Delivered in the context of ABC-III-000442

An introduction to the European Interoperability Reference Architecture (EIRA©) v2.0.0

Change Control

Modification	Details
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 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

Modification	Details
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 application of the EIRA©.	
Additional section (3.3.2) introducing the Cartography Tool.	
Improvement of the Key Concepts of the EIRA© (Section 3.1)	Provided more information to define what a reference architecture is in the context of the EIRA© with a link to Enterprise Architecture.
Updated EIRA© meta model	EIRA© meta model updated in Key Concepts in EIRA© (Section 3.1)
Version 1.0.0	
Initial version	

Disclaimer:

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1 INTRODUCTION

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.

[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:

- **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;
- ***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;

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

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

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

2.2 Characteristics and Tools

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

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

1. **Common terminology to achieve coordination:** It provides a common understanding of the most salient Architecture Building Blocks needed to build interoperable public services.
2. **Reference architecture for delivering digital public services:** It offers a framework to categorise (re)usable Solution Building Blocks (SBBs) of an eGovernment solution. It allows portfolio managers to rationalise, manage and document their portfolio of solutions.
3. **Technology- and product-neutral and a service-oriented architecture (SOA) style**: The EIRA© adopts a service-oriented architecture style and promotes ArchiMate® as a modelling notation. In fact, the EIRA© ABBs can be seen as an extension of the model concepts in ArchiMate®, as explained in Section 3.1.
4. **Alignment with EIF and TOGAF:** The EIRA© is aligned with the New European Interoperability Framework (EIF) (2) and complies with the context given in the European Interoperability Framework – Implementation Strategy (EIF-IS) (4). The views of the EIRA© correspond to the interoperability levels in the EIF: legal, organisational, semantic and technical interoperability which are already anchored in the National Interoperability Frameworks (NIFs) of the Member States. The EIRA© provides an additional view that lists the principles that are outlined in the new EIF. Within TOGAF® and the Enterprise Architecture Continuum, EIRA© focuses on the architecture continuum. It re-uses terminology and paradigms from TOGAF® such as architecture patterns, building blocks and views. This not only assures a high level of quality but also allows architects to easily understand EIRA© and relate it to existing work.

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

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

[4] http://archimatetool.com/

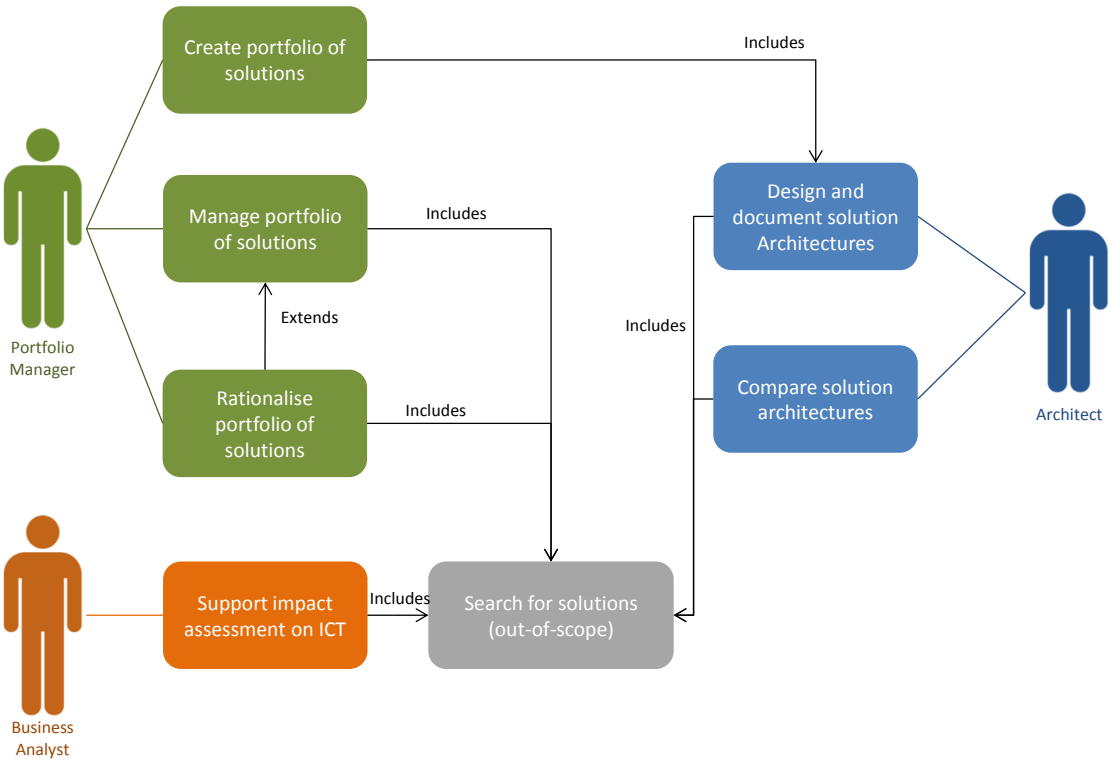


Figure 1 - Target users and their use cases within the EIRA©

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.

[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:

- 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

De 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 if 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
  - discovery of systems with identical or overlapping functionalities inside the organisation which might be phased out and
  - 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

[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.

EIRA EUROPEAN INTEROPERABILITY REFERENCE ARCHITECTURE ● CarTool [EIRA] CARTOGRAPHY TOOL ●	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.

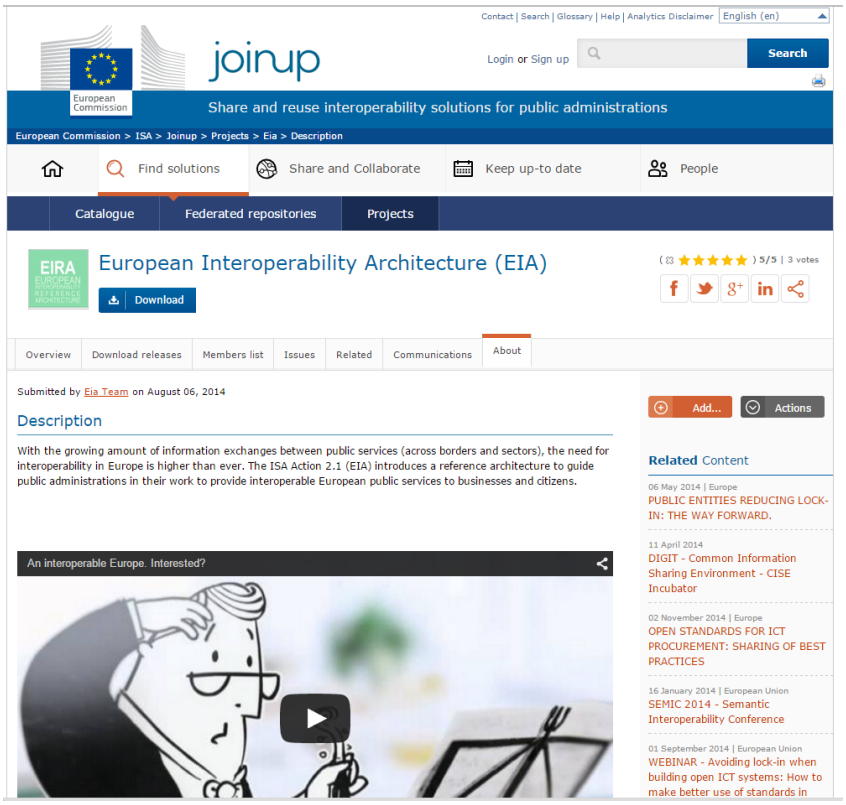


Figure 2 – Screenshot of the EIRA community on Joinup

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).

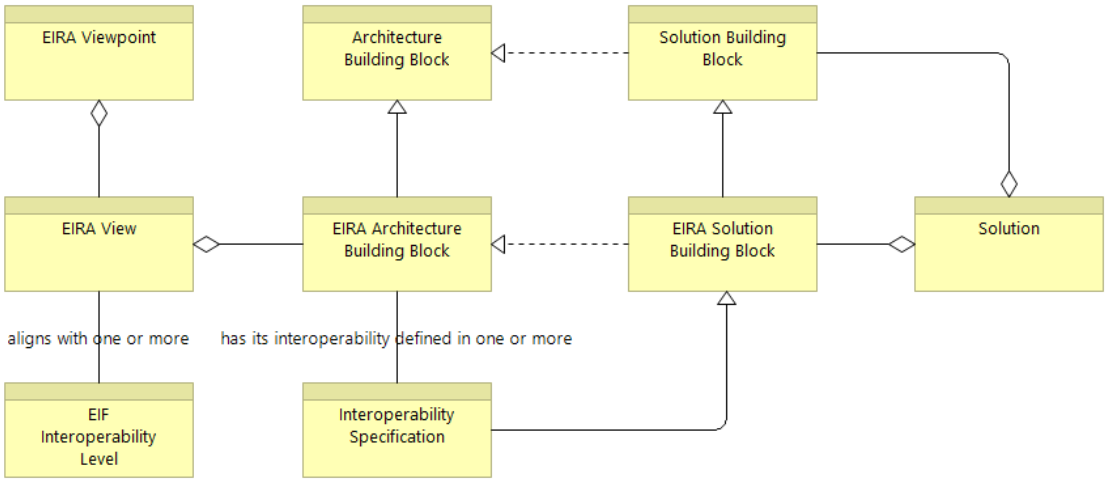


Figure 3 – Key concepts in EIRA©

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.

3.2 ArchiMate® notation

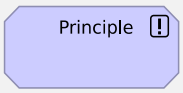
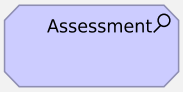
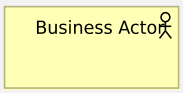
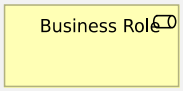
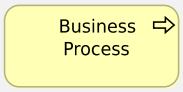
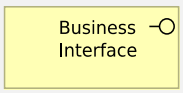
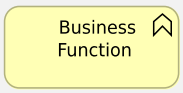
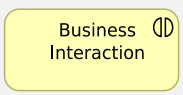
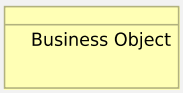
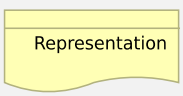
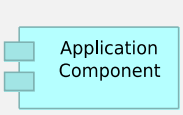
The EIRA© uses the ArchiMate® language as a notation. In fact, the EIRA© can be considered as an *extension* of the ArchiMate® language, using two of the extension mechanisms foreseen by ArchiMate® (1): specialisation (stereotyping) and attributes. This section first provides an overview of the ArchiMate® 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©.

