privacy viewpoint

Security and privacy are primary concerns 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 view highlighting the Security and Privacy aspects of the EIRA:

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

2. The selected Architecture Building Block of the organisational view show that a [Security and Privacy Framework] is a specialisation of a [Security and Privacy Policy] which on its turn is a specialisation of an [Organisational Policy]. The [Organisational Policy] is influenced by the [Public Policy].

3. The selected Architecture Building Block of the semantic view shows the [Data Policy] which is a specialisation of an [Organisational Policy].

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]. [Data Policies] and a [Security and Privacy Framework], which is a specialisation of a [Security and Privacy Policy], are [Organisational Policies] that are influenced by the [Public Policy]. [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], together with 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 Conceptual Model for Integrated Public Service Provisioning viewpoint

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.
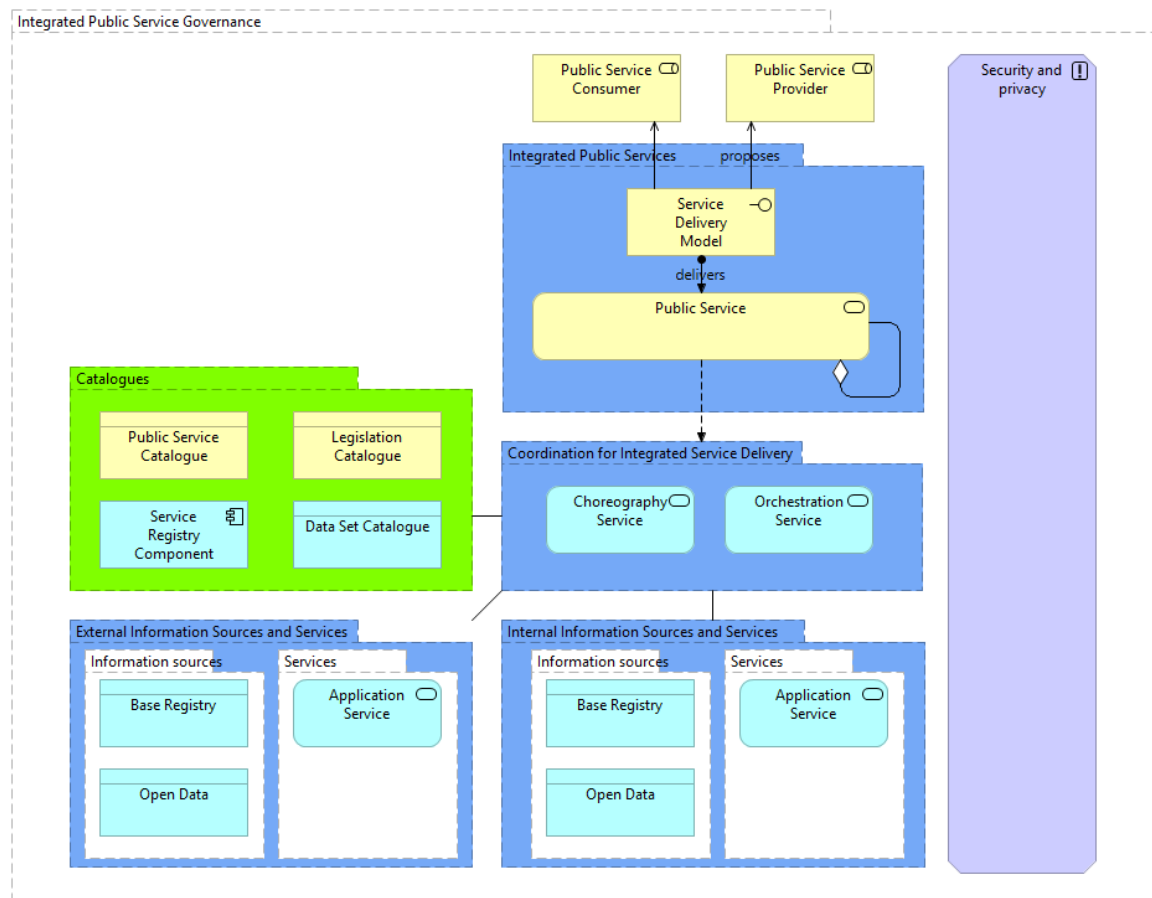
Narrative: A [Public Service Consumer] consumes a [Public Service] which is provided by a [Public Service Provider] via a [Service Delivery Model]. This [Public Service] can use other [Public Services], coordinated via either [Choreography Services] or [Orchestration Services]. These services use Catalogues ([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 [Base Registries] and [Open Data] as information sources, provided via [Application Services]. [Security and Privacy] principles apply to the entire conceptual model.

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® (5)).
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® (5)).
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.

Term / acronym	Definition
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; • 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. (13)
Interoperability Solutions for European Public Administrations (ISA)	Interoperability Solutions for European Public Administrations is the programme executing the ISA decision.

Term / acronym	Definition
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.
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® (5)).
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®) (5) 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.