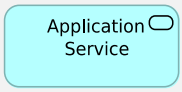
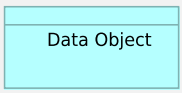
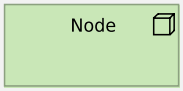
[8] See also the definition of an enterprise in (5): "TOGAF defines 'enterprise' as any collection of organizations that has a common set of goals. For example, an enterprise could be a government agency, a whole corporation, a division of a corporation, a single department, or a chain of geographically distant organizations linked together by common ownership".

3.2.1 ArchiMate® model concepts

The EIRA© uses the following ArchiMate® model concepts (1):

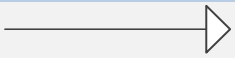
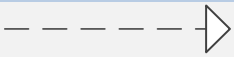
Table 3-1 – ArchiMate® model concepts used in EIRA© (1)

Model concept	Definition
	A *principle* represents a qualitative statement of intent that should be met by the architecture.
	A *goal* represents a high-level statement of intent, direction, or desired end state for an organization and its stakeholders
	An *assessment* is defined as the outcome of some analysis of some driver.
	A *business actor* is a business entity that is capable of performing behavior.
	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.
	A *business process* represents a sequence of business behaviors that achieves a specific outcome such as a defined set of products or business services.
	A *business interface* is a point of access where a business service is made available to the environment.
	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.
	A *business interaction* is a unit of collective business behavior performed by (a collaboration of) two or more business roles.
	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.
	A *business service* represents an explicitly defined exposed business behavior.
	A *business object* represents a concept used within a particular business domain.
	A *representation* represents a perceptible form of the information carried by a business object.
	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
	An *application interface* represents a point of access where application services are made available to a user, another application component, or a node.
	An *application service* represents an explicitly defined exposed application behavior.
	A *data object* represents data structured for automated processing.
	A *technology service* represents an explicitly defined exposed technology behavior.
	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.
	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'.

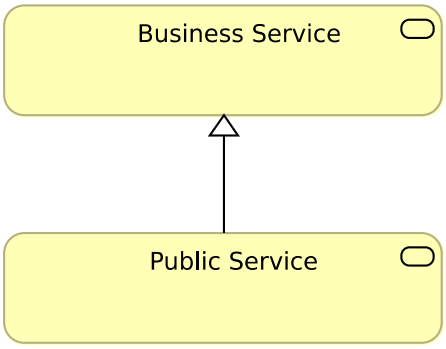


Figure 5 – Specialisation in the EIRA© metamodel

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>>.

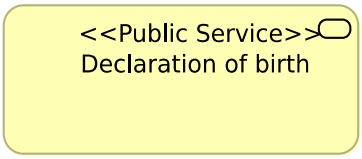


Figure 6 – Example: stereotyping of Solution Building Blocks

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:

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

[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.

[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.

[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 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.

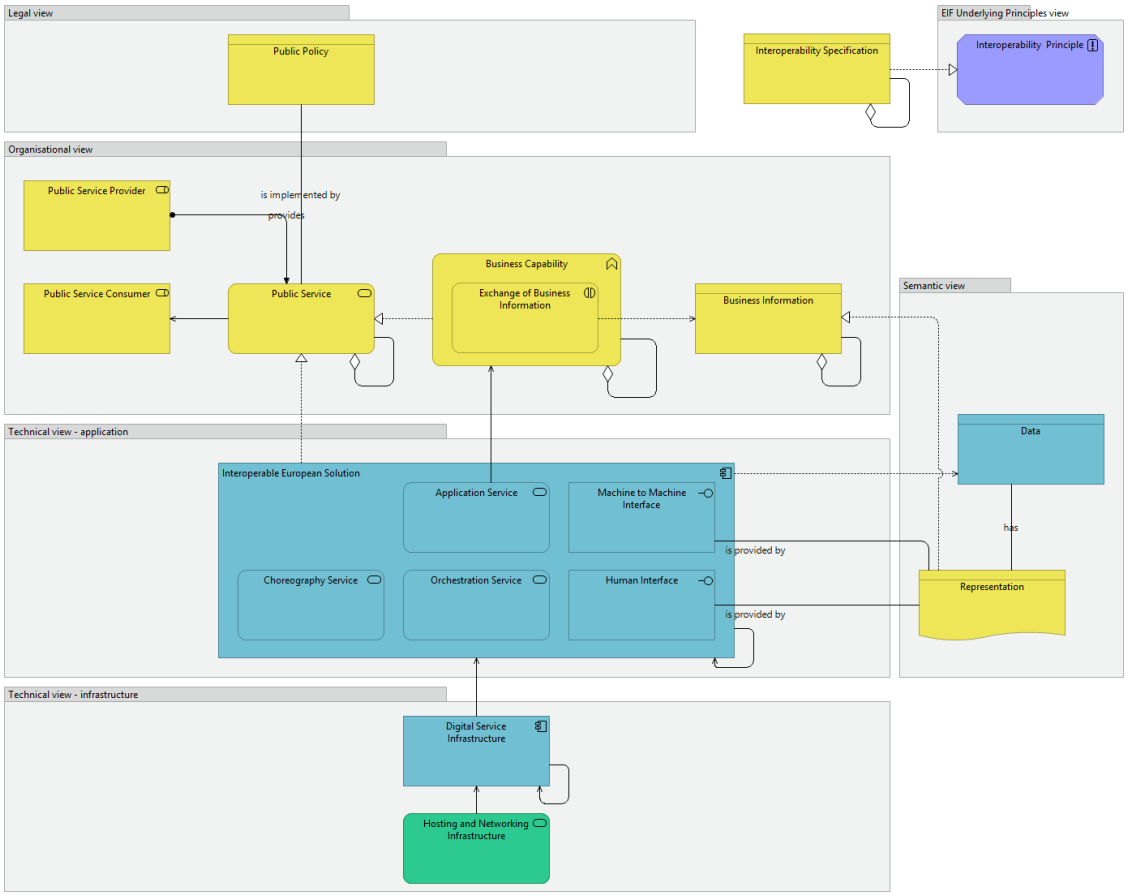


Figure 7 – EIRA© high-level viewpoint (3)

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.

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

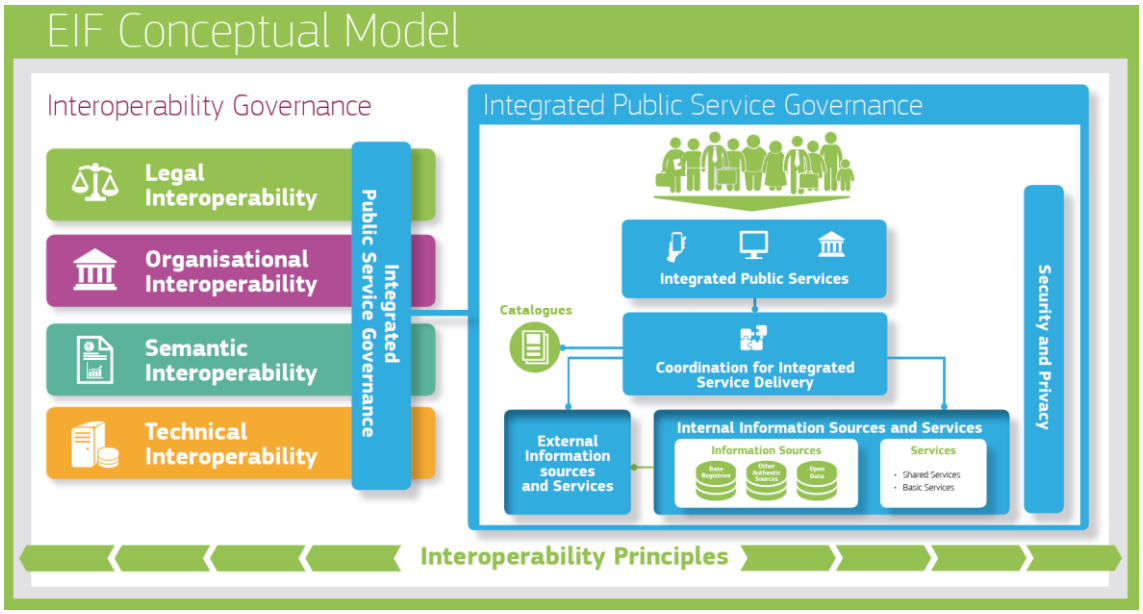


Figure 8 - EIF conceptual model for public services (2)

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.

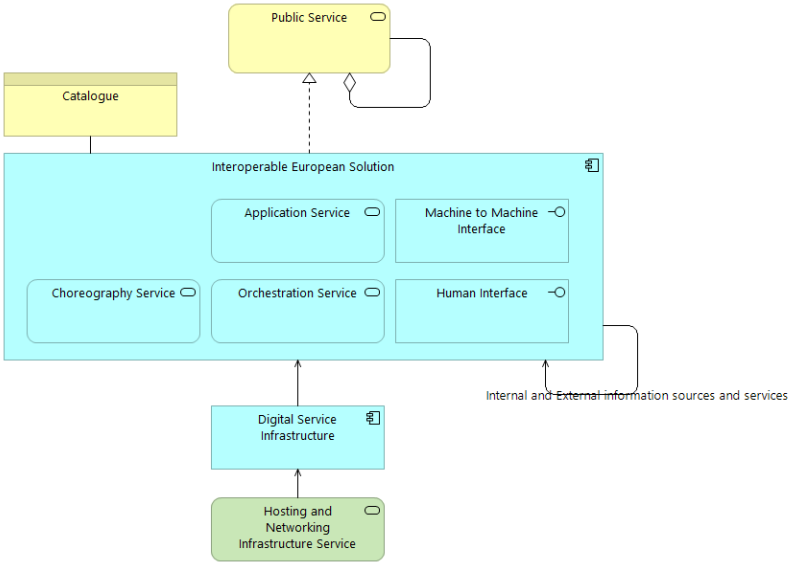


Figure 9 – Conceptual model of a reusable Interoperable European Solution (13)

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.

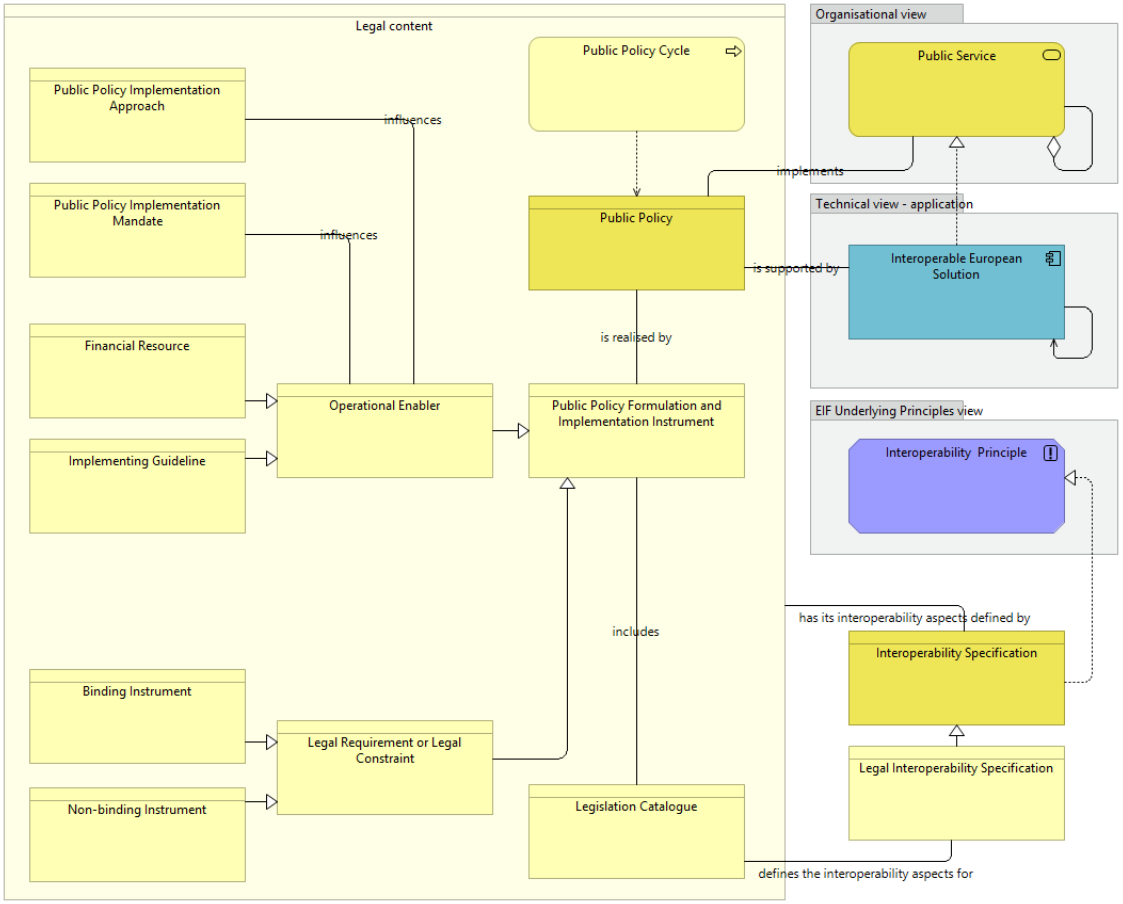


Figure 10 – Legal view of the EIRA© (3)

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]).

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.

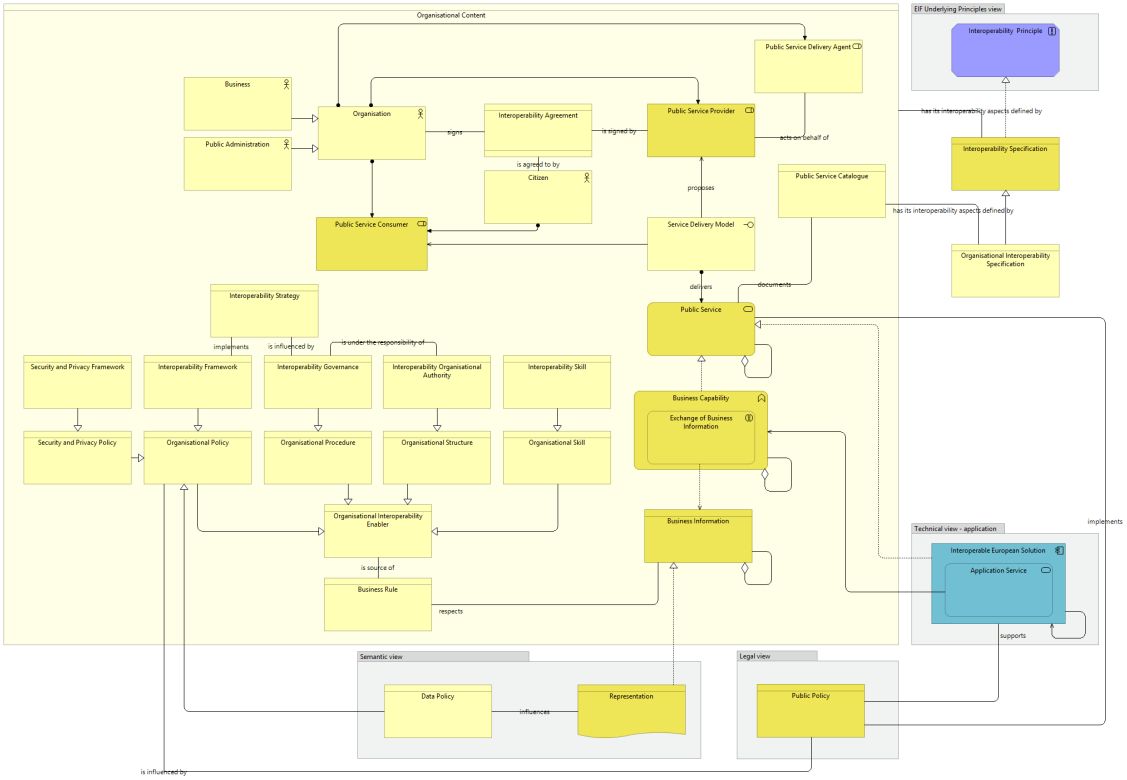


Figure 11 – Organisational view of the EIRA© [4]

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

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

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.

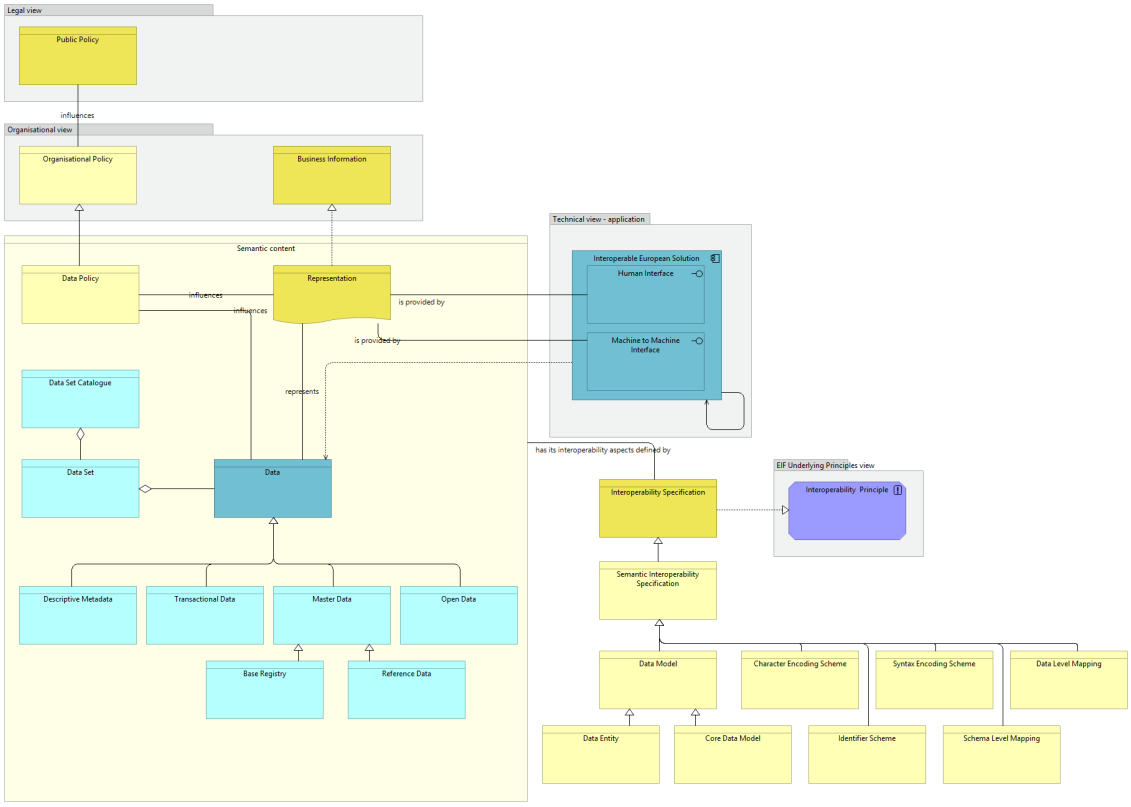


Figure 12 - Semantic view of the EIRA© (3)

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], [Reference Data], [Open Data], [Descriptive Metadata] and [Base are specialisations of [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.