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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
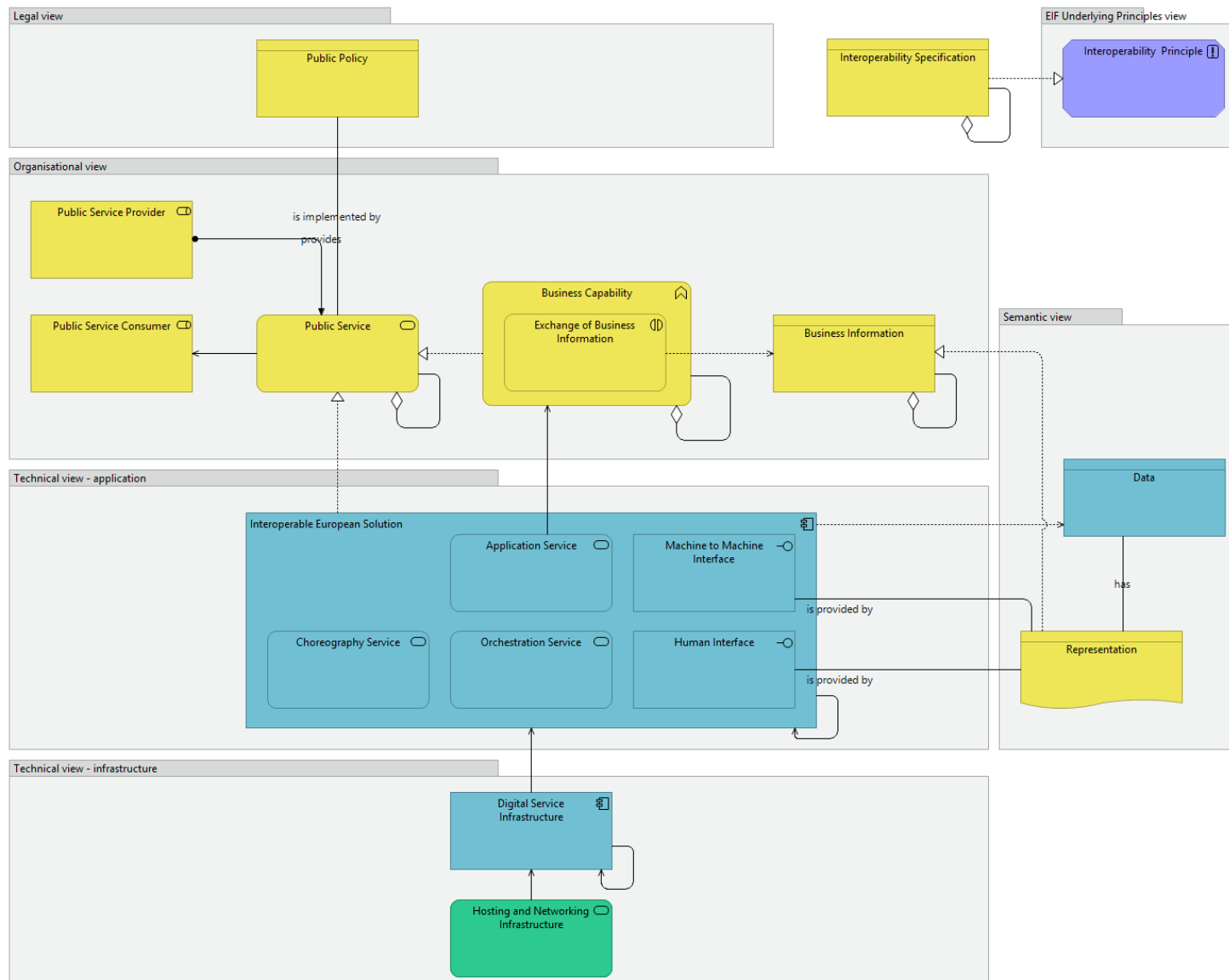
8.1.2 Legal view
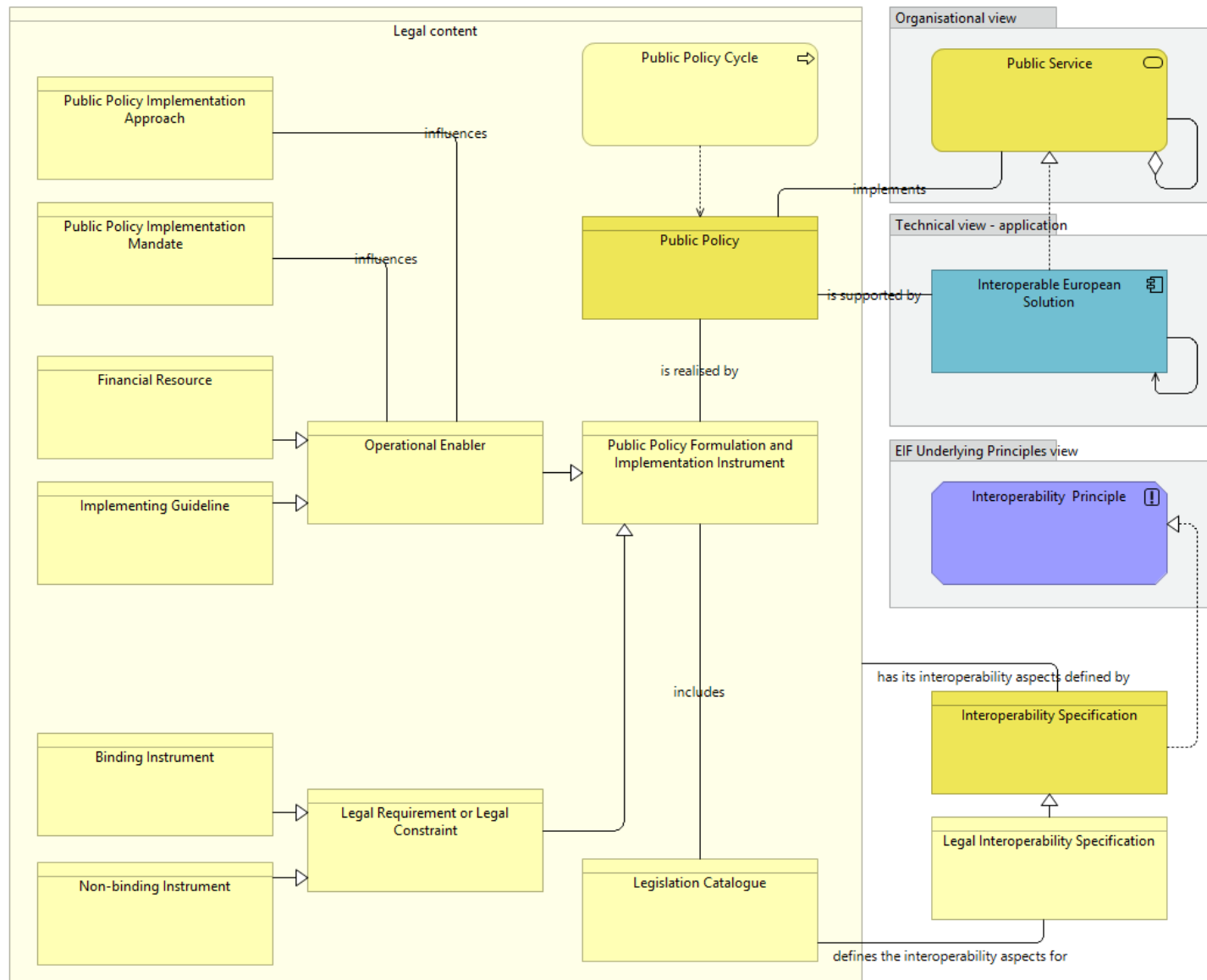
8.1.3 Organisational view
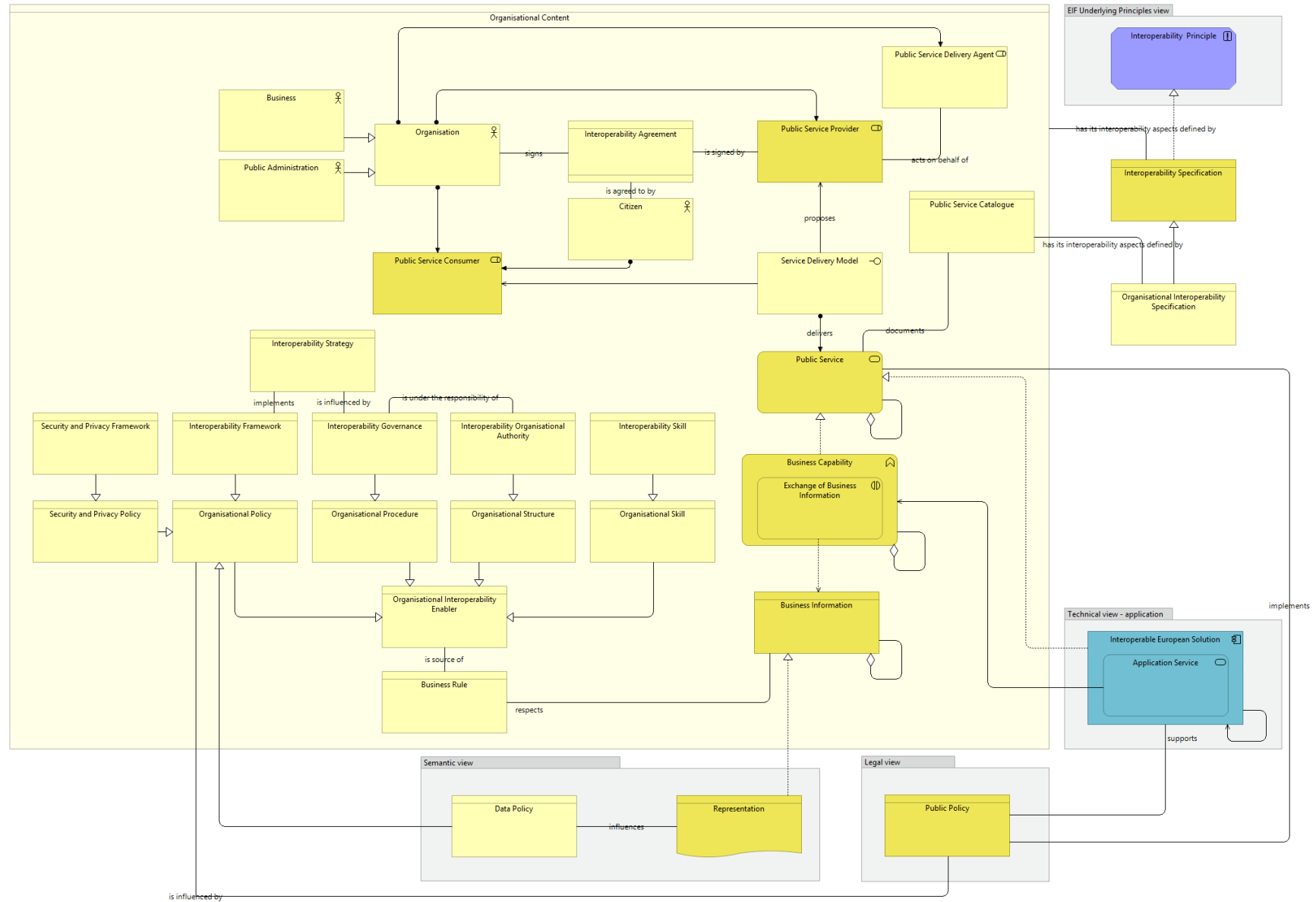
8.1.4 Semantic view
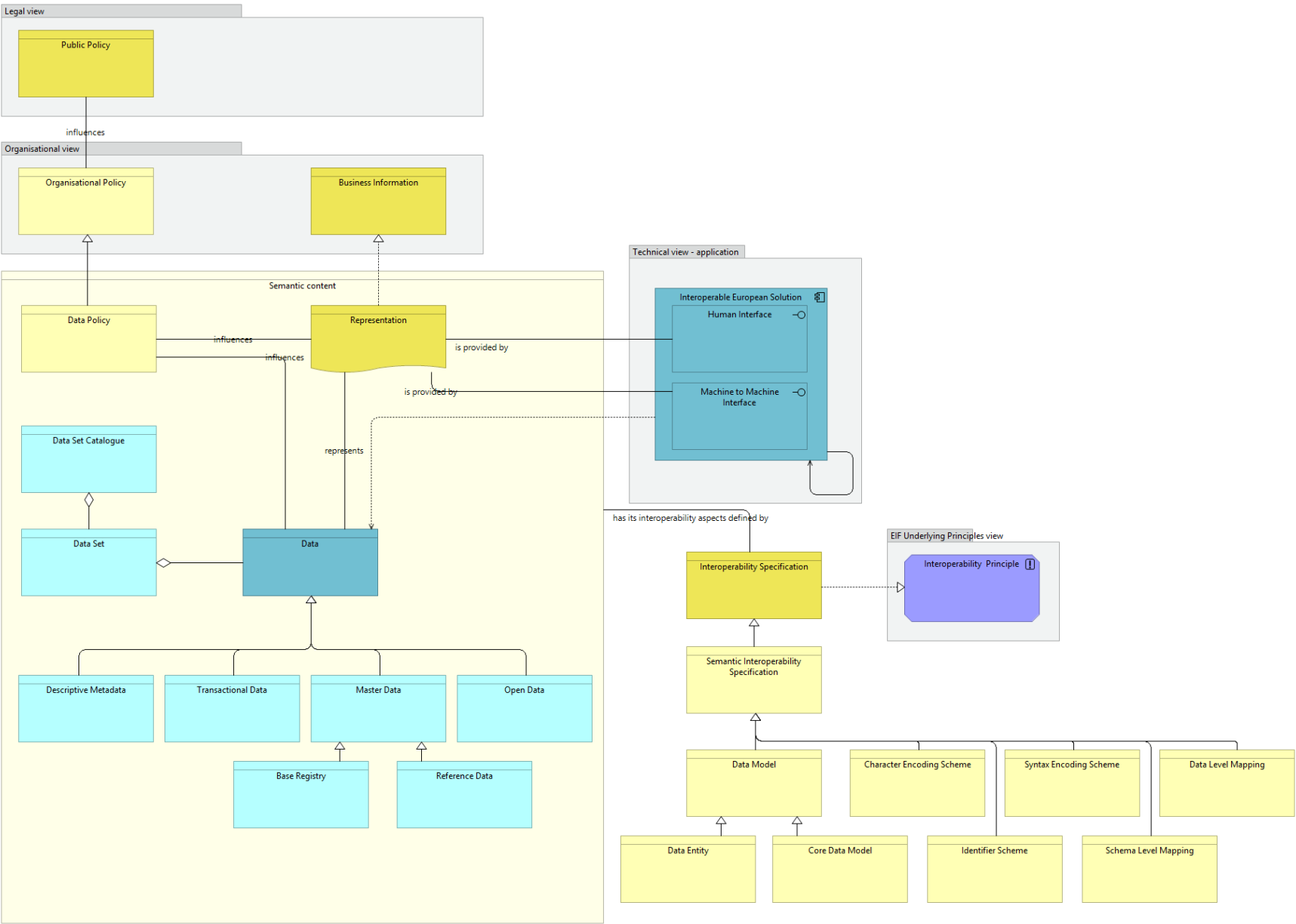
8.1.5 Technical – application view
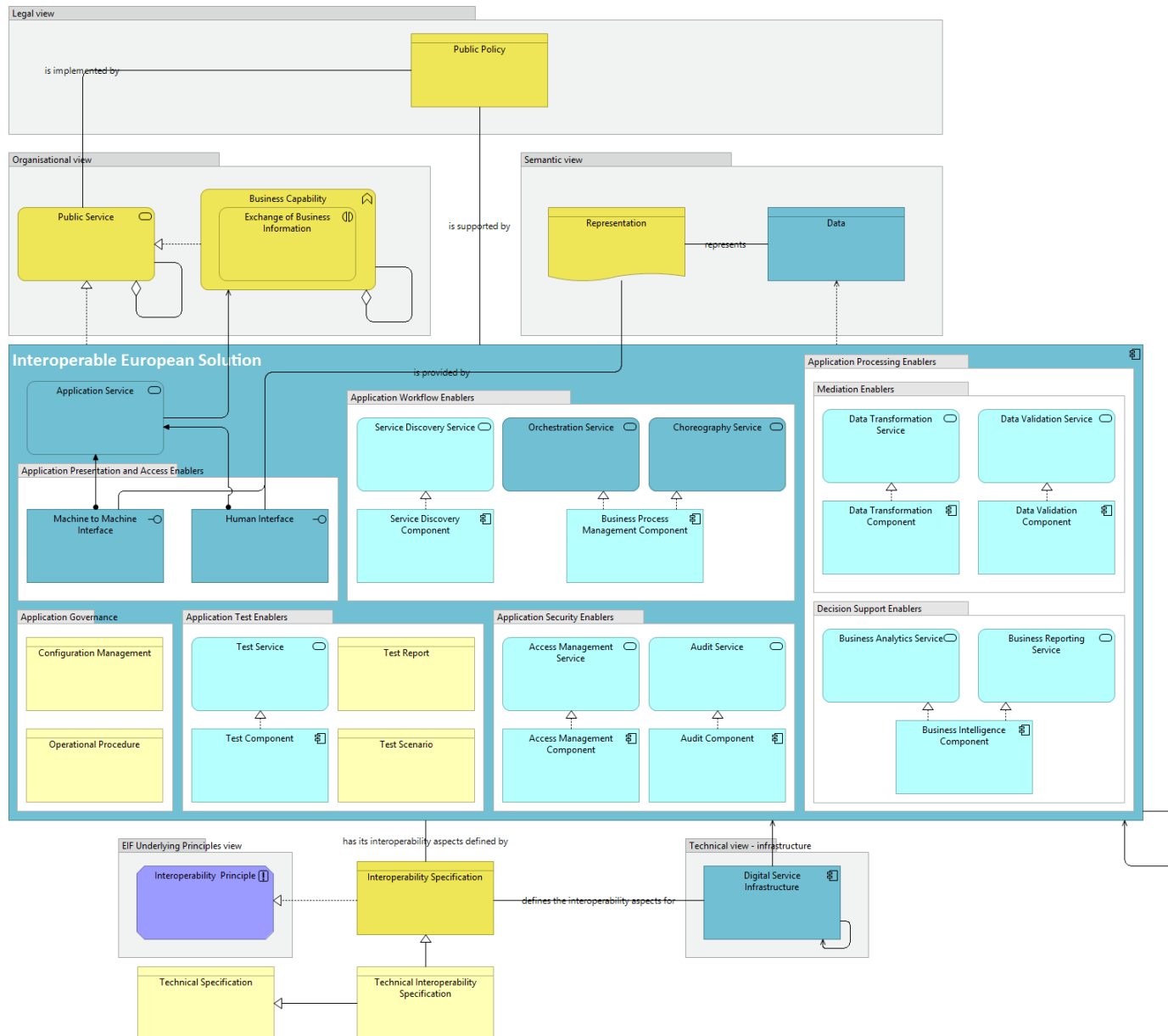
8.1.6 Technical – infrastructure view
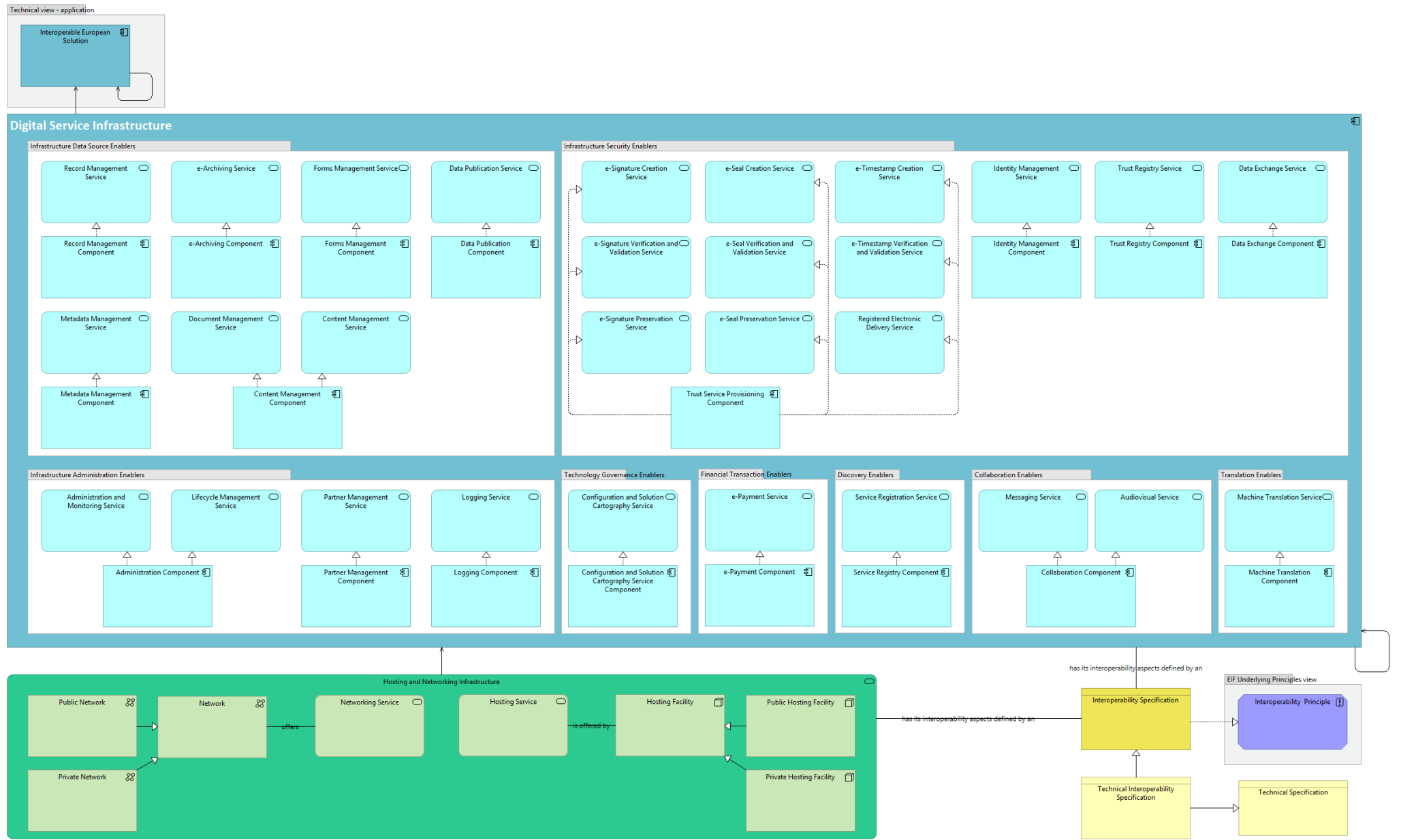
8.1.7 European Interoperability Framework underlying principles view