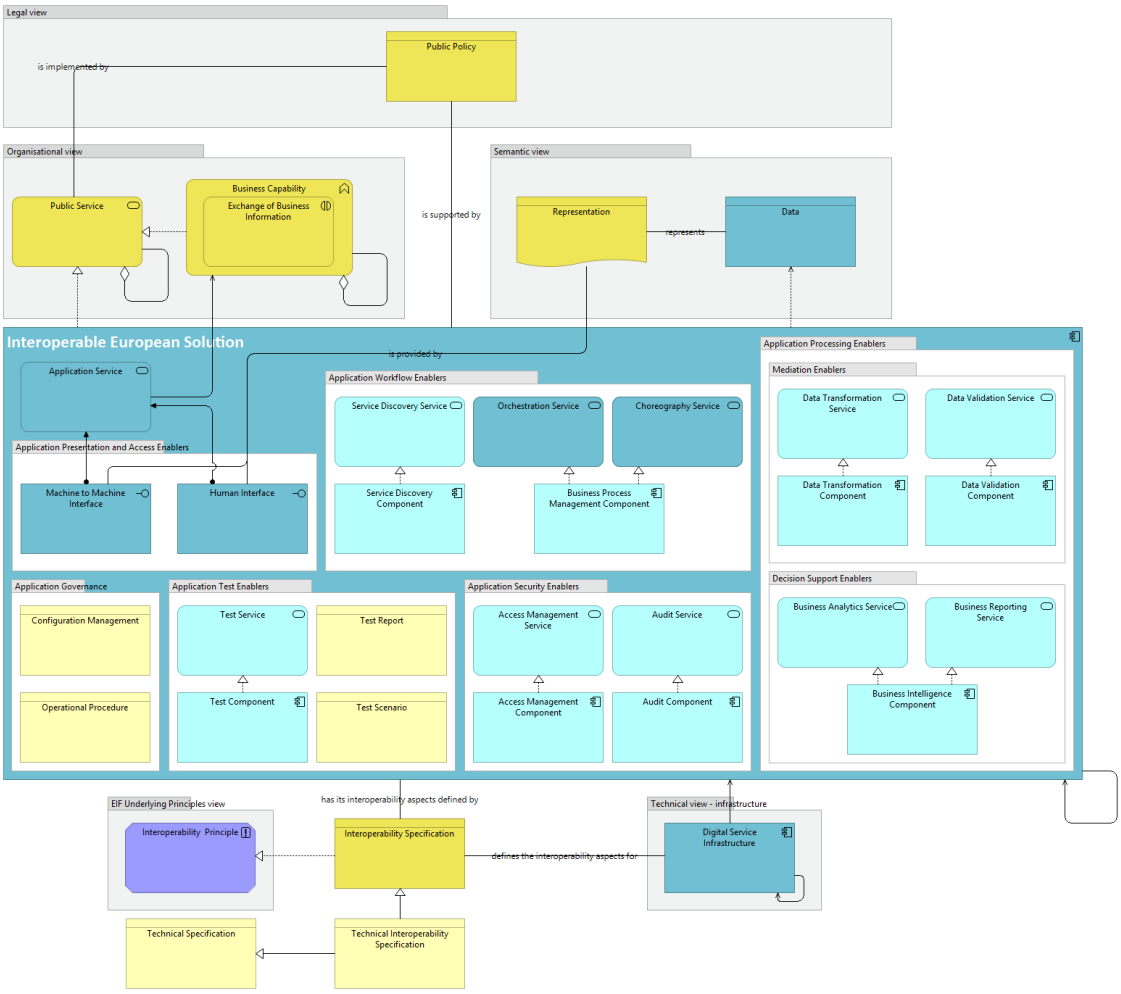


Figure 13 - Technical - application view of the EIRA© (3)

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.

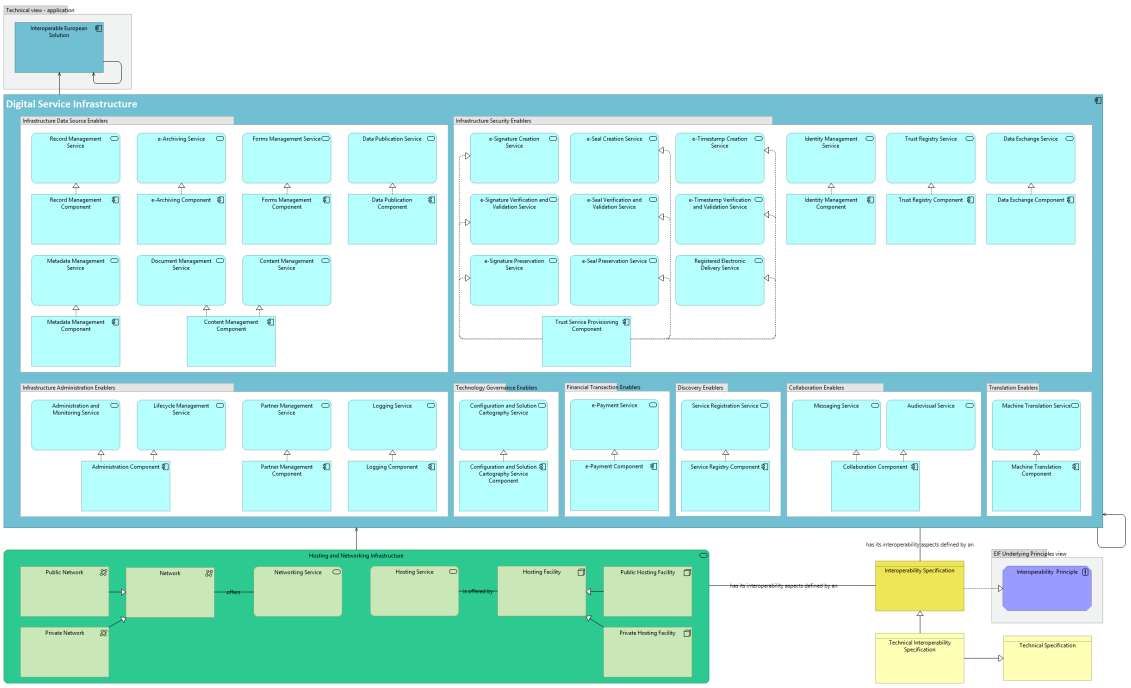


Figure 14 - Technical - infrastructure view of the EIRA© (3)

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).

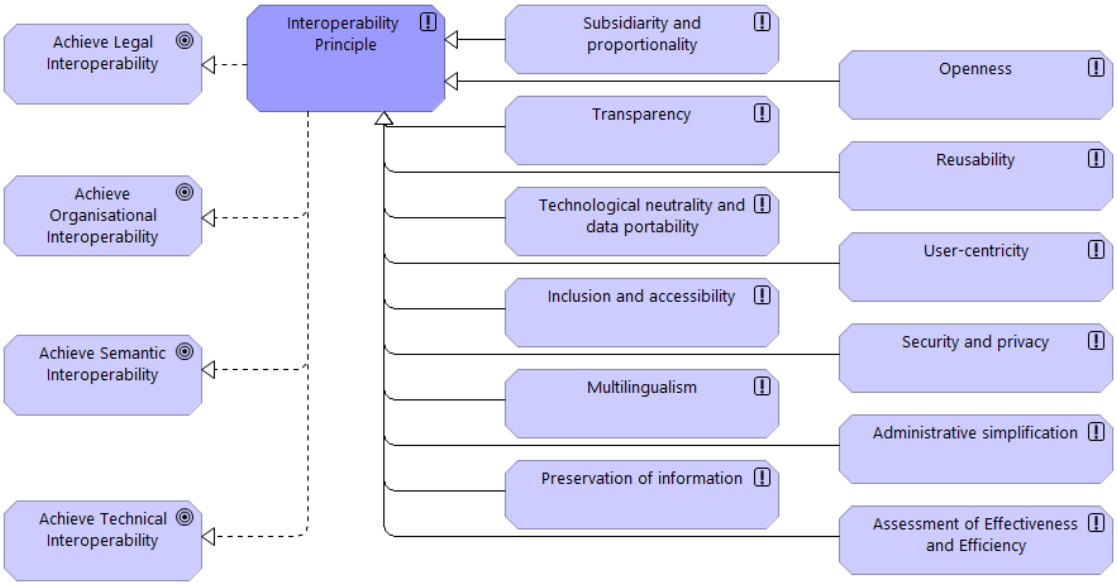


Figure 15 - EIF Underlying Principles view

Narrative: The twelve interoperability principles of the New EIF ([Subsidiarity and proportionality], [Openness], [Transparency], [Transparency], [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.

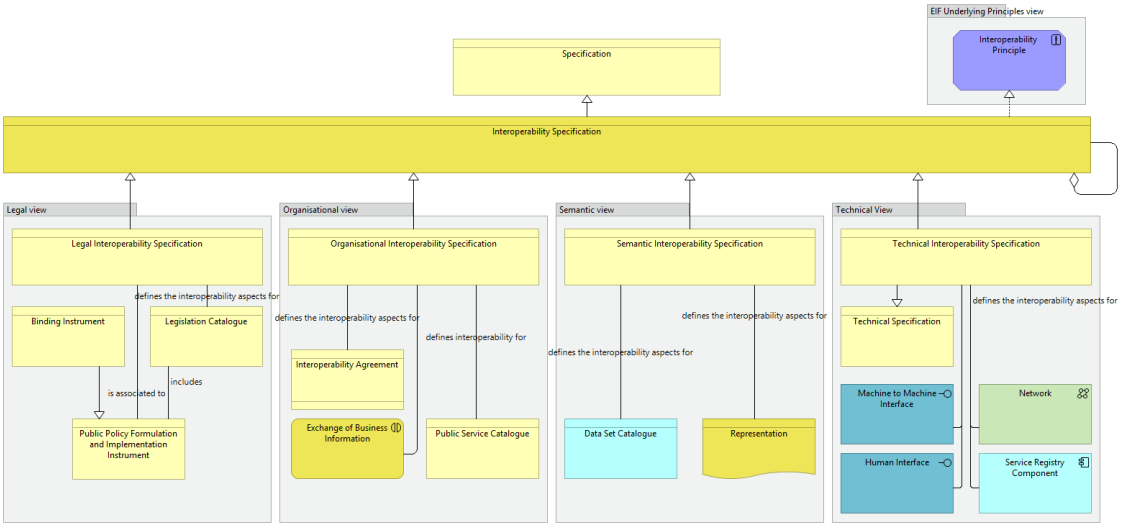


Figure 16 - Interoperability Specification viewpoint

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.