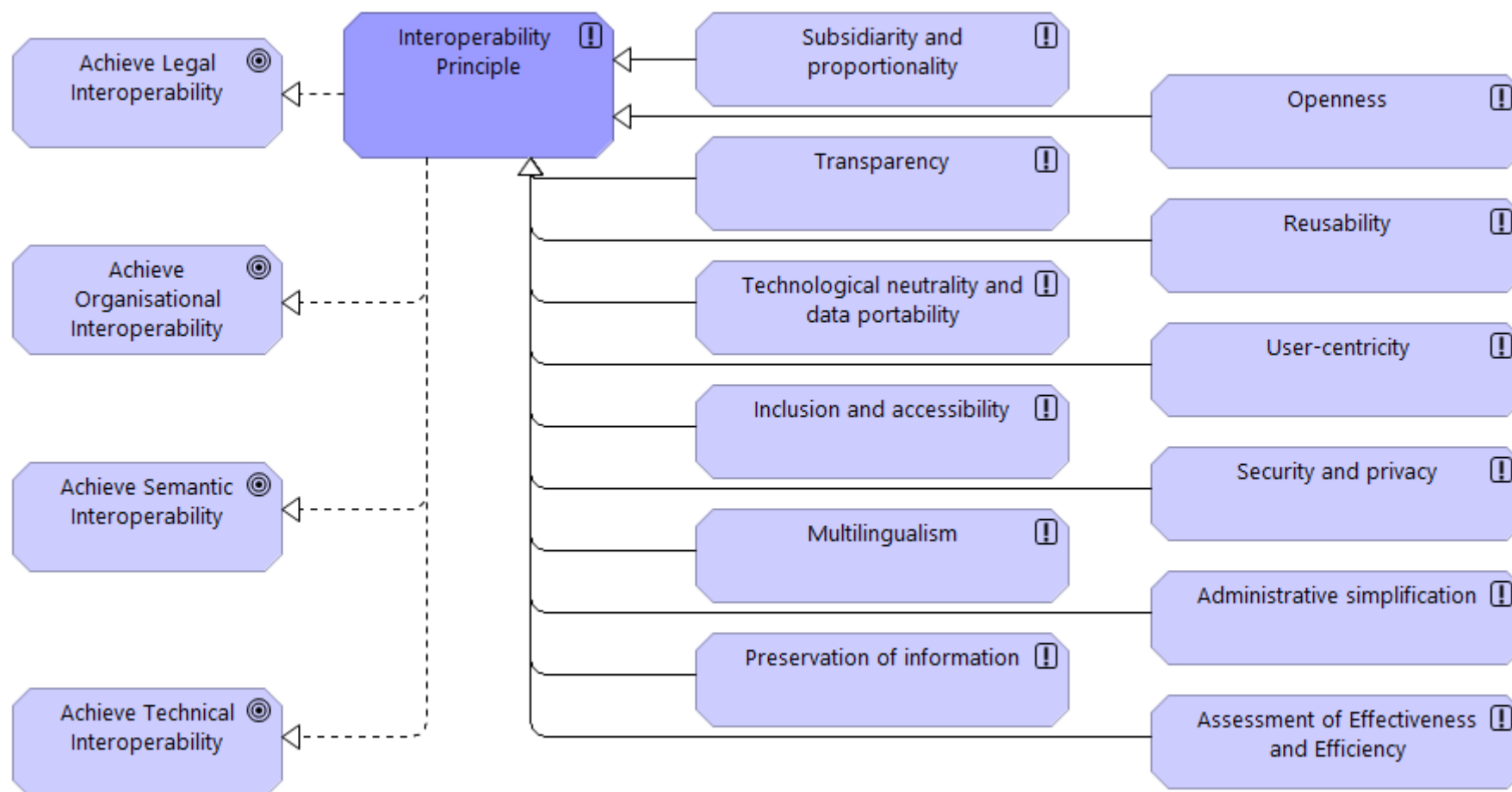
8.1.8 Interoperability specification viewpoint
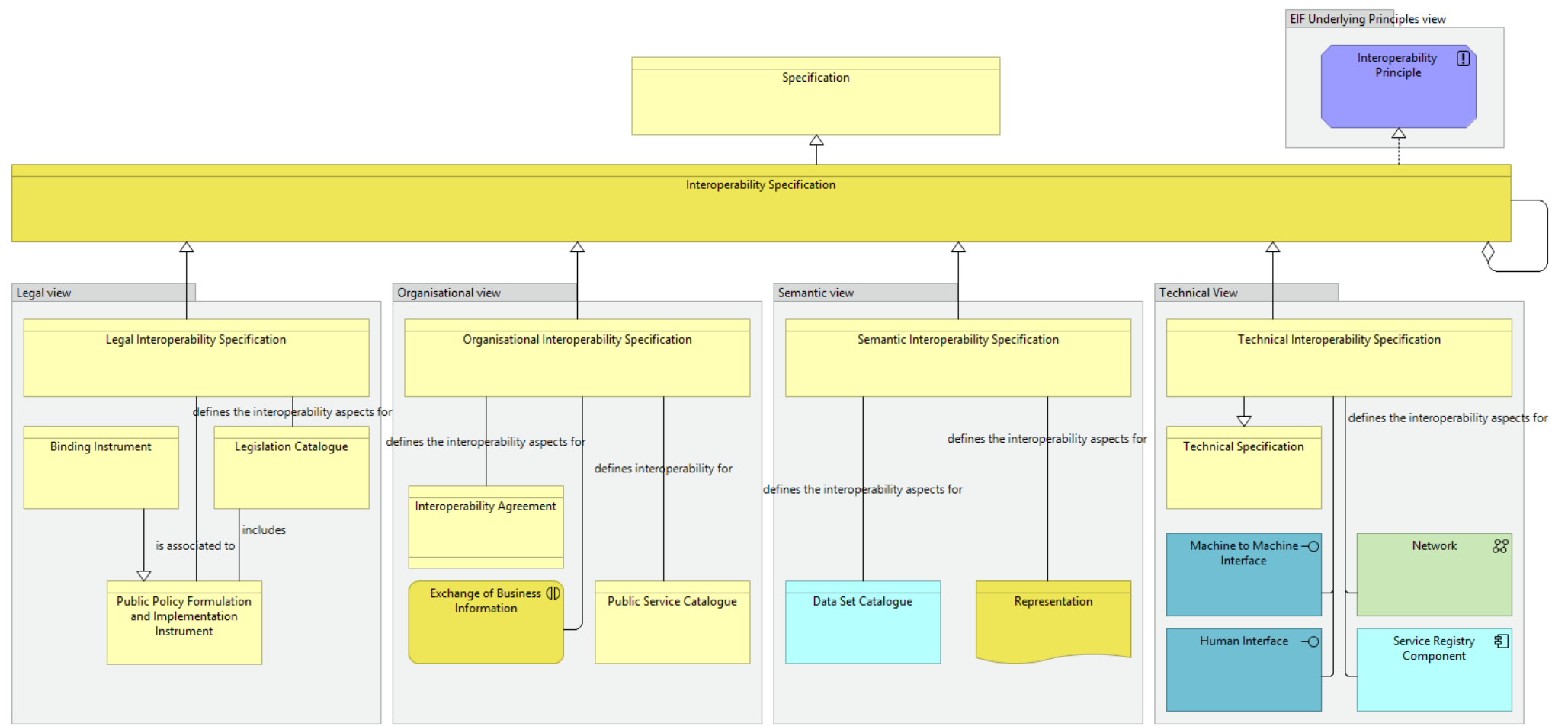
8.1.9 Interoperability Governance Viewpoint
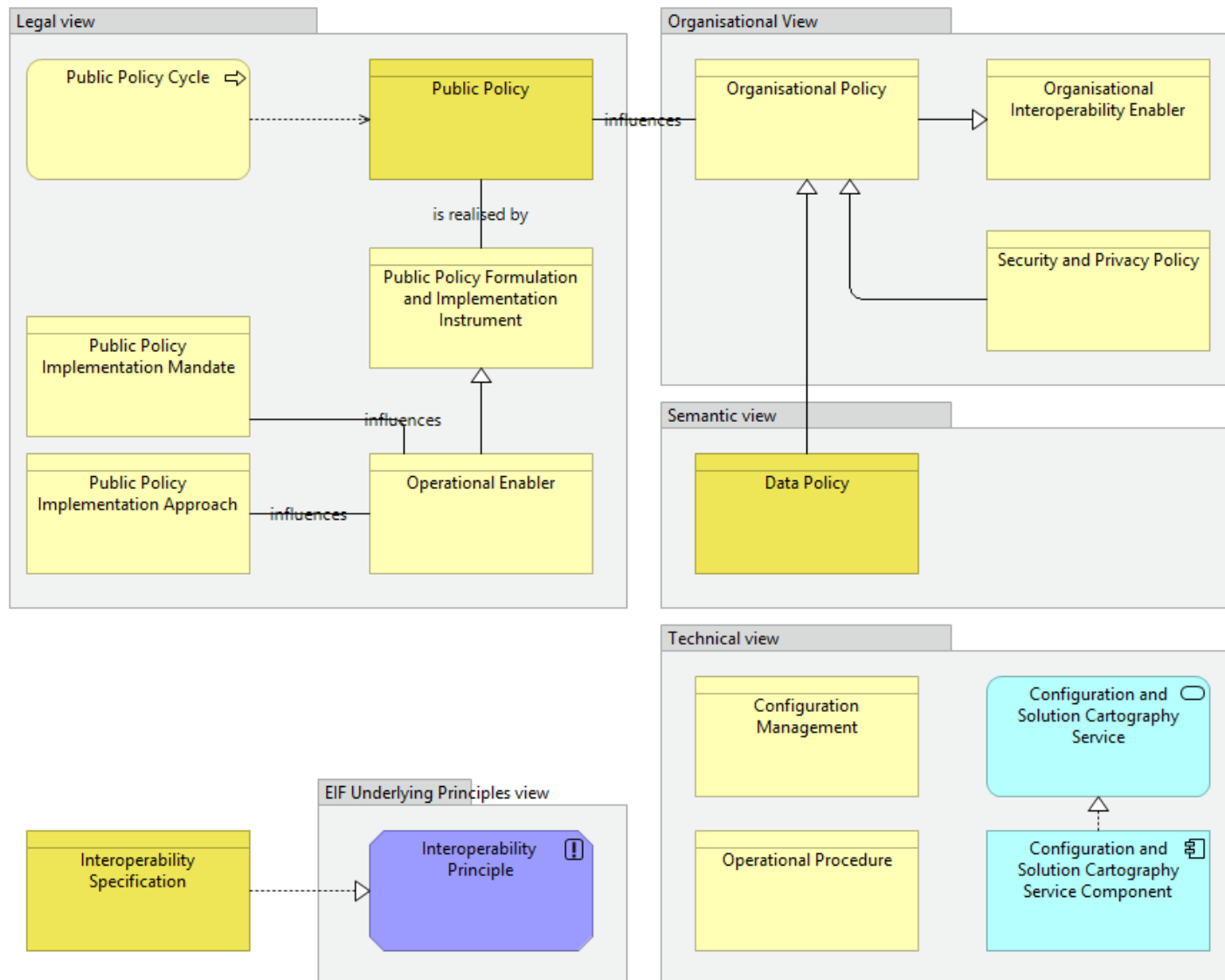
8.1.10　Integrated Public Service Governance viewpoint
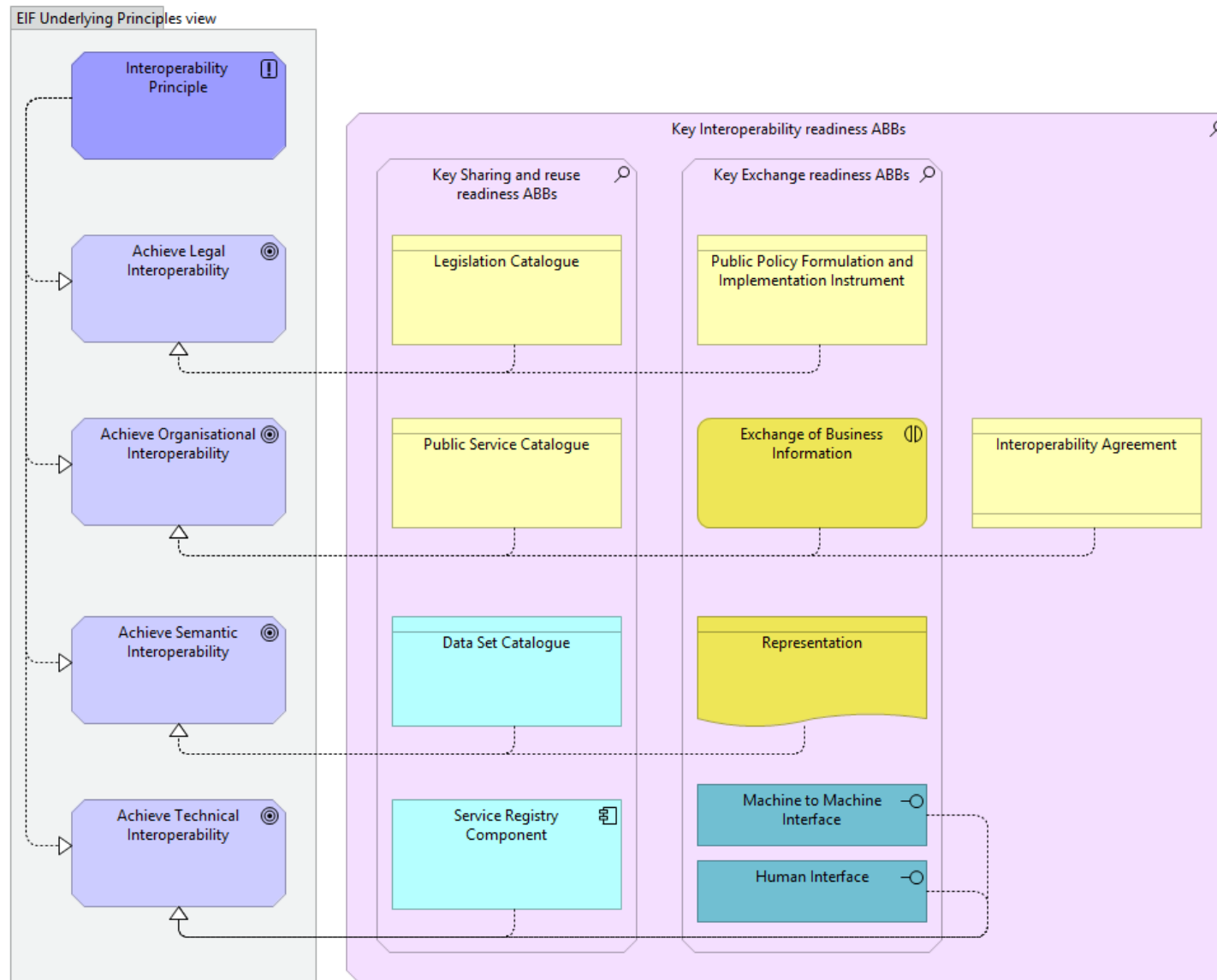
8.1.11   Interoperability Security and Privacy viewpoint
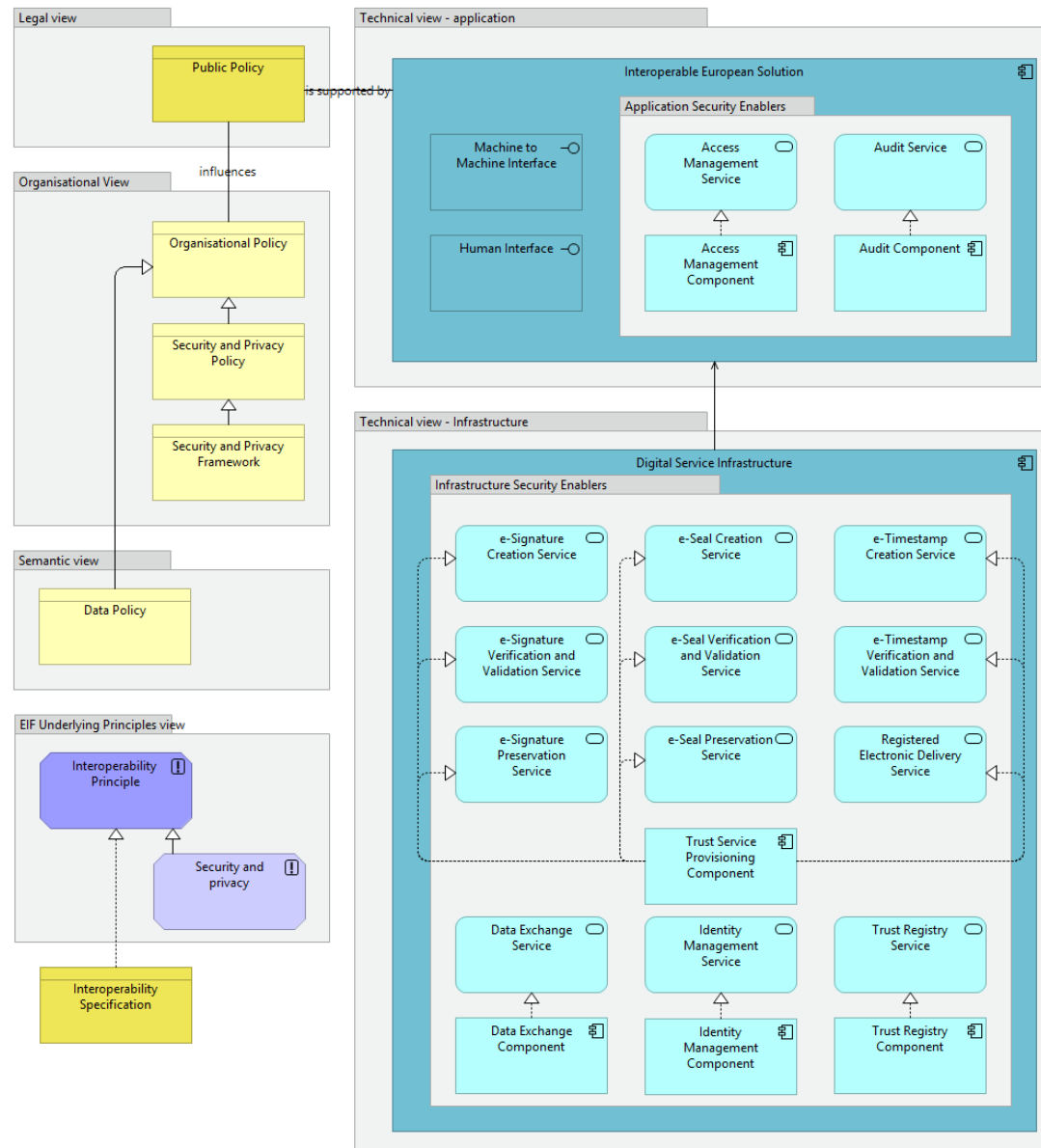
8.1.12 Conceptual Model for Integrated Public Service Provisioning viewpoint
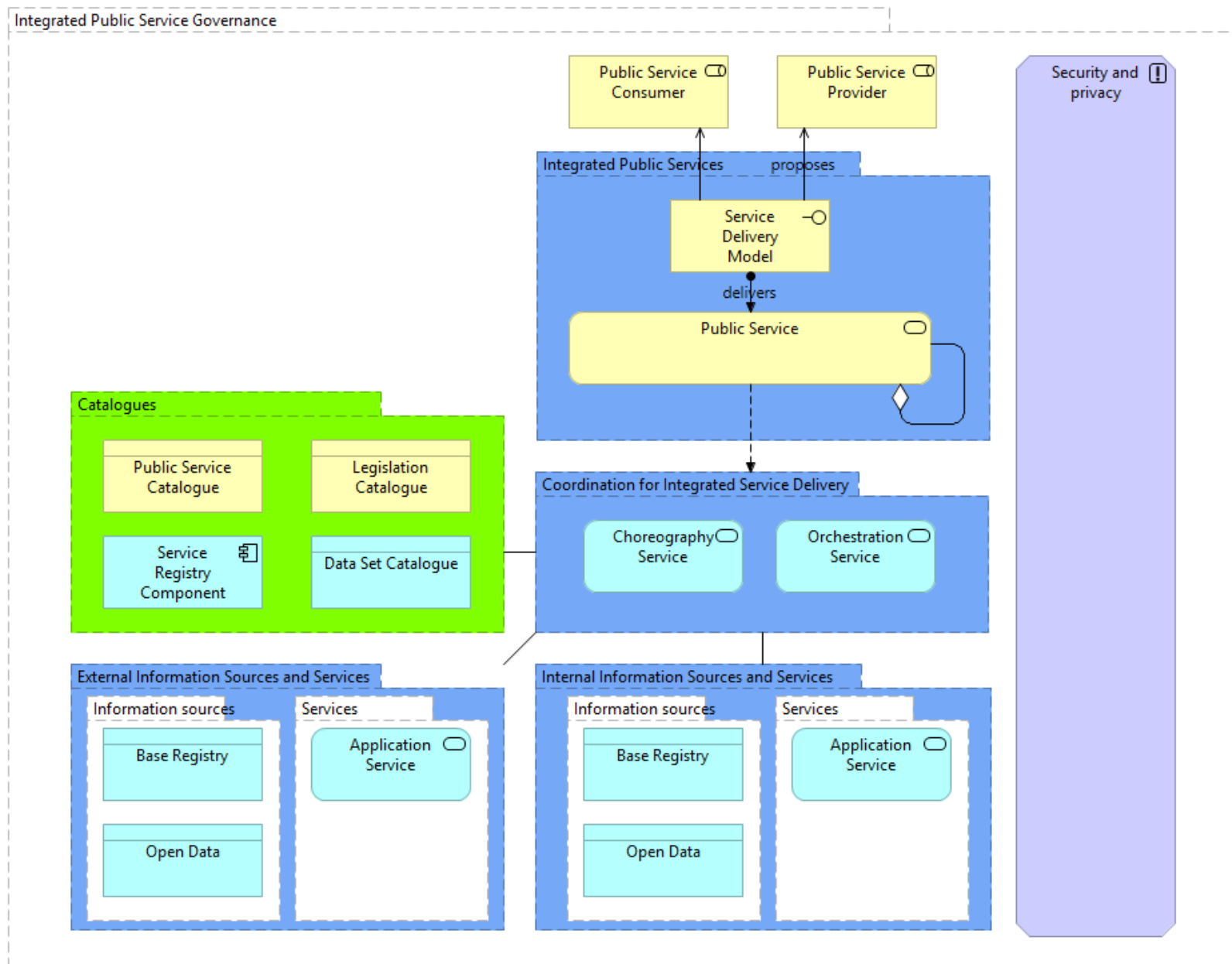
8.2 Architecture Building Blocks definitions