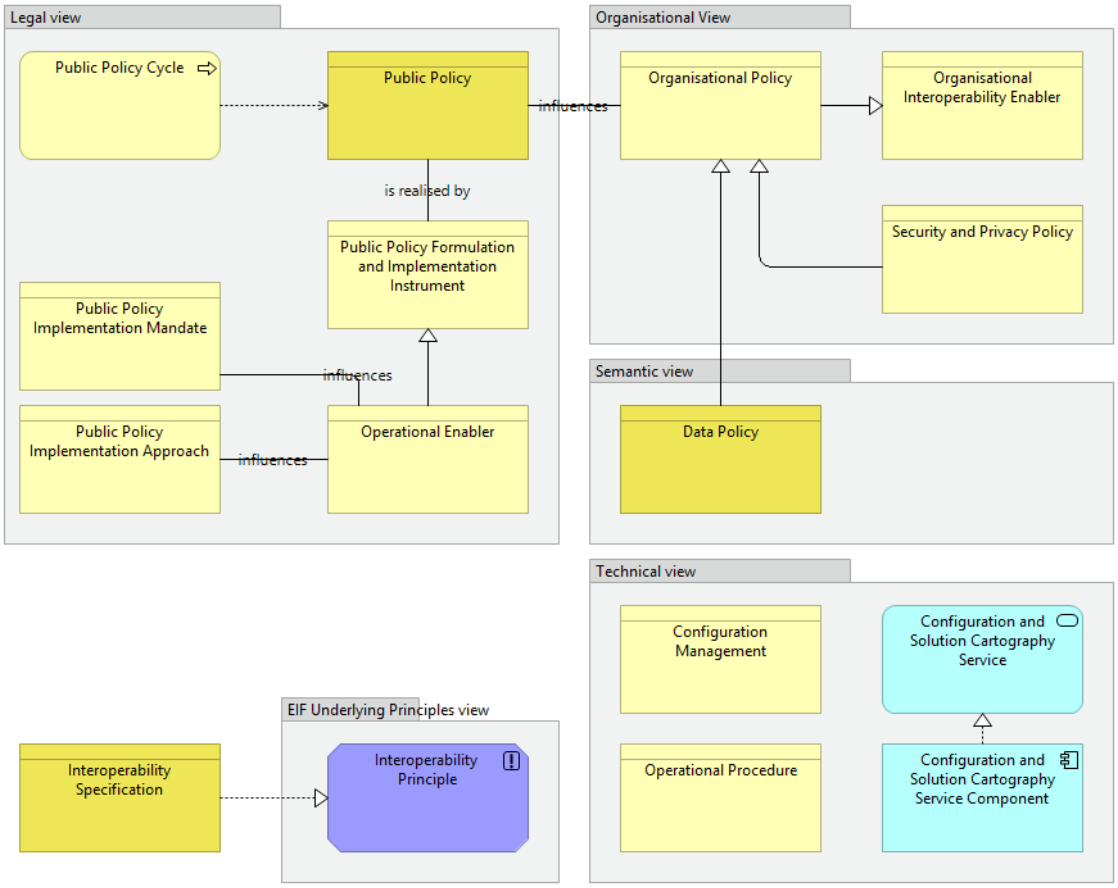


Figure 17 - Interoperability Governance viewpoint

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 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 organization.
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

[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.

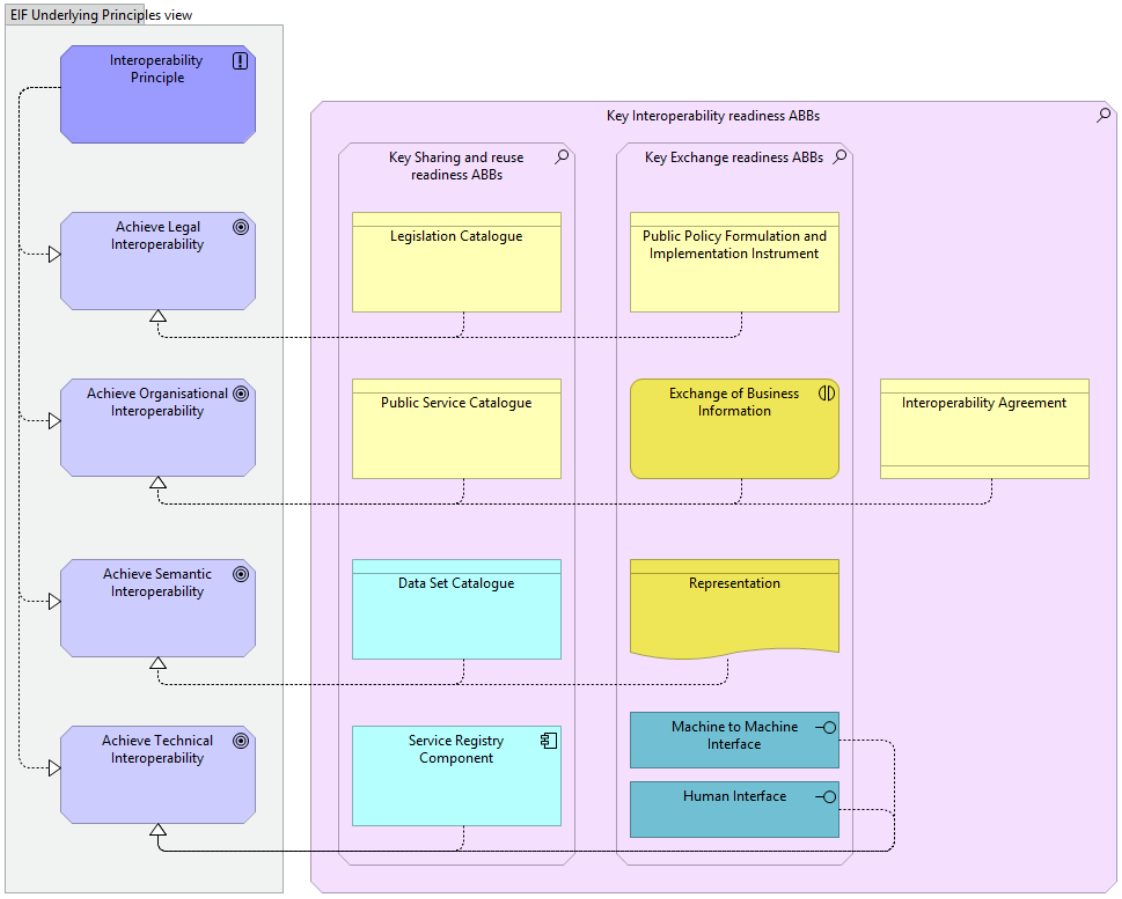


Figure 18 - Integrated Public Service Governance viewpoint

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 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 Registries] 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.

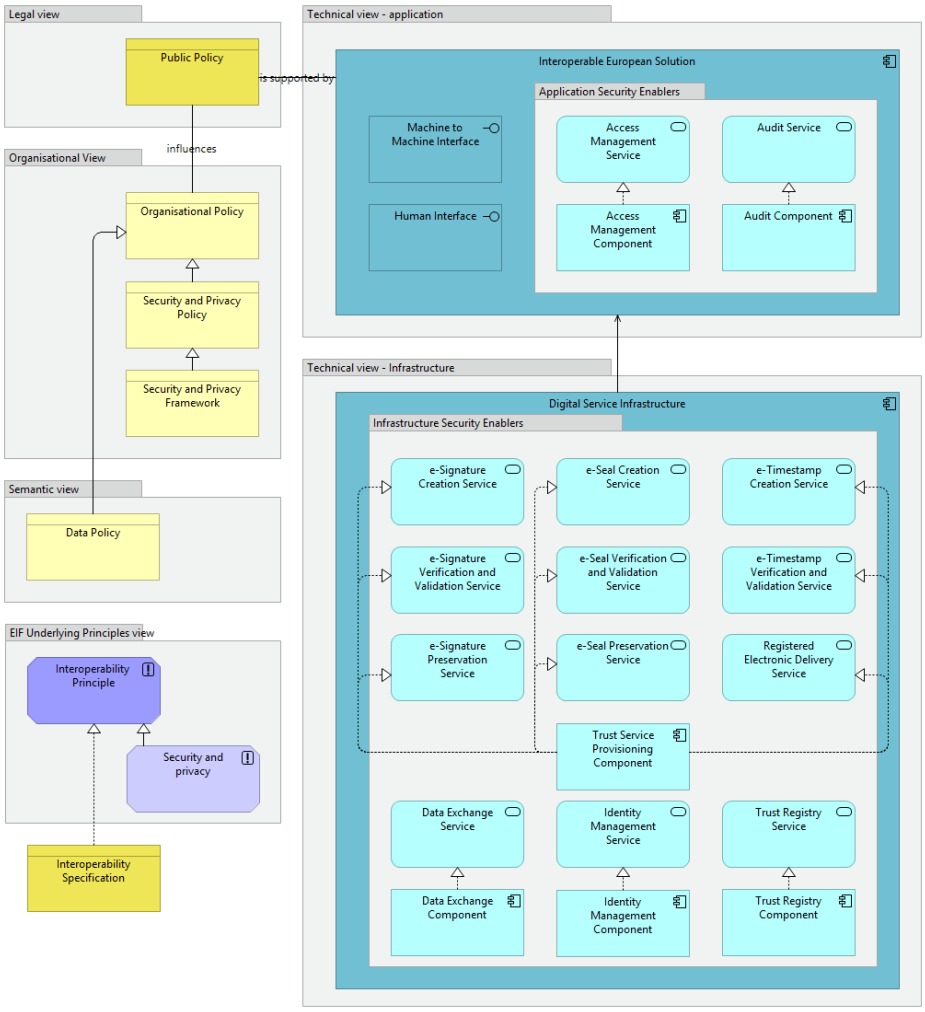


Figure 19 - Interoperability Security and Privacy viewpoint

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 that 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], as well as the [Data Exchange Service] realised by the [Data Exchange Component], the [Identity Management Service] realised by the [Identity Management Component] and the [Trust Registry Service] realised by the [Trust Registry Component].
5. The selected Architecture Building Block of the EIF Underlying Principles view show that [Interoperability Specifications] realise [Interoperability Principles], the general intended properties used to achieve interoperability, of which the [Security and Privacy Principle] is a specialisation. The interoperability Specifications can be used to define the interoperability aspects for any of the Architecture Building Blocks.

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.
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.

Term / acronym	Definition
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.
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.