8.2.1 Table 6-1 Legal view definitions

Name	Status	Definition
Binding Instrument		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 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). 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	Status	Definition
Financial Resource		A stock or supply of money. Based on the Oxford Dictionary https://en.oxforddictionaries.com/definition/resource *Syn. Funding Instrument* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *CEF Programme* The Connecting Europe Facility (CEF) is a key EU funding instrument to promote growth, jobs and competitiveness through targeted infrastructure investment at European level. It supports the development of high performing, sustainable and efficiently interconnected trans-European networks in the fields of transport, energy and digital services. CEF investments fill the missing links in Europe's energy, transport and digital backbone. https://ec.europa.eu/inea/en/connecting-europe-facility
Implementing Guideline		General rules, principles, or pieces of advice to put a public policy into effect. Based on the Oxford Dictionary https://en.oxforddictionaries.com/definition/guideline *Syn. Recommendations and Standards* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *European Code of Good Conduct for microcredit provision* This European Code of Good Conduct for microcredit provision, published by the European Commission in October 2011, provides recommendations and standards that should foster best practice in the microcredit sector. It is intended to provide guidance for microcredit providers from the point of view of consumers, investors, funders and regulators. http://ec.europa.eu/regional_policy/en/information/publications/brochures/2011/european-code-of-good-conduct-for-microcredit-provision

Name	Status	Definition
Legislation Catalogue		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/ *Syn. Official Journal* 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	Status	Definition
Legal Interoperability Specification		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 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
Legal Requirement or Legal Constraint		Legal requirements: Any legal demands, constraints, needs to be met. Legal constraint: Legal limitation. Based on the Black's law dictionary: http://thelawdictionary.org/requirements/ http://thelawdictionary.org/constraint/ No specific examples are provided for this Architecture Building Block.

Name	Status	Definition
Non-binding Instrument		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 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 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

| Operational Enabler | | An organisation, person, object or event that makes it possible to formulate or implement the a public policy

Based on Hill, M. and Hupe, P, Implementing Public Policy: Governance in Theory and in Practice, SAGE Publications Ltd 2002

An [Operational Enabler] is influenced by a [Public Policy Implementation Approach] and a [Public Policy Implementation Mandate] which determine the role of the organisation, person, object or event.
This role is determined by the following quadrant:

Option A: Public Policy Implementation Mandate: Strongly / Low Level Regulated, Public Policy Implementation Approach: Top / Centralised
SETTING THE PUBLIC POLICY KEY IMPLEMENTATION IOP INSTRUMENTS (i.e. focus on data architecture like a base registry solution)

Option B: Public Policy Implementation Mandate: Strongly / Low Level Regulated, Public Policy Implementation Approach: Down / Delegated |

Name	Status	Definition
		SETTING PUBLIC POLICY IMPLEMENTATION STANDARDS AND RULES (i.e. focus on technology architecture like eID tech specifications) Option C: Public Policy Implementation Mandate: Softly / High Level Regulated, Public Policy Implementation Approach: Top / Centralised SETTING PUBLIC POLICY IMPLEMENTATION OBJECTIVES (i.e. focus on business architecture like a national interoperability strategy) Option D: Public Policy Implementation Mandate: Softly / High Level Regulated, Public Policy Implementation Approach: Down / Delegated SETTING PUBLIC POLICY IMPLEMENTATION FRAMEWORKS AND COLLABORATION PROTOCOLS CROSS THE DIFFERENT DELEGATION LEVELS (i.e. focus on application architecture like a national reference architecture) 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	Status	Definition
Public Policy		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. 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* 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	Status	Definition
Public Policy Cycle		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* 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

| Public Policy Formulation and Implementation Instrument | | Public Policy Formulation Instrument: Technique or means for the development of pertinent and acceptable proposed courses of action for dealing with public problems.
Public Policy Implementation Instrument: Technique or means for the carrying out of a policy decision.
This ABB is a key interoperability enabler (*) for assessing the compatibility of legal/juridical certainty in exchanged information.

(*)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 NCPI and OECD definitions.
https://web.stanford.edu/group/ncpi/unspecified/assessment_states/framework.html
https://www.oecd.org/edu/ceri/The%20Nature%20of%20Policy%20Change%20and%20Implementation.pdf

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

Article 168 TFEU, ex Article 152 TEC
1. A high level of human health protection shall be ensured in the definition and implementation of all Union policies and activities. Union action, which shall complement national policies, shall be directed towards improving public health, preventing physical and mental illness and diseases, and obviating sources of danger to physical and mental health. Such action shall cover the fight against the major health scourges, by promoting research into their causes, their transmission and their prevention, as well as health information and education, and monitoring, early warning of and combating serious cross-border threats to health. The Union shall complement the Member States' action in reducing drugs-related health damage, including information and prevention.
2. The Union shall encourage cooperation between the Member States in the areas referred to in this Article and, if necessary, lend support to their action. It shall in particular encourage cooperation between the Member States to improve the complementarity of their health services in cross-border areas. Member States shall, in liaison with the Commission, coordinate among themselves their policies and programmes in the areas referred to in paragraph 1. The Commission may, in close contact with the Member States, take any useful initiative to promote such coordination, in particular initiatives aiming at the establishment of guidelines and indicators, the organisation of exchange of best practice, and the preparation of the necessary elements for periodic monitoring and evaluation. The European Parliament shall be kept fully informed.
3. The Union and the Member States shall foster cooperation with third countries and the competent international organisations in the sphere of public health. |

Name	Status	Definition
		4. By way of derogation from Article 2(5) and Article 6(a) and in accordance with Article 4(2)(k) the European Parliament and the Council, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee and the Committee of the Regions, shall contribute to the achievement of the objectives referred to in this Article through adopting in order to meet common safety concerns: (a) measures setting high standards of quality and safety of organs and substances of human origin, blood and blood derivatives; these measures shall not prevent any Member State from maintaining or introducing more stringent protective measures; (b) measures in the veterinary and phytosanitary fields which have as their direct objective the protection of public health; (c) measures setting high standards of quality and safety for medicinal products and devices for medical use. 5. The European Parliament and the Council, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee and the Committee of the Regions, may also adopt incentive measures designed to protect and improve human health and in particular to combat the major cross-border health scourges, measures concerning monitoring, early warning of and combating serious cross-border threats to health, and measures which have as their direct objective the protection of public health regarding tobacco and the abuse of alcohol, excluding any harmonisation of the laws and regulations of the Member States. 6. The Council, on a proposal from the Commission, may also adopt recommendations for the purposes set out in this Article. 7. Union action shall respect the responsibilities of the Member States for the definition of their health policy and for the organisation and delivery of health services and medical care. The responsibilities of the Member States shall include the management of health services and medical care and the allocation of the resources assigned to them. The measures referred to in paragraph 4(a) shall not affect national provisions on the donation or medical use of organs and blood. http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12008E168&from=EN

Name	Status	Definition
Public Policy Implementation Approach		The delegation mode (centralised or delegated) adopted by organization enablers to implement a public policy. Based on Hill, M. and Hupe, P, Implementing Public Policy: Governance in Theory and in Practice, SAGE Publications Ltd 2002 *Syn. Governance of Public Policies* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Governance of Public Policies in Decentralised Contexts - The Multi-Level Approach* Multi-level governance is always required for managing public policies in a decentralised context. Multi-level governance (MLG) is the term used to characterise the relationship between public actors situated at different administrative levels. MLG therefore refers to the explicit or implicit sharing of policy-making authority, responsibility, development and implementation at different administrative and territorial levels, i.e. (i) across different ministries and/or public agencies at central government level (upper horizontally), (ii) between different layers of government at local, regional, provincial/state, national and supranational levels (vertically), and (iii) across different actors at sub national level (lower horizontally). "Multi-level governance" approaches often includes also interaction between public and private entities (profit or non profit ones), in particular citizens and businesses. https://www.oecd.org/governance/regional-policy/48724565.pdf

Name	Status	Definition
Public Policy Implementation Mandate		The intensity of the mandate given to organization enablers to implement a public policy. It can go from a strongly regulated mandate, defining the specifications, to a softly regulated mandate, defining the concept to be implemented. Based on Hill, M. and Hupe, P, Implementing Public Policy: Governance in Theory and in Practice, SAGE Publications Ltd 2002 Syn. Mission Statement The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Mandate of the Directorate of Policy Planning of the Council of Europe* Directorate of Policy Planning (DPP). Overall mandate: to provide the Secretary General, the Committee of Ministers and Major Administrative Entities (MAEs) with conceptual and strategic analyses about relevant political and societal developments in Europe and beyond, based on research and on topical exchanges with internal and external networks, thereby enhancing the Organisation's ability to anticipate major trends and challenges facing member states and to offer coherent short- and long-term responses within its statutory mandate. https://www.coe.int/en/web/portal/organisation-and-mandates-of-the-secretariat?desktop=true *Mission statement of the Directorate-General for Taxation and the Customs Union* The Directorate General Taxation and Customs Union's mission is to develop and manage the Customs Union, a foundation of the European Union, and to develop and implement tax policy across the EU for the benefit of citizens, businesses and the Member States. Particular attention is given to the Internal Market, by making sure it functions smoothly and efficiently. https://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/common/about/welcome/mission_statement_en.pdf
Definition of Public Policy Objectives	Obsolete (since v2.0.0)	A Definition of Public Policy Objectives is a stage where public policy objectives are defined. Source: Based on the concepts laid out in http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507457/IPOL-IMCO_ET(2013)507457_EN.pdf

Name	Status	Definition
Formulation of Public Policy Scenarios	Obsolete (since v2.0.0)	A Formulation of Public Policy Scenarios is a stage where a number of public policy options for addressing the problem and achieving the public policy objectives are developed. Source: Based on the concepts laid out in http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507457/IPOL-IMCO_ET(2013)507457_EN.pdf
Impact Assessment	Obsolete (since v2.0.0)	An Impact assessment is a key tool to ensure that the public policy process is carried out on the basis of transparent, comprehensive and balanced evidence, an Impact assessment is an aid to political decision-making. Source: Based on the concepts laid out in http://ec.europa.eu/smart-regulation/impact/commission_guidelines/docs/iag_2009_en.pdf
Public Policy Development Enabler	Obsolete (since v2.0.0)	A Public Policy Development Enabler is an organisation or thing that make the development and implementation of the Public Policy possible. [Oxford Dictionary] Source: http://www.oxforddictionaries.com/definition/english/enabler
Public Policy Evaluation	Obsolete (since v2.0.0)	A Public Policy Evaluation is an assessment of how the public policy met its objectives (according to defined criteria). Source: Based on the concepts laid out in http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507457/IPOL-IMCO_ET(2013)507457_EN.pdf
Public Policy Implementation	Obsolete (since v2.0.0)	A Public Policy Implementation is the process of putting a public policy into effect. [Oxford Dictionary]

8.2.2 Table 6-2 Organisational view definitions

Name	Status	Definition
Business		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* 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	Status	Definition
Business Capability		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 TOGAF definition and description of business capability. https://www2.opengroup.org/ogsys/catalog/g161 *Syn. Business Ability* 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	Status	Definition
Business Information		Represents the business facts, data, or opinions, in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audio-visual forms that the capability exchanges with other capabilities to support the execution of value streams. Examples include information about public service consumers, products and services, policies and rules, reports and metrics. 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* 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
Business Rule		Representation of the relationships between the inputs, controls, outputs, mechanisms and resources used by the activities performed in a business process. Based on TOGAF definitions. http://pubs.opengroup.org/architecture/togaf9-doc/arch/ 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 - answer language* Answer is given in the chosen language http://europa.eu/youreurope/advice/index_en.htm

Name	Status	Definition
Citizen		A person who is a member of a particular country and who has rights because of being born there or because of being given rights, or a person who lives in a particular town or city. Every national of a Member State shall be a citizen of the Union. Citizenship of the Union shall be additional to national citizenship and shall not replace it (Treaty of Maastricht on European Union, Title II Provisions on democratic principles, article 8). The main difference between the two (European citizenship and citizenship of a Member State) is that the rights that citizens enjoy as a result of European citizenship are not matched with duties. Legal basis: Articles 9 to 12 TEU and 18 to 25 TFEU (European Parliament). The additional rights EU citizenship confers are detailed at http://ec.europa.eu/justice/citizen/index_en.htm (European Commission). Based on EUR-Lex, Europa web site and the Cambridge Dictionary http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C:2007:306:FULL&from=EN http://www.europarl.europa.eu/atyourservice/en/displayFtu.html?ftuId=FTU_2.1.1.html http://dictionary.cambridge.org/dictionary/english/citizen The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EUROPASS2 - EU citizen* Every national of a Member State shall be a citizen of the Union. http://europass.cedefop.europa.eu/europass-and-you

Name	Status	Definition
Exchange of Business Information		Communication of business information by a business capability. This ABB is a key interoperability enabler (*) for assessing the compatibility of interaction in exchanged information. 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* 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	Status	Definition
Interoperability Agreement		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). 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	Status	Definition
Interoperability Framework		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* 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	Status	Definition
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. 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* 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	Status	Definition
Interoperability Organisational Authority		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* 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	Status	Definition
Interoperability Strategy		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 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	Status	Definition
Interoperability Skill		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* 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	Status	Definition
Organisation		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* 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	Status	Definition
Organisational Interoperability Enabler		That which allows how organisations cooperate to achieve their mutually agreed goals. It can be capabilities, forces, or resources. Source: Based on the Black's Law Dictionary definition of enablers and the EIRA definition of organisational interoperability. https://joinup.ec.europa.eu/asset/eia/document/how-does-eira-support-interoperability http://thelawdictionary.org/enablers/ The following implementations are examples on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *RAPEX - Semantic Web Gate* Public set of RAPEX notifications are available via the Semantic Web Gate in the Open Data portal http://ec.europa.eu/semantic_webgate/query/dataset=rapex *e-Justice Portal - Commission's approach on the security of communication and information systems in the European Commission* Commission Decision (EU, Euratom) 2017/46 of 10 January 2017 on the security of communication and information systems in the European Commission. The Commission's approach should take into account EU policy initiatives and legislation on network and information security, industry standards and good practices, to comply with all relevant legislation and to allow interoperability and compatibility. This decision applies to all communication and information systems (CISs) which are owned, procured, managed or operated by or on behalf of the Commission and all usage of those CISs by the Commission. This decision sets out the basic principles, objectives, organisation and responsibilities regarding the security of those CISs, and in particular for Commission departments owning, procuring, managing or operating CISs and including CISs provided by an internal IT service provider. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.006.01.0040.01.ENG

Name	Status	Definition
Organisational Interoperability Specification		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. 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 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	Status	Definition
Organisational Policy		Principles, rules, and guidelines formulated or adopted by an organization to reach its long-term goals and typically published in a booklet or other form that is widely accessible. Policies and procedures are designed to influence and determine all major decisions and actions, and all activities take place within the boundaries set by them. Based on BusinessDictionary.com definition of Policies and Procedures http://www.businessdictionary.com/definition/policies-and-procedures.html The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Inspire - re-use of public sector information* Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information. This Directive establishes a minimum set of rules governing the re-use and the practical means of facilitating re-use of existing documents held by public sector bodies of the Member States. http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32003L0098
Organisational Procedure		The specific methods employed to express organisational policies in action in day-to-day operations of the organization. Together, policies and procedures ensure that a point of view held by the governing body of an organization is translated into steps that result in an outcome compatible with that view. Based on BusinessDictionary.com definition of Policies and Procedures http://www.businessdictionary.com/definition/policies-and-procedures.html The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *TRACES - Listing procedures* Describe how to approve or register establishments and operators on the European portal. https://ec.europa.eu/food/sites/food/files/animals/docs/ah-traces-info-mat-toolkit_en.pdf

Name	Status	Definition
Organisational Skill		Ability to organise something well, expertise in organizing something. Based on the definitions of skill and organisational in the Oxford dictionary. https://en.oxforddictionaries.com/definition/skill *Syn. Organisational Competence* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Surveillance3 - COMMISSION DECISION of 14 September 2009 setting up a European Consumer Consultative Group (2009/705/EC)* One of the set of criteria for membership to the European Consumer Consultative Group membership is: be non-governmental, non-profit-making, independent of industry, commerce and business or other conflicting interests, and 1. have as their primary objectives and activities the promotion and protection of the health, safety and economic interest of consumers in the Community, 2. have been mandated to represent the interests of consumers at Community level by national consumer organisations in at least half of the Member States that are representative in accordance with national rules or practice, of consumers and are active at regional or national level, and 3. have provided to the Commission satisfactory accounts of their membership, internal rules and sources of funding http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009D0705

Name	Status	Definition
Organisational Structure		The hierarchical arrangement of lines of authority, communications, rights and duties of an organization. Organizational structure determines how the roles, power and responsibilities are assigned, controlled, and coordinated, and how information flows between the different levels of management. Based on BusinessDictionary.com definition of Organizational Structure http://www.businessdictionary.com/definition/organizational-structure.html The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EUCARIS - registry network* EUCARIS is an initiative of several European countries and can be described as a cooperation between several national registration authorities. Formalised in a multilateral treaty, this cooperation is focused on the data-exchange regarding vehicle registration, driving licences, and the accompanying personal data. For this exchange, a system is used which was especially developed for this purpose: EUCARIS II. It is essential to note that EUCARIS makes no use of a central European database. Each country is responsible for its own registry of vehicle and driving licence information and its own registration procedures. Through their national registration authority other government institutions can request information on e.g. vehicles from another country. The national registration authority becomes a central hub in EUCARIS. https://joinup.ec.europa.eu/document/eucaris-european-car-and-driving-licence-information-system-eucaris-0

Name	Status	Definition
Public Administration		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* 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	Status	Definition
Public Service		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 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	Status	Definition
Public Service Catalogue		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* 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	Status	Definition
Public Service Consumer		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 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	Status	Definition
Public Service Delivery Agent		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 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	Status	Definition
Public Service Provider		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/ 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	Status	Definition
Security and Privacy Framework		Conceptual structure made of interlinked items underlying and supporting the management, protection and distribution of sensitive information, individual's information and other resources. Based on the "framework" definitions of the Black's Law and Oxford dictionaries and on the present EIRA© definition of "security and privacy policy". http://thelawdictionary.org/framework/ https://en.oxforddictionaries.com/definition/framework *Syn. Security and Privacy Supporting Structure* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *ISO/IEC 27000-series* The ISO/IEC 27000 information security standards are published jointly by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). They contain recommendations on information security management and notably address privacy, confidentiality and cybersecurity issues. http://standards.iso.org/ittf/PubliclyAvailableStandards/c066435_ISO_IEC_27000_2016(E).zip

| Security and Privacy Policy | | The set of rules and practices that regulate how sensitive information, individual's information and other resources are managed, protected and distributed.

Based on IATE definitions of "security policy" and Black's Dictionary of Law definition of "privacy".
http://iate.europa.eu/
http://thelawdictionary.org/privacy/

Syn. Security and Privacy Statement

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

Policy about personal information displayed on the INSPIRE Knowledge Base
All personal information displayed on the INSPIRE Knowledge Base and subsites is subject to a Specific Privacy Statement, accepted by the data subject prior to the collection of his/her personal data, and is published with his/her unambiguous consent.
This e-service is operated by the Digital Economy Unit, Joint Research Centre (JRC). The objective of the INSPIRE Knowledge Base is to provide the INSPIRE community a space on the Internet where they can share information, documents, participate in discussion fora, and share best practices. Upon registration, your personal data will be collected and further processed. The Digital Economy Unit who manages the processing acts as personal data processor.
As this processing collects and further processes personal data, Regulation (EC) 45/2001, of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data, is applicable.

The Privacy Statement covers the following:

- What is the personal information collected, what is the legal basis, for what purpose and through which technical means?
- Who has access to the information and to whom is it disclosed?
- How is the information protected and safeguarded?
- How can personal information be verified, modified or deleted information?
- How long is the data kept?
- Contact Information
- Recourse

http://inspire.ec.europa.eu/privacy-policy/59294 |

Name	Status	Definition
Service Delivery Model		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 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	Status	Definition
Base Registry		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 The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Belgian national register* The National Register refers to the information processing system which records, stores and communicates information relating to the identification of natural persons ie citizens. It is therefore a central database in which are recorded: • all Belgians residing in Belgium; • all Belgians residing abroad who register in the population registers held in Belgian diplomatic missions or consular posts abroad; • all foreigners residing in Belgium who are admitted or authorized to settle or reside in the Kingdom; • all foreigners (and their family members) who declare themselves refugees or who are seeking recognition of refugee status. The municipalities (and the Immigration Office for the last category of the population) are responsible for recording the information. As a pillar of e-government, the National Register ensures the sharing of authentic data identifying individuals between different public services with limited access to such data. The Sectorial Committee of the National Register established within the Commission for the Protection of Privacy is competent to authorize access to the information of the National Register or the communication thereof. https://www.ehealth.fgov.be/fr/ehealthplatform

Name	Status	Definition
Character Encoding Scheme		Digital Encoding of Characters. To be of any use in computers, in computer communications and in particular on the World Wide Web, characters must be encoded. In fact, much of the information processed by computers over the last few decades has been encoded text, exceptions being images, audio, video and numeric data. To achieve text encoding, a large variety of character encodings have been devised. Character encodings can loosely be explained as mappings between the character sequences that users manipulate and the sequences of bits that computers manipulate. Source: W3C https://www.w3.org/TR/2003/WD-charmod-20030822/ The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Unicode Transformation Format (UTF-8)* ISO/IEC 10646-1 defines a large character set called the Universal Character Set (UCS) which encompasses most of the world's writing systems. The originally proposed encodings of the UCS, however, were not compatible with many current applications and protocols, and this has led to the development of UTF-8. UTF-8 has the characteristic of preserving the full US-ASCII range, providing compatibility with file systems, parsers and other software that rely on US-ASCII values but are transparent to other values. UTF-8 has a one-octet encoding unit. It uses all bits of an octet, but has the quality of preserving the full US-ASCII [US-ASCII] range: US-ASCII characters are encoded in one octet having the normal US-ASCII value, and any octet with such a value can only stand for a US-ASCII character, and nothing else. UTF-8 encodes UCS characters as a varying number of octets, where the number of octets, and the value of each, depend on the integer value assigned to the character in ISO/IEC 10646 (the character number, a.k.a. code position, code point or Unicode scalar value). https://tools.ietf.org/html/rfc3629