Term / acronym	Definition
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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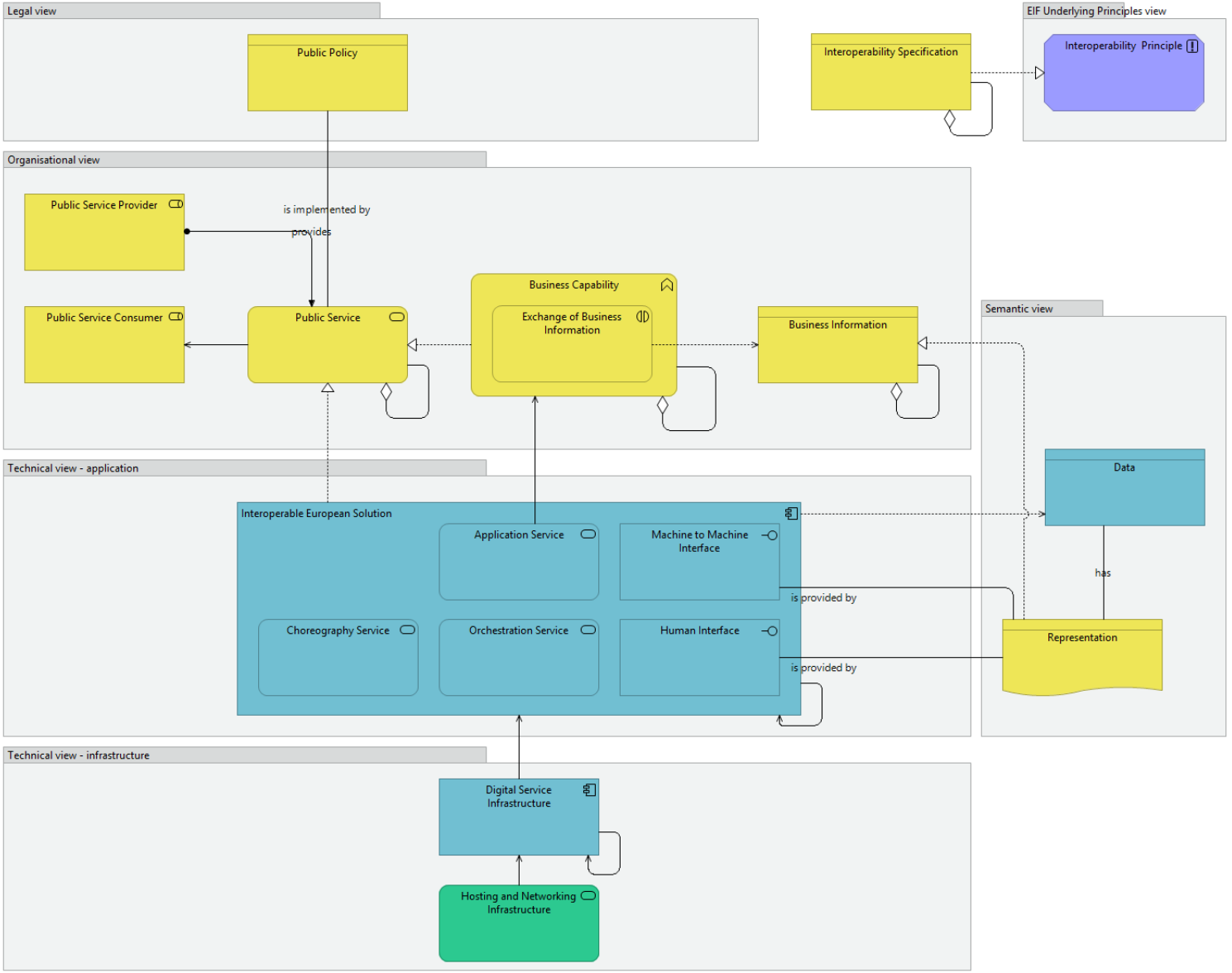
8 APPENDIX EIRA© VIEWS, VIEWPOINTS AND ABB DEFINITIONS

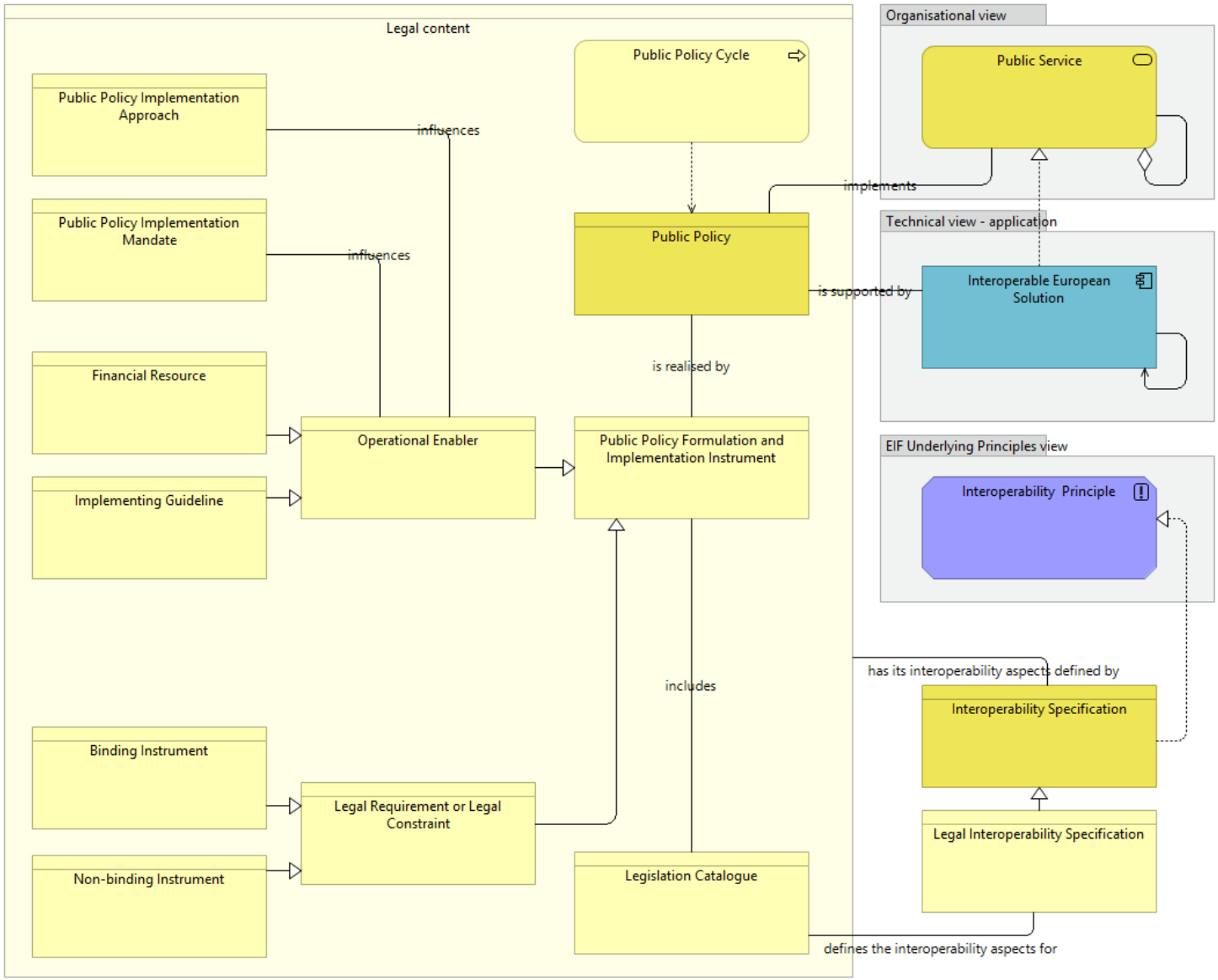
This appendix contains the EIRA© views, viewpoints and ABB definitions.

8.1 Views and Viewpoints

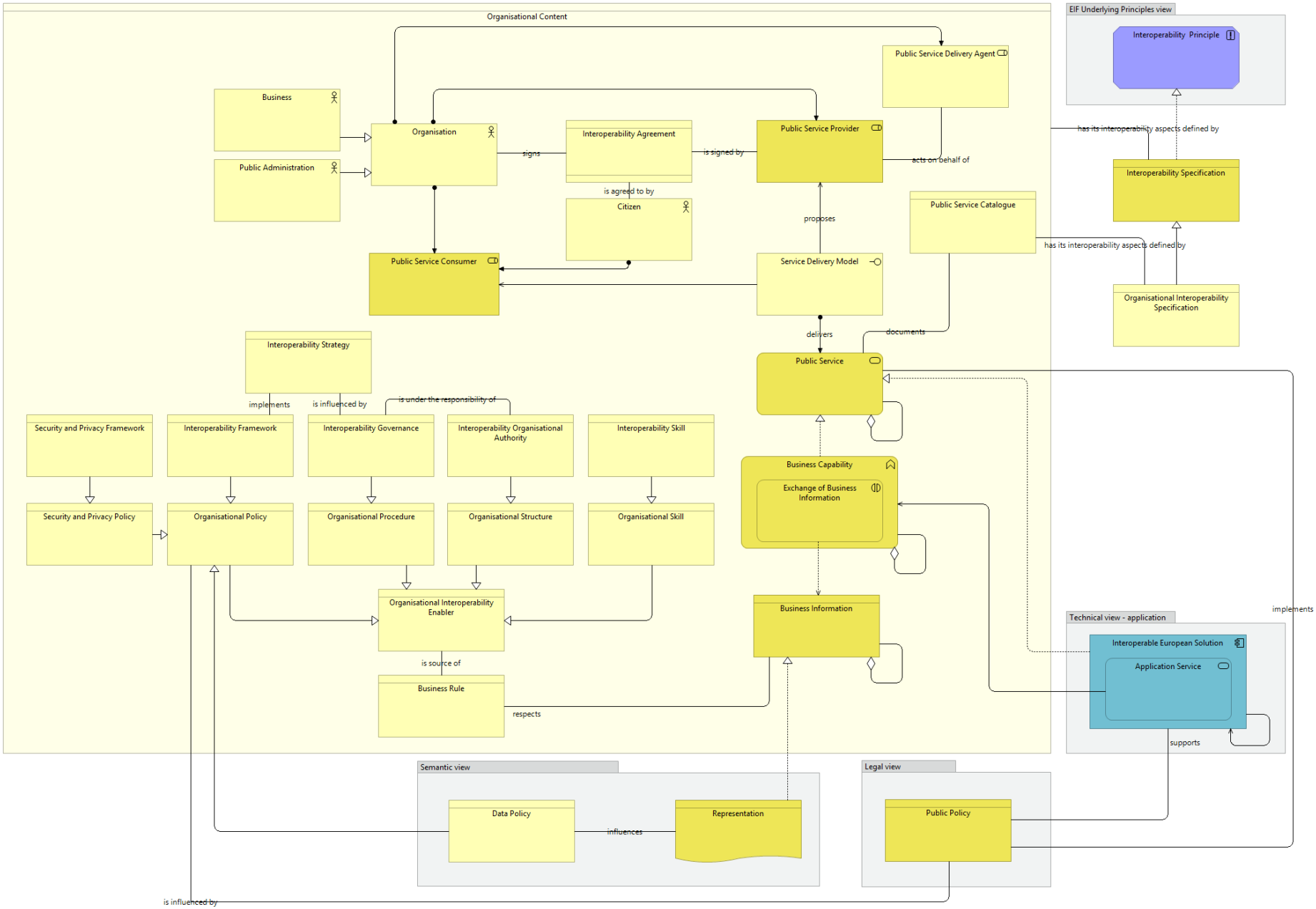
EIRA© high-level viewpoint



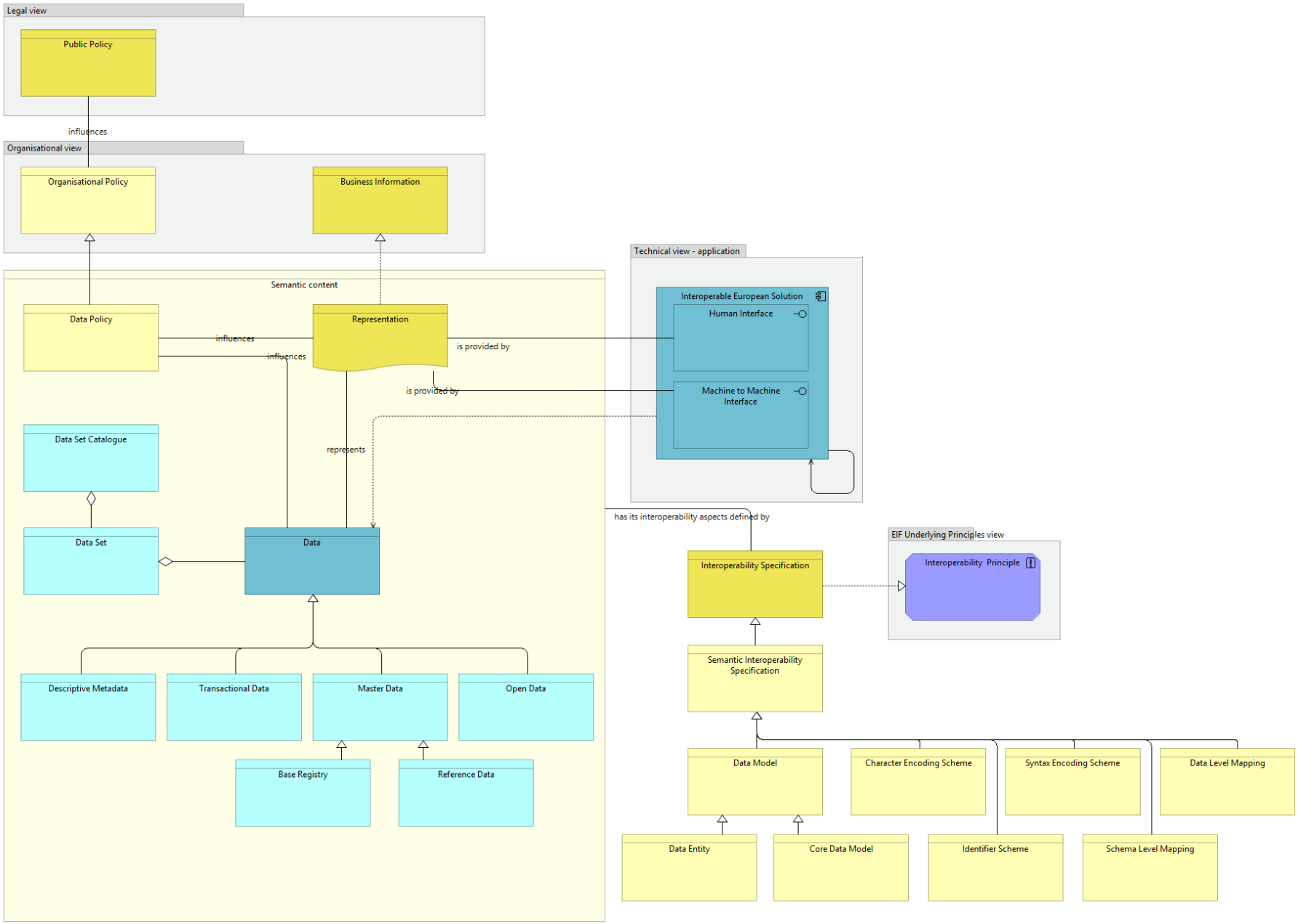
Legal view


Legal content
Public Policy Cycle
Public Policy Implementation Approach
influences
Public Policy Implementation Mandate
influences
Public Policy
is realised by
Financial Resource
Operational Enabler
Public Policy Formulation and Implementation Instrument
Implementing Guideline
includes
Binding Instrument
Legal Requirement or Legal Constraint
Non-binding Instrument
Legislation Catalogue
Organisational view
Public Service
implements
Technical view - application
is supported by
Interoperable European Solution
EIF Underlying Principles view
Interoperability Principle
has its interoperability aspects defined by
Interoperability Specification
Legal Interoperability Specification
defines the interoperability aspects for