Name	Status	Definition
Core Data Model		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/ 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	Status	Definition
Data		Data is facts represented as text, numbers, graphics, images, sound, or video. Data is the raw material used to represent information, or from which information can be derived. This ABB is a key interoperability enabler (*) enabling for sharing/PROVISIONING and reusing/CONSUMING Data. Source: Data Management Body Of Knowledge (DAMA DM_BOK) First edition http://www.dama.org (*)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* 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	Status	Definition
Data Entity		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* 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	Status	Definition
Data Level Mapping		A Data-level Mapping is a mapping between specific data elements (or data values). Source: ISO/DIS 25964-2 https://www.iso.org/standard/53658.html The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *eConfidentiality - Mapping with documents and metadata in Case Management System* Mapping between documents and metadata in eConfidentiality system with documents and metadata in Case Management System. N.B. Context: All documents concerning an anti-trust case are stored by case number in the case management application called "CMAfx". Documents are stored in different formats: pdf format (if available in paper form only and subsequently digitised) or word, excel, tif, rtf, html, txt version (if received as such or produced by DG Competition). CMAfx contains also procedural steps and case information, such as the composition of the case team, relevant legal basis, type of case, priority, name of undertaking concerned etc. Access to CMAfx is restricted to DG Competition personnel and national experts on secondment using DG Competition IT infrastructure. The undertakings answering the queries are obliged to indicate the confidentiality status of their responses, i.e., whether their answer must be treated as confidential, and in that case the system does not allow submission of their responses until a non-confidential answer has been provided for each confidential one. The non-confidential versions of the Commission's decisions adopted pursuant to articles 7-10, 23 and 24 of Regulation 1/2003 are published on DG Competition website, after the confidentiality claims (with regard to business secrets and other confidential information) were cleared with the respective parties. http://ec.europa.eu/dpo-register/details.htm?id=38367

Name	Status	Definition
Data Model		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 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	Status	Definition
Data Policy		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 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	Status	Definition
Data Set		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 The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Eurostat - Water productivity data set* Water productivity indicates how much economic output is produced per cubic meter of fresh water abstracted (in EUR per m3 or PPS per m3). It serves as a measure of the efficiency of water use. Total fresh water abstraction includes water removed from any fresh water source, either permanently or temporarily. Mine water and drainage water as well as water abstractions from precipitation are included, whereas water used for hydroelectricity generation (in situ use) is excluded. For the interpretation it should be taken into account that water productivity is strongly influenced by the economic structure and the proportion of water intensive industries. A lower water productivity primarily means that the economic and industrial structure of the country is water use intensive. A less water-consuming economy would show a relatively high water productivity. The change in water productivity is influenced by both 'real' productivity improvements and deteriorations, as well as by changes in economic and industry structure. For the calculation of water productivity Eurostat uses the GDP either in the unit of EUR in chain-linked volumes to the reference year 2010 at 2010 exchange rates or in the unit PPS (Purchasing Power Standard). The unit EUR in chain linked volumes allows observing the water productivity trends over time in a single geographic area, whereas the unit PPS allows to compare countries for the same year. Since GDP is measured in million EUR or million PPS and water abstraction in million cubic meters, water productivity is available in both EUR per m3 and PPS per m3. https://data.europa.eu/euodp/en/data/dataset/dJp7fG1qYJ6KqhQURbCzw

Name	Status	Definition
Data Set Catalogue		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* 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
Descriptive Metadata		A resource for purposes such as discovery and identification. It can include elements such as title, abstract, author, and keywords. Source: http://www.niso.org/publications/press/UnderstandingMetadata.pdf 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 Criterion and Core Evidence Vocabulary - Evidence metadata* Evidences are resources and can have associated metadata. The DCMI Type Vocabulary can be used for providing a list of evidences that can be submitted for satisfying a specific criterion. Note. Initially developed in 2002, the DCMI Type Vocabulary provides a general, cross-domain list of approved terms that may be used as values for the Type element to identify the genre of a resource. Type includes terms describing general categories, functions, genres, or aggregation levels for content. https://joinup.ec.europa.eu/sites/default/files/distribution/2016-12/core_evidence_and_core_criterion_vocabulary_version_1.0.0.docx http://dublincore.org/documents/dcmi-type-vocabulary/

Name	Status	Definition
Identifier Scheme		Defines the values of an identifier. Source: CEN BII http://spec.cenbii.eu/ The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *UUID* A UUID is an identifier that is unique across both space and time, with respect to the space of all UUIDs. Since a UUID is a fixed size and contains a time field, it is possible for values to rollover. A UUID can be used for multiple purposes, from tagging objects with an extremely short lifetime, to reliably identifying very persistent objects across a network. The internal representation of a UUID is a specific sequence of bits in memory, as described in Section 4. To accurately represent a UUID as a URN, it is necessary to convert the bit sequence to a string representation. Each field is treated as an integer and has its value printed as a zero-filled hexadecimal digit string with the most significant digit first. The hexadecimal values "a" through "f" are output as lower case characters and are case insensitive on input. https://tools.ietf.org/html/rfc4122
Master Data		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 The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *INSPIRE code list register* The INSPIRE code list register contains the code lists and their values, as defined in the INSPIRE implementing rules on interoperability of spatial data sets and services (Commission Regulation (EU) No 1089/2010). http://inspire.ec.europa.eu/codelist

Name	Status	Definition
Open Data		Open data refers to the 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 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. 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/

Reference Data		Reference Data is any data used to organise or categorise other data, or for relating data to information both within and beyond the boundaries of the enterprise. Usually consists 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].

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

EUROSTAT - Nomenclature of Territorial Units for Statistics (NUTS)
Principle 1: Population thresholds
The NUTS regulation defines minimum and maximum population thresholds for the size of the NUTS regions:

Level	Minimum	Maximum
NUTS 1	3 000 000	7 000 000
NUTS 2	800 000	3 000 000
NUTS 3	150 000	150 000

For administrative levels of NUTS, it is sufficient if the average size of the corresponding regions lies within the thresholds; in case of non-administrative levels, each individual region should do so. Exceptions exist however in case of geographical, socio-economic, historical, cultural or environmental circumstances.
Despite the aim of ensuring that regions of comparable size all appear at the same NUTS level, each level still contains regions which differ greatly in terms of population.
Principle 2: NUTS favours administrative divisions
For practical reasons the NUTS classification generally mirrors the territorial administrative division of the Member States. This supports the availability of data and the implementation capacity of policy.
Principle 3: Regular and extraordinary amendments
The NUTS classification can be amended, but generally not more frequently than every three years. The amendments are usually based on changes of the territorial structure in one or more Member States.
In case of a substantial reorganisation of the administrative structure of a Member State, amendments to the NUTS may be adopted at intervals of less than three years. This has only happened once so far, in 2014 for Portugal.
http://ec.europa.eu/eurostat/web/nuts/overview
http://ec.europa.eu/eurostat/web/nuts/principles-and-characteristics

Name	Status	Definition
Representation		The perceptible form of the information carried by a business object. If relevant, representations can be classified in various ways; for example, in terms of medium (electronic, paper, audio, etc.) or format (HTML, ASCII, PDF, RTF, etc.). This ABB is a key interoperability enabler (*) for assessing compatible interpretations of Data. 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 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	Status	Definition
Schema Level Mapping		A Schema-level Mapping is a mapping between related classes and properties. Source: ISO/DIS 25964-2 https://www.iso.org/standard/53658.html The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Open Contracting Data Standard schema-level mapping - Template and guidance* This guide details an example of using the OCDS 1.1 Field Level Mapping Template to map the fields from a single table in a fictional e-GP system to OCDS. Step 1: Source System Details 　OCDS data may originate in multiple source systems, therefore it is important to record the details of the source system we are mapping from. Step 2: Source Field Details 　Using the (Source) Fields sheet, populate the following information for each field in the source table: the system the field is from (as recorded in step 1); the table in which the field is located; the field title. 　Where additional context is required you may also record a narrative description of the source field in the description field and it might also be useful to add an example of the value that the field takes alongside further technical information on the type and multiplicity of the field. Step 3: Mapping 　The mapping template has a sheet for each stage of the contracting process, from (OCDS) 2. Planning through to (OCDS) 6. Implementation, with details of the relevant fields from the OCDS schema, in addition to the (OCDS) 1. General (all stages) sheet which contains fields relevant to all stages of the contracting process. Review each of the (OCDS) sheets in the mapping template to identify fields in the OCDS schema to which a field in the source system can be mapped. Step 4: Review 　Repeat steps 1-3 for all tables and all source systems to complete the mapping. 　Gaps in currently held data: if you identify data OCDS requests, but that you do not hold, engage with data users to consider whether this additional data could and should be provided. 　Gaps in OCDS: you might have data which is not covered by OCDS. In these cases, talk with the OCDS helpdesk to see whether this should be included in an extension to the standard. Additional fields can be documented at the bottom of each mapping sheet in the template. https://www.open-contracting.org/resources/ocds-field-level-mapping-template/ https://docs.google.com/document/d/1YwDLVIhiVgKCWVJDeL2lDSKNUX1qfO1Rccxxk1n2bcU/edit#heading=h.i2ififc8i9k4

| Semantic Interoperability Specification | | 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

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.
http://ephyto.ippc.int/UN-CEFACT-schema/ |

Name	Status	Definition
Syntax Encoding Scheme		A set of strings and an associated set of rules that describe a mapping between that set of strings and a set of resources. The mapping rules may define how the string is structured or they may simply enumerate all the strings and the corresponding resources. Source: W3C http://www.w3.org/2000/01/rdf-schema#Datatype *Syn. Encoding format* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Guidelines for Dublin Core Application Profiles : date and language* date: Because we want to perform automated operations like sorting on the date, we can select the Dublin Core property dcterms:date. This property can take a string value. We can indicate that the value string is formatted in accordance with the W3C Date and Time Formats specification by using syntax encoding scheme dcterms:W3CDTF. language: The language needs to be selected from a controlled list. We achieve this by requiring the use of three-letter codes listed in the international standard ISO 639-3 for the representation of names of languages (such as ""eng"" for ""English"") together with the syntax encoding scheme dcterms:ISO639-3 as a datatype. For this, we can use the DCMI property dcterms:language, which can accommodate either an identifier for the language term or a string. http://dublincore.org/documents/profile-guidelines/ https://www.w3.org/TR/NOTE-datetime

Name	Status	Definition
Transactional Data		Data that covers the business information related to business transactions and information exchanges. Based on DAMA DM_BOK http://www.dama.org The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *DATA EXCHANGE STANDARDS FOR REGISTRY SYSTEMS UNDER THE KYOTO PROTOCOL - TECHNICAL SPECIFICATIONS* This section of the Technical Specifications addresses the messages and content requirements necessary to support submissions of unit transactions by registries and the validation of those transactions by the ITL. The unit transactions either involve the transfer of ownership of a unit, a change in an attribute of a unit, or the replacement of a tCER or lCER. This section will describe the data exchange flow, the responsibilities of registries, and the responsibilities of the ITL in order to complete a unit transaction. The following unit transactions are described: • Issuance; • Conversion; • External Transfers; • Cancellation (Internal Transfer); • Replacement (Internal Transfer); • Retirement (Internal Transfer); • Carry-over; and • Expiry Date Change. http://unfccc.int/kyoto_protocol/registry_systems/itl/items/4065.php
Data Standard	Obsolete (since v2.0.0)	A data standard is a structural metadata specification that describes or defines other data [ISO111179]. Structural metadata indicates how compound objects are put together [NISO]. It can consist of among others data models, reference data, and identifier schemas.
Data Standard Catalogue	Obsolete (since v2.0.0)	A Data Standard Catalogue is a catalogue of Data Standards.

8.2.4 Table 6-4 Technical view – application definitions

Name	Status	Definition
Access Management Component		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 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	Status	Definition
Access Management Service		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* 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	Status	Definition
Application Service		Represents an explicitly defined shared application behavior. Based on ArchiMate® v3 http://pubs.opengroup.org/architecture/archimate3-doc/chap09.html 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
Audit Component		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 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	Status	Definition
Audit Service		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 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	Status	Definition
Business Analytics Service		Shares the functionalities of i) building analysis models and simulations to create scenarios, ii) understand realities and/or iii) predict future states. Business analytics includes data mining, predictive analytics, applied analytics and statistics, and is delivered as an application suitable for a business user. These analytics solutions often come with prebuilt industry content that is targeted at an industry business process (for example, claims, underwriting or a specific regulatory requirement). Based on Gartner http://www.gartner.com/it-glossary/business-analytics/ The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *KNIME®* KNIME® Analytics Platform is the leading open solution for data-driven innovation, helping discovering the potential hidden in data, mine for fresh insights, or predict new futures. This enterprise-grade, open source platform is scalable. KNIME Analytics Platform provides to data scientists more than 1000 modules, hundreds of ready-to-run examples, a comprehensive range of integrated tools, and a wide choice of advanced algorithms. • Data Blending: simple text files, databases, documents, images, networks, and even Hadoop-based data can all be combined within the same visual workflow. • Tool Blending: integration of more than a dozen tools, including legacy scripting/code, allows expertise to be reused, graphically documented, and shared among data scientists. • Visual: easy-to-learn graphical interface means that coding is optional and work is visually documented. https://www.knime.com/knime-server

Name	Status	Definition
Business Intelligence Component		Implements the functionalities that include i) the applications, ii) infrastructure and tools, and/or iii) best practices that enable access to and analysis of information to improve and optimize decisions and performance. Based on Gartner http://www.gartner.com/it-glossary/business-intelligence-bi/ The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *JasperReports* The JasperReports Library is an open source reporting engine. It is entirely written in Java and it is able to use data coming from any kind of data source and produce pixel-perfect documents that can be viewed, printed or exported in a variety of document formats including HTML, PDF, Excel, OpenOffice and Word. https://community.jaspersoft.com/project/jasperreports-library
Business Process Management Component		Implements the functionality that uses various methods to discover, model, analyse, measure, improve, and optimize business processes. A business process coordinates the behavior of people, systems, information, and things to produce business outcomes in support of the business strategy. Processes can be structured and repeatable or unstructured and variable. Based on Gartner http://www.gartner.com/it-glossary/business-process-management-bpm/ 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	Status	Definition
Business Reporting Service		Shares the functionality of providing detailed reports using unified views of enterprise data. This includes, but is not limited to, financial statements, financial information, non-financial information and regulatory filings such as annual and quarterly financial statements. Based on XBRL (eXtensible Business Reporting Language) Specification http://www.xbrl.org/Specification/XBRL-2.1/REC-2003-12-31/XBRL-2.1-REC-2003-12-31+corrected-errata-2013-02-20.html The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *BIRT* BIRT is an open source software project that provides the BIRT technology platform to create data visualizations and reports that can be embedded into rich client and web applications, especially those based on Java and Java EE. BIRT is a top-level software project within the Eclipse Foundation, an independent not-for-profit consortium of software industry vendors and an open source community. BIRT technology platform is one of the most widely adopted data visualization and reporting technologies with over 12 million downloads and over 2.5M developers across 157 countries. BIRT also has a large, active and growing developer community representing all types of organizations. http://www.eclipse.org/birt/about/

Name	Status	Definition
Choreography Service		Shares the functionality of modelling a sequence of operations, states, and conditions that control the interactions involved in the participating services. The interaction prescribed by a choreography results in the completion of some useful function.

A choreography can be distinguished from an orchestration. An orchestration defines 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/

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

Camunda
The core of Camunda BPM is a model execution engine that supports the OMG standards BPMN 2.0 for process automation, CMMN 1.1 for case management and DMN 1.1 for decision management.
Camunda BPM ships with a set of applications to help you model, execute and administer process applications running on the Camunda core engine. Those applications interact with the core engine's public REST API. You can also create your own applications that may also use the core engine's public Java API. It is lightweight and requires less than 3MB of disk space. It can run in any Java Virtual Machine (JVM) and comes with extended integration for different runtime containers.
The engine can be accessed via the REST API, or via the Java API and existing integrations with Spring and Java EE can be used. BPMN service tasks can be implemented in Java code, or the built-in REST and SOAP connectors can be used. Scripts, expressions and templates can also be applied for process implementation. Clustering for horizontal scalability is straightforward as the engine is stateless: multiple instances can share the same database.
BPMN 2.0 Processes permits the fully automated service orchestration and human workflow management.
https://camunda.org/features/ |

Name	Status	Definition
Configuration Management		The process responsible for maintaining information about configuration Items required to deliver an IT Service, including their relationships. Based on ITIL v3 https://www.axelos.com/Corporate/media/Files/Glossaries/AXELOS-Common-Glossary.pdf The following implementation are examples on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Syn. [Distributed] Version Control, Source Code Management* *Quattor* Quattor is a system administration toolkit providing a powerful, portable, and modular set of tools for the automated installation, configuration, and management of clusters, farms, grids and clouds. Quattor is developed as a community effort and provided as open-source software under the Apache 2.0 license and EU DataGrid Software License. Quattor was originally developed in the framework of European Data Grid project. Since its first release in 2003, Quattor has been maintained and extended by a volunteer community of users and developers, primarily from the community of grid system administrators. Three features make it particularly attractive for managing grid resources: Federated Management, Shared Configuration and Management Efficiency, Coherent Site Model. http://www.quattor.org/ *Salt* Salt (also called SaltStack Platform) is a Python-based open-source configuration management software and remote execution engine supporting the "Infrastructure as code" approach to deployment and cloud management. SaltStack takes a new approach to infrastructure management by developing software that is easy enough to get running in seconds, scalable enough to manage tens of thousands of servers, and fast enough to control and communicate with them in milliseconds. SaltStack delivers a dynamic infrastructure communication bus used for orchestration, remote execution, configuration management and much more. The Salt Open project was launched in 2011 and is one of the fastest-growing, most-active infrastructure orchestration and configuration management open source project in the world. The SaltStack community is committed to keeping the Salt Open project focused, healthy and open. https://saltstack.com/community/

Name	Status	Definition
Data Transformation Component		Implements the functionality of conversion of data from one data format to another. Source: ISA2 – EIA Action 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
Data Transformation Service		Shares the functionality of conversion of one data format to another. Source: ISA2 – EIA Action 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 use within Eurostat. In time, however, this service will be opened up to the ESS at which point a user guide will be made available. http://ec.europa.eu/eurostat/web/sdmx-infospace/validation-transformation/transformation-services

Name	Status	Definition
Data Validation Component		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 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	Status	Definition
Data Validation Service		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 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
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 compatible 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* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *EU Open 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/rapex-rapid-alert-system-non-food

Name	Status	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
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 compatible 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. 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

Name	Status	Definition
Operational Procedure		Defines the process of operating a solution, how the procedures are implemented and the rules for operating it. Source: ISA2 – EIA Action The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Apache HTTP Server documentation* Apache HTTP Server Version 2.4 Documentation contains pages with operational procedures, like starting the server, controlling the access, reverse proxy setup, content caching, etc. http://httpd.apache.org/docs/2.4/
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 https://www.w3.org/TR/ws-arch/ 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	Status	Definition
Service Discovery Component		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/ 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	Status	Definition
Service Discovery Service		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/ 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	Status	Definition
Technical Interoperability Specification		The ability of two or more information and communication technology applications, to accept data from each other and perform a given task in an appropriate and satisfactory manner without the need for extra operator intervention. Technical interoperability specifications support technical interoperability, at the application level, by addressing the core technical application interoperability background for solutions. Technical interoperability specifications support technical interoperability, at the infrastructure level, by addressing the core technical infrastructure 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 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
Technical Specification		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 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1998L0034:20070101:EN:PDF *Syn. Implementing Rules* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *INSPIRE Implementing Rules* To ensure that the spatial data infrastructures of the Member States are compatible and usable in a Community and transboundary context, the INSPIRE Directive requires that common Implementing Rules (IR) are adopted in a number of specific areas https://inspire.ec.europa.eu/node/57528

Name	Status	Definition
Test Component		Implements the functionality of allowing a structured and modular approach to implement test automation. Based on ISTQB http://glossary.istqb.org/search/test 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
Test Report		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* 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	Status	Definition
Test Scenario		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* 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
Test Service		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 The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *OuluHealth Labs* OuluHealth Labs, the innovation environment of OuluHealth, is an important part of the ecosystem and provides a unique, integrated health test and development environment – including professionals' feedback – for every phase of an R&D process. To summarise, OuluHealth Labs offers a user-centric innovation platform for the products and solutions that are in the development phase. Structured collaboration methods between healthcare professionals and companies ensure the effective utilisation of resources. https://ec.europa.eu/eip/ageing/repository/ouluhealth-labs_en

8.2.5 Table 6-5 Technical view – infrastructure definitions

Name	Status	Definition
Administration and Monitoring Service		Shares the functionalities of i) administration of services and/or systems and ii) monitoring of services and/or systems with the goal of ensuring that these solutions run in an efficient and effective way. Source: ISA2 – EIA Action *Syn. Data Center Infrastructure Management* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Nagios* Nagios is a powerful monitoring system that enables organizations to identify and resolve IT infrastructure problems before they affect critical business processes. It provides the following features: • Comprehensive Monitoring: o Capabilities to monitor applications, services, operating systems, network protocols, system metrics and infrastructure components o Powerful script APIs allow easy monitoring of in-house and custom applications, services, and systems • Problem Remediation o Alert acknowledgments provide communication on known issues and problem response o Event handlers allow automatic restart of failed applications and services • Reporting o Availability reports o Historical reports provide record of alerts, notifications, outages, and alert response • Extendable Architecture o Multiple APIs permit the integration with in-house and third-party applications o Hundreds of community-developed add-ons extend core Nagios functionality • Visibility & Awareness o Centralized view of entire monitored IT infrastructure o Detailed status information available through web interface o Fast detection of infrastructure outages o Alerts can be delivered to technical staff via email or SMS o Escalation capabilities • Proactive Planning o Trending and capacity planning add-ons permit the follow-up of aging infrastructure o Scheduled downtime allows for alert suppression during infrastructure upgrades

Name	Status	Definition

		• Multi-Tenant Capabilities
		   o Multi-user access to web interface allows stake holders to view infrastructure status
		   o User-specific views ensures clients see only their infrastructure components
		• Stable, Reliable Platform
		   o Over 10 years of active development
		   o Scales to monitor thousands of nodes
		   o Failover capabilities ensure non-stop monitoring of critical IT infrastructure components
		• Customizable Code
		   o Open Source Software
		   o Full access to source code
		   o Released under the GPL license
		• Active community
		   o Over 1 million+ users worldwide
		   o Hundreds of add-ons
		https://www.nagios.org/

Name	Status	Definition
Administration Component		Implements the functionalities of i) administration of services and/or systems and ii) monitoring of services and/or systems and iii) the various functions that manages the full lifecycle of solutions, with the goal of ensuring that these services and/or systems run in an efficient and effective way. Source: ISA2 – EIA Action The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *AnywhereTS* AnywhereTS is an open source configuration tool to create and deploy thin-clients, utilizing ordinary office PCs as clients. The organization can re-use already existing office PCs instead of, or in addition to using dedicated thin clients. https://sourceforge.net/projects/anywherets/
Audiovisual Service		Shares the functionality of broadcasting of "audio and video" content over the internet or satellite. Source: ISA2 - EIA Action *Syn. Social Network* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Avalon Media System* The Avalon Media System is an open source system for managing and providing access to large collections of digital audio and video. The freely available system enables libraries and archives to easily curate, distribute and provide online access to their collections for purposes of teaching, learning and research. The Avalon Community is made up of a dozen educational, media and open-technology institutions. http://www.avalonmediasystem.org/project

Name	Status	Definition
Collaboration Component		Implements the functionalities of i) transmission of text and/or ii) broadcasting of "audio and video" content. Source: ISA2 - EIA Action *Syn. Social Network* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Kune* Kune is a free and open source federated collaborative social network, focused on collaboration rather than just on communication. That is, it provides online real-time collaborative editing (based on Apache Wave), decentralized social networking and web publishing, while focusing on workgroups rather than individuals. It aims to allow the creation of online spaces for collaborative work, where organizations and individuals can build projects online, coordinate common agendas, set up virtual meetings, publish on the web, and join organizations with similar interests. Kune is 100% free software (AGPLv3), built with free tools. https://github.com/comunes/kune
Configuration and Solution Cartography Service		Shares the functionality of documenting the configuration and architecture of solutions. Source: ISA2 - EIA Action 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	Status	Definition
Configuration and Solution Cartography Service Component		Implements the functionality of documenting the configuration and architecture of solutions. Source: ISA2 - EIA Action 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	Status	Definition

Content Management Component		Implements the functionality of the categorisation of information resources so that they can be stored, published and reused in multiple contexts.
		
		Based on DAMA
		http://www.dama.org/
		
		The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB):
		
		Plone
		Plone provides the following features:
		  - Enterprise integration: Plone connects with specialized applications and standard enterprise systems like CRMs, Salesforce, and Oracle. It integrates with web servers, SQL and NoSQL databases, continuous integration tools, web services, and frameworks.
		  - Flexible Workflows: Manage the life cycle of your content (from initial creation to publication and storage) with version control, content locking, document and digital asset management, and search.
		  - Industrial Strength Security: The creativity and speed of Open Source blended with a technologically-advanced Python backend yields superior security without sacrificing power or extensibility. The extremely low number of vulnerabilities found in Python and Plone demonstrates the maturity of Plone's security and development processes
		  - Extensibility: hundreds of add-ons for document and content storage, content delivery, forms processing, social syndication, personalization and more
		  - Scalability: Plone also has outstanding clustering capabilities - allowing websites to be split across multiple servers to handle high traffic
		  - Search Capabilities: Live search gets inside Word documents and PDF files. Supercharge search with add-ons for Google Search Appliance, Elasticsearch and Apache Solr.
		  - Intranets and Multi-site Management
		  - Theming engine and Multilingual
		  - WCAG 2.0 compliant and meets or exceeds W3C's WAI-AA
		https://plone.com/features

Name	Status	Definition
Content Management Service		Shares the functionality of the categorisation of information resources so that they can be stored, published and reused in multiple contexts. Based on DAMA http://www.dama.org/ *Syn. CMS* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *CROS Portal* The CROS Portal is a content management system based on Drupal and stands for "Portal on Collaboration in Research and Methodology for Official Statistics". The CROS Portal is dedicated to the collaboration between researchers and Official Statisticians in Europe and beyond. It provides a working space and tools for dissemination and information exchange for statistical projects and methodological topics. Services provided include hosting of statistical communities, repositories of useful documents, research results, project deliverables, CVs of experts in statistical relevant areas, and discussion fora on different topics like the future research needs in Official Statistics. https://ec.europa.eu/eurostat/cros/
Data Exchange Component		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 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

Name	Status	Definition
Data Exchange Service		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 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

Data Publication Component		Implements the functionality of making data available for common use.
		Based on DAMA
		http://www.dama.org/
		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)
		- 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

Name	Status	Definition
		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		Shares the functionality of making data available for common use.
		Based on DAMA http://www.dama.org/ 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/ *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

Name	Status	Definition
		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	Status	Definition
Digital Service Infrastructure		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 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	Status	Definition
Document Management Service		Shares the functionality of categorisation of electronic documents in order to i) store, ii) publish and iii) reuse these documents in multiple contexts. For a differentiation between ERMS and EDMS visit section 10.3 of Moreq: http://ec.europa.eu/archival-policy/moreq/doc/moreq_en The definition of a Record Management Service includes a differentiation towards record management and e-archiving. Based on the EC Document and Archival Policy https://ec.europa.eu/info/about-european-union/principles-and-values/transparency/access-documents/information-and-document-management_en The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Council of Europe - Documents, Records and Archives* You will find on the Documents, Records and Archives website information about the Council of Europe's documents, records and archives, how they are organised and how to access them, whatever their format (audio-visual, electronic, paper or web archives): - information about the Council of Europe's documents, records and archives, how they are organised and how to access them, whatever their format (audio-visual, electronic, paper or web archives) - information on the rules and procedures governing access - search tools and other professional tools - a timeline with a selection of themes related to the construction of the Council of Europe and the personalities involved (being developed) - an information management guidance page https://www.coe.int/en/web/documents-records-archives-information/home

Name	Status	Definition
e-Archiving Component		Implements 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 Component* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Archivematica* Archivematica is a web- and standards-based, open-source application which allows your institution to preserve long-term access to trustworthy, authentic and reliable digital content. Archivematica is an integrated suite of open-source software tools that allows users to process digital objects from ingest to access in compliance with the ISO-OAIS functional model. Users monitor and control ingest and preservation micro-services via a web-based dashboard. Archivematica uses METS, PREMIS, Dublin Core, the Library of Congress BagIt specification and other recognized standards to generate trustworthy, authentic, reliable and system-independent Archival Information Packages (AIPs) for storage in your preferred repository. https://www.archivematica.org/en/

| e-Archiving Service | | 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

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

Vitam
Three French government ministries have pooled resources to build a digital archiving software to secure and maintain digital documents. The software, called Vitam, is an open back-end which could be used by any administration. It makes use of new technologies to promote re-use. Agility is a priority in keeping the project aligned with business needs and ensuring that it remains economically viable.
The basic functions of Vitam span the ingestion of a document, its conservation (or destruction), and its maintenance. These functions are:
- Ingest documents based on defined standards;
- Index the archived documents, and provide access as required. Both metadata and logs are searchable;
- Ensure the preservation of the documents. Documents are translated into pre-defined standard formats to ensure that they remain accessible over time. The translations are based on specific rules set by the administrations;
- Manage the storage infrastructure. |

Name	Status	Definition
		Vitam has been developed to support large volumes of documents, so it can address both large administrations and groups of smaller communities. The platform will be able to manage petabytes of data. Vitam has been designed to be used via web services. Document ingestion, metadata searching and document access are accessible via RESTful APIs. Administrations can integrate these into their own applications, such as messaging or human resources (HR) systems. https://joinup.ec.europa.eu/document/french-ministries-build-open-archiving-platform-vitam *SAEM* The SAEM project in France is supported by the Departmental Council of Gironde, the City of Bordeaux and the Urban Community of Bordeaux. It aims to provide an electronic archiving service for all documents that require storage for either the short or the long term. The project is based on an open partnership between administrations to pool financial and development resources. https://joinup.ec.europa.eu/document/gironde-bordeaux-develop-online-shared-archiving-service-based-open-source http://saem.e-bordeaux.org/

Name	Status	Definition
e-Payment Component		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 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	Status	Definition
e-Payment Service		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 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

Name	Status	Definition
e-Seal Preservation Service		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* 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	Status	Definition
e-Seal Verification and Validation Service		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 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: - Signature formats and packaging methods; - Signature validation procedures; - Validation relying on Member States' trusted lists: - 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	Status	Definition
e-Signature Creation Service		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 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	Status	Definition
e-Signature Preservation Service		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* 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	Status	Definition
e-Signature Verification and Validation Service		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 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	Status	Definition
e-Timestamp Creation Service		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* 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 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	Status	Definition
e-Timestamp Verification and Validation Service		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* 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/
Forms Management Component		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* 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	Status	Definition
Forms Management Service		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* 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	Status	Definition
Hosting and Networking Infrastructure		Shares the functionalities for i) hosting Interoperable European Solutions and ii) providing the necessary networks for operating these solutions. Source: ISA2 - EIA Action 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	Status	Definition
Hosting Facility		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 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
Hosting Service		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 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	Status	Definition
Identity Management Component		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* 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		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* 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: - 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

Name	Status	Definition
		• 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	Status	Definition
Lifecycle Management Service		Shares the functionalities of emphasising the importance of coordination and control across the various Functions, Processes, and Systems necessary to manage the full Lifecycle of IT Services. The Service Management Lifecycle approach considers the Strategy, Design, Transition, Operation and Continuous Improvement of IT Services. Based on ITIL® V3 Glossary v01, 30 May 2007 https://www.axelos.com/corporate/media/files/glossaries/itil_2011_glossary_gb-v1-0.pdf The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Foreman* Foreman is an open source complete lifecycle systems management tool for provisioning, configuring and monitoring of physical and virtual servers. It permits system administrators to easily automate repetitive tasks, quickly deploy applications, and proactively manage servers, on premise or in the cloud. - Provisioning: Bare metal, Amazon EC2, Google Compute Engine, OpenStack, Libvirt, oVirt, VMware, and many other providers allow to manage a hybrid cloud through Foreman. - Configuration: an external node classifier, hiera-like parameters, and reports monitoring for Puppet, Salt and Chef are included. Completely ready to tweak host groups in the data centre. - Monitor hosts: Foreman reports tells exactly what happened in your nodes, and alerts if necessary. The dashboard shows which hosts are healthy, and which ones are outdated. https://theforeman.org/

Name	Status	Definition
Logging Component		Implements the functionality of tracing all events and user actions impacting a data entity throughout its lifecycle (from its creation to its disposal). It can be used to reproduce a certain state of a data entity at a certain moment in time. Logging = To record details of information or events in an organized record-keeping system, usually sequenced in the order in which they occurred. Based on ISACA https://www.isaca.org The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Log4j 2* Apache Log4j is a Java-based logging utility, part of the Apache Logging Services project of the Apache Software Foundation. Log4j 1.x has been widely adopted and used in many applications. However, through the years development on it has slowed down. It has become more difficult to maintain due to its need to be compliant with very old versions of Java and became End of Life in August 2015. Improvements in Log4j 2: • Log4j 2 is designed to be usable as an audit logging framework. • Log4j 2 contains next-generation Asynchronous Loggers based on the LMAX Disruptor library. In multi-threaded scenarios Asynchronous Loggers have 10 times higher throughput and orders of magnitude lower latency than Log4j 1.x and Logback. • Log4j 2 is garbage free for stand-alone applications, and low garbage for web applications during steady state logging. This reduces pressure on the garbage collector and can give better response time performance. • Log4j 2 uses a Plugin system that makes it extremely easy to extend the framework by adding new Appenders, Filters, Layouts, Lookups, and Pattern Converters without requiring any changes to Log4j. • Support for custom log levels. Custom log levels can be defined in code or in configuration. • Support for Message objects. Messages allow support for interesting and complex constructs to be passed through the logging system and be efficiently manipulated. • Log4j 2 takes advantage of Java 5 concurrency support and performs locking at the lowest level possible. • It is an Apache Software Foundation project following the community and support model used by all ASF projects. http://logging.apache.org/log4j/2.x/index.html

Name	Status	Definition
Logging Service		Shares the functionality of tracing all events and user actions impacting a data entity throughout its lifecycle (from its creation to its disposal). It can be used to reproduce a certain state of a data entity at a certain moment in time. Logging = To record details of information or events in an organized record-keeping system, usually sequenced in the order in which they occurred. Based on ISACA https://www.isaca.org The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Graylog2 - open source log management platform* Graylog2 is an open source log management platform. Each message is saved in an Elasticsearch database and a web interface allows to manage and analyse the logs. Graylog2 is divided into two parts: graylog2-server and graylog2-web-interface. The first is a Java application that accepts messages on different protocols: UDP, TCP, GELF, AMQP... Each message is analysed and saved in the Elasticsearch database. A Rest API is also integrated into the tool and is used in particular by the web-interface part. This allows to manage users, streams and dashboards. Some possible uses: - Centralization of the logs: several types of inputs: syslog, GELF, raw... Rather than having to connect to each of the servers to consult the error logs, they can be configured to send all the messages in Graylog2. - Debug application - Exception handling - Log analysis For example, it can easily list the clients who are still using the deprecated version of an API. Another search can e.g. allow you to list the largest consumers or the most used parts of an API. Graylog Enterprise is built on top of the Graylog open source platform and offers additional features: - Archiving: automatically archive the data that are not searched through very often. Store this data on more cost-effective, slower hard disks and make it available for search in Graylog only when needed. - Audit Log: Graylog Enterprise also offers Audit Log capabilities. Audit Log records and stores actions taken by a user or administrator that make changes in the Graylog system. https://www.graylog.org/

Name	Status	Definition
Machine Translation Component		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 The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Machine translation for public administrations — MT@EC* MT@EC is an online machine translation service provided by the European Commission (EC). https://ec.europa.eu/info/resources-partners/machine-translation-public-administrations-mtec_en
Machine Translation Service		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 The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Machine translation for public administrations — MT@EC* MT@EC is an online machine translation service provided by the European Commission (EC). https://ec.europa.eu/info/resources-partners/machine-translation-public-administrations-mtec_en

Name	Status	Definition
Messaging Service		Shares the functionalities of i) transmission of text and/or ii) broadcasting of "audio and video" content. Source: ISA2 - EIA Action *Syn. Social Network* The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *HumHub User Mail System* HumHub is a free and open source social network software coded on top of the Yii PHP framework that provides an easy to use toolkit for creating and launching an own social network. The platform can be used for internal communication and collaboration that can range from a few users up to huge Intranets that serve companies with hundreds and thousands of employees. The platform was meant to be self-hosted and currently comes with pretty normal requirements, working with most shared hosting environments around. HumHub also supports themes and modules to extend the functionality for almost all requirements. The user mail system module provides a private messaging system to communicate with one or more users. https://github.com/humhub/humhub-modules-mail
Metadata Management Component		Implements the functionalities for the i) creation, ii) storage, iii) categorisation and iv) retrieval of metadata. Based on DAMA http://www.dama.org/ 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

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Metadata Management Service		Shares the functionalities for the i) creation, ii) storage, iii) categorisation and iv) retrieval of metadata. Based on DAMA http://www.dama.org/ 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
Network		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 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	Status	Definition
Networking Service		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 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
Partner Management Component		Implements the functionalities of i) managing service consumption (i.e. consumers) and ii) controlling service consumption by partners (i.e. consumers) in order to ensure scalability and availability. It enables the management of IES' interoperability agreements Source: ISA2 – EIA Action The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *OpenNebula* The OpenNebula monitoring subsystem gathers information relative to the hosts and the virtual machines, such as the host status, basic performance indicators, as well as VM status and capacity consumption. This information is collected by executing a set of static probes provided by OpenNebula. The information is sent according to the following process: each host periodically sends monitoring data to the front-end which collects it and processes it in a dedicated module. This model is highly scalable and its limit (in terms of number of VMs monitored per second) is bounded to the performance of the server running on and the database server. OpenNebula also brings resource quota management to allocate, track and limit resource utilization/consumption. https://opennebula.org/

Name	Status	Definition
Partner Management Service		Shares the functionalities of i) managing service consumption by partners (i.e. consumers) and ii) controlling service consumption by partners (i.e. consumers) in order to ensure scalability and availability. It enables the management of IES' interoperability agreements Source: ISA2 – EIA Action The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *OpenNebula* The OpenNebula monitoring subsystem gathers information relative to the hosts and the virtual machines, such as the host status, basic performance indicators, as well as VM status and capacity consumption. This information is collected by executing a set of static probes provided by OpenNebula. The information is sent according to the following process: each host periodically sends monitoring data to the front-end which collects it and processes it in a dedicated module. This model is highly scalable and its limit (in terms of number of VMs monitored per second) is bounded to the performance of the server running on and the database server. OpenNebula also brings resource quota management to allocate, track and limit resource utilization/consumption. https://opennebula.org/
Private Hosting Facility		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 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	Status	Definition
Private Network		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 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
Public Hosting Facility		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 No example is provided.

Public Network		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 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

Record Management Component		Implements the functionalities responsible for the efficient and systematic control of the i) creation, ii) receipt, iii) maintenance, iv) use and v) disposal of records, including processes for capturing and maintaining evidence of, and information about, business activities and transactions in the form of records.
		ISO 15489-1:2001 defines records as "information created, received, and maintained as evidence and information by an organization or person, in pursuance of legal obligations or in the transaction of business".
		
		Based on ISO 15489-1:2016
		https://www.iso.org/standard/62542.html
		
		The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB):
		
		OpenKM
		OpenKM is an Enterprise Document and Record Management System that has support for records management software. The file plan of OpenKM records management software specifies how records are to be organized once they have been created or received, provides a roadmap to the records created and maintained by an organizational unit, and facilitates dispositioning of the records. The file plan is created by detailing the file series of the records in your organizational unit, as well as information about how they are managed and by whom.
		Features:
		• File plan
		  o The file plan of OpenKM document management describes every type of records in the organization, the location where they should be stored, the rules applying to them, the retention schedule and timeline, manner of their disposition, and the person(s) responsible for their management.
		• Inheritance
		  o OpenKM allows inheritance between file series.
		• Security
		  o Set security by file series of the record.
		• Record manager:
		  o Create your own dynamic logic for each file series, for example, based on metadata values, the file series can be promoted as "record" status.
		• Search:
		  o Define common searches based on file series of record.
		• Classification of business activities:
		  o Classification system reflect the business of the organization from which they derive and are normally based on an analysis of the organization's business activities. The system can be used to support a variety of records management processes.
		• Catalogue:
		  o Create dynamic destinations based on record values.

Name	Status	Definition
		o Dynamic wizard requiring the user for metadata values based on file series of the record (control of the creation). • Disposition: o Set retention schedule and period. o Create dynamic disposition based on record values. https://www.openkm.com/ *ePHOENIX* epoline® PHOENIX (ePHOENIX) is a document and dossier management system designed to support the processes involved in the handling of Intellectual Property (IP)-related documents. The system, which was developed by the European Patent Office, allows IP offices to manage application dossiers in electronic form. It provides a means for scanning all incoming documents and a user interface to display the resulting electronic dossier on screen, as well as supporting the printing and distribution of work. ePHOENIX replaces physical paper files, thus removing the need for space-consuming archives and time-consuming transportation and management. Representing a further step towards the paperless office, the system improves efficiency and cost-effectiveness throughout the life-cycle of IP documents. ePHOENIX is highly configurable. It provides tools and interfaces which allow existing IT systems, organisational structures, working procedures and conventions to be retained. This means minimal development costs, minimal risk and maximum user acceptance. Furthermore, it is a flexible Java-based system that can operate in a wide variety of IT architectures. Thanks to its customisation possibilities, ePHOENIX can also be used to handle non-IP documents. http://ephx.sourceforge.net/summary.html

Name	Status	Definition
Record Management Service		Shares the functionalities responsible for the efficient and systematic control of the i) creation, ii) receipt, iii) maintenance, iv) use and v) disposal of records, including processes for capturing and maintaining evidence of, and information about, business activities and transactions in the form of records. ISO 15489-1:2001 defines records as "information created, received, and maintained as evidence and information by an organization or person, in pursuance of legal obligations or in the transaction of business". Based on ISO 15489-1:2016 https://www.iso.org/standard/62542.html The following implementation is an example on how this specific Architecture Building Block (ABB) can be instantiated as a Solution Building Block (SBB): *Council of Europe - Documents, Records and Archives* You will find on the Documents, Records and Archives website information about the Council of Europe's documents, records and archives, how they are organised and how to access them, whatever their format (audio-visual, electronic, paper or web archives): • information about the Council of Europe's documents, records and archives, how they are organised and how to access them, whatever their format (audio-visual, electronic, paper or web archives) • information on the rules and procedures governing access • search tools and other professional tools • a timeline with a selection of themes related to the construction of the Council of Europe and the personalities involved (being developed) • an information management guidance page https://www.coe.int/en/web/documents-records-archives-information/home *Barracuda Cloud Archiving Service* Barracuda Cloud Archiving Service permits to protect email for On-Premises, Cloud and Hybrid Environments. It provides cloud-based archiving of email, enabling organizations to meet demanding compliance requirements and address eDiscovery requests effectively and easily. Ideal for organizations using cloud-based email services like Office 365, Barracuda stores archived email in a separate, secure repository for as long as needed without risk of corruption or deletion. With Barracuda, compliance is easy to demonstrate, and end users can have read only access to search and retrieve archived email at any time from any device. https://www.barracuda.com/products/cloudarchivingservice

Name	Status	Definition
Registered Electronic Delivery Service		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 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	Status	Definition
Service Registration Service		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* 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	Status	Definition
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. 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* 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/
Technical Interoperability Specification		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 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	Status	Definition
Trust Registry Component		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* 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. 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	Status	Definition
Trust Registry Service		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* 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	Status	Definition
Trust Service Provisioning Component		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 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	Status	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	Status	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	Status	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	Status	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	Status	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 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.

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	Status	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	Status	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	Status	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	Status	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	Status	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	Status	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.