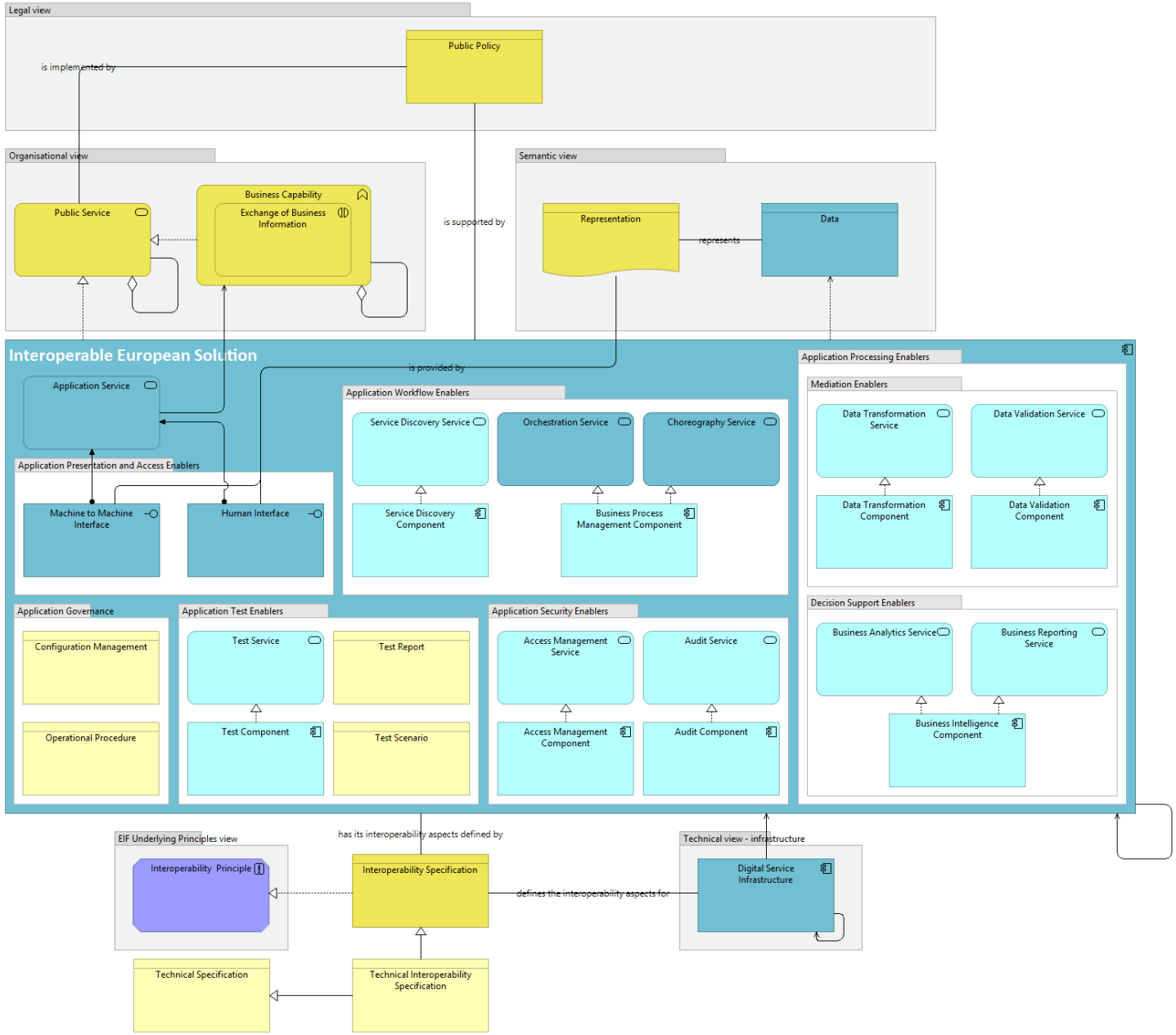
Organisational view



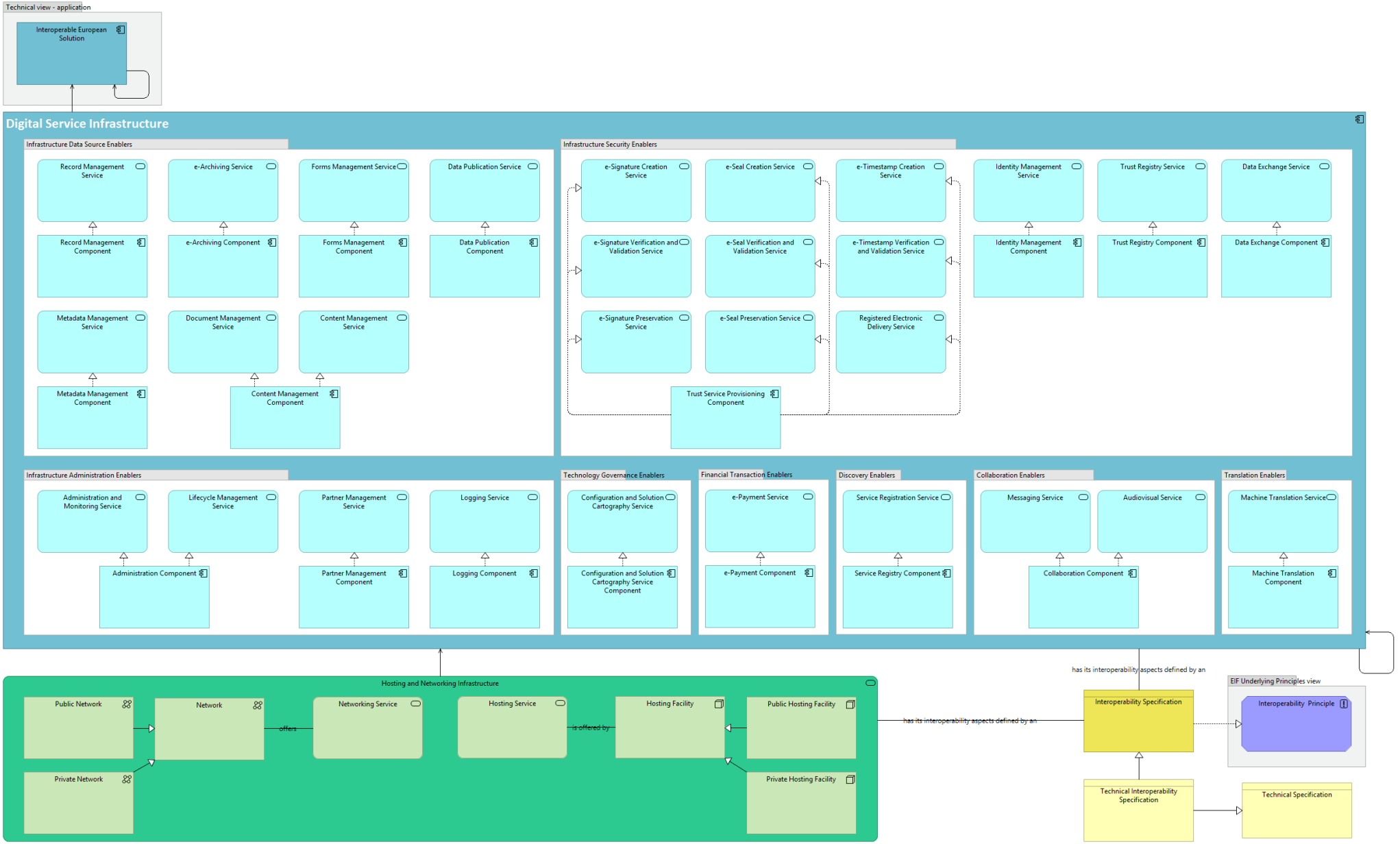
Semantic view



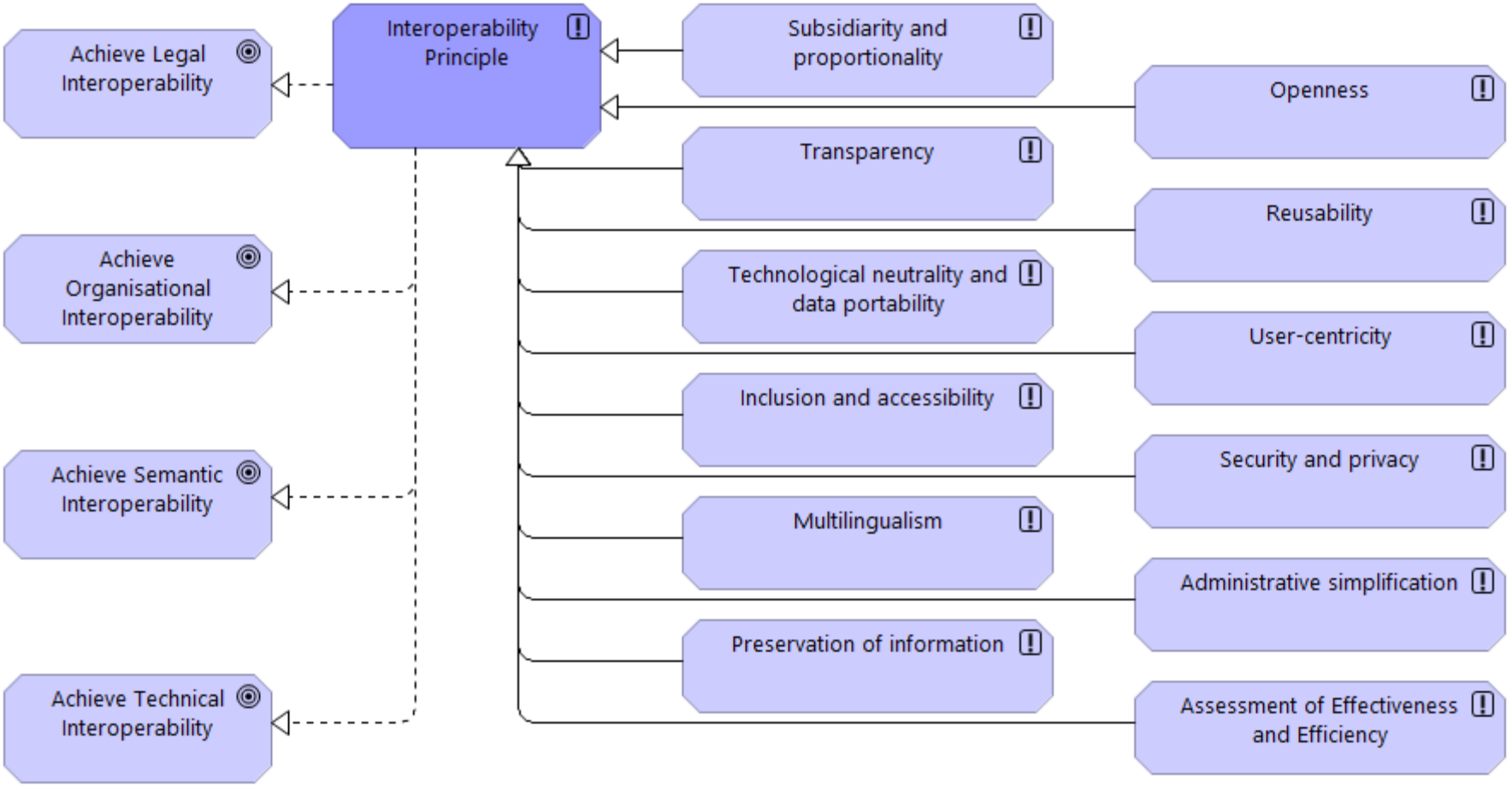
Technical – application view



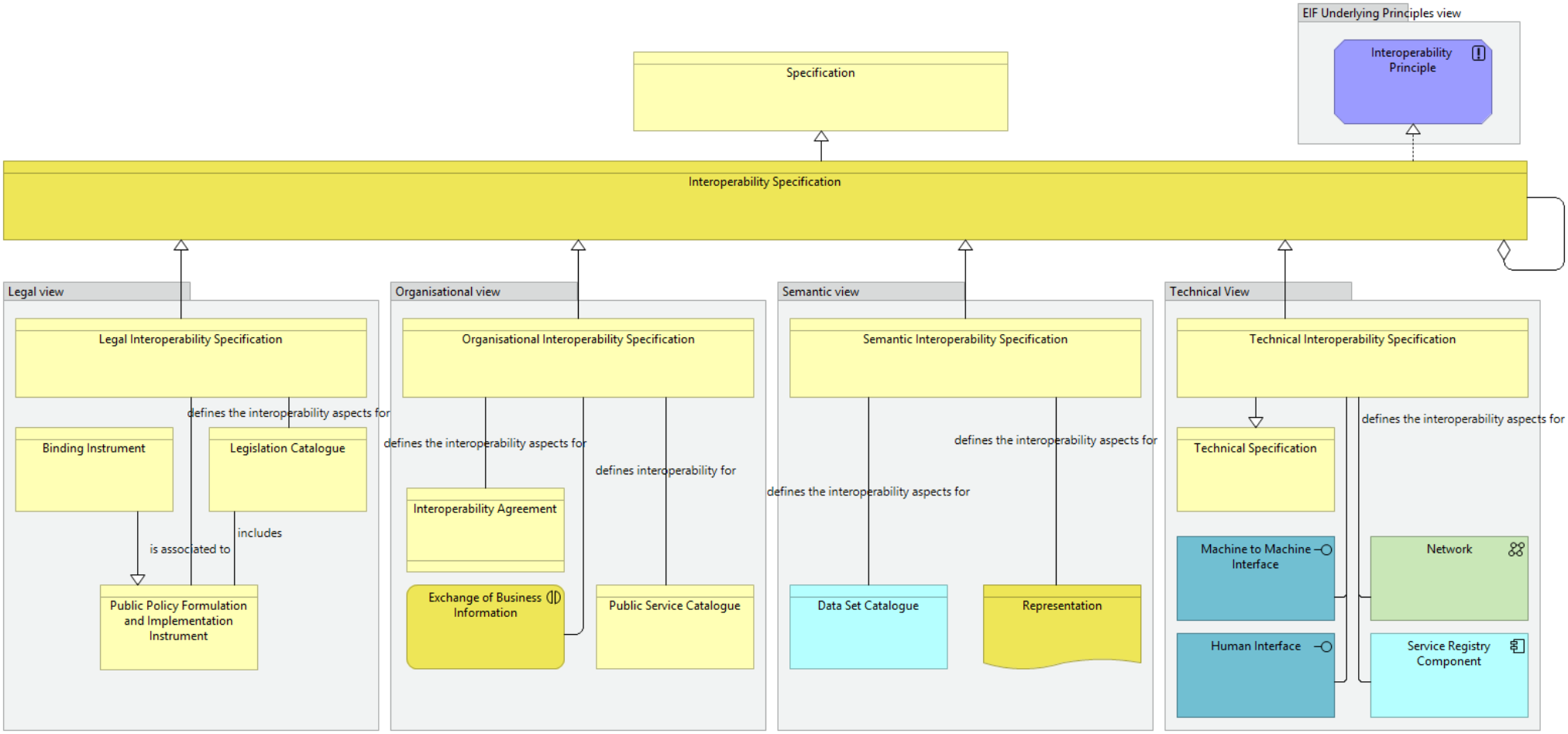
Technical – infrastructure view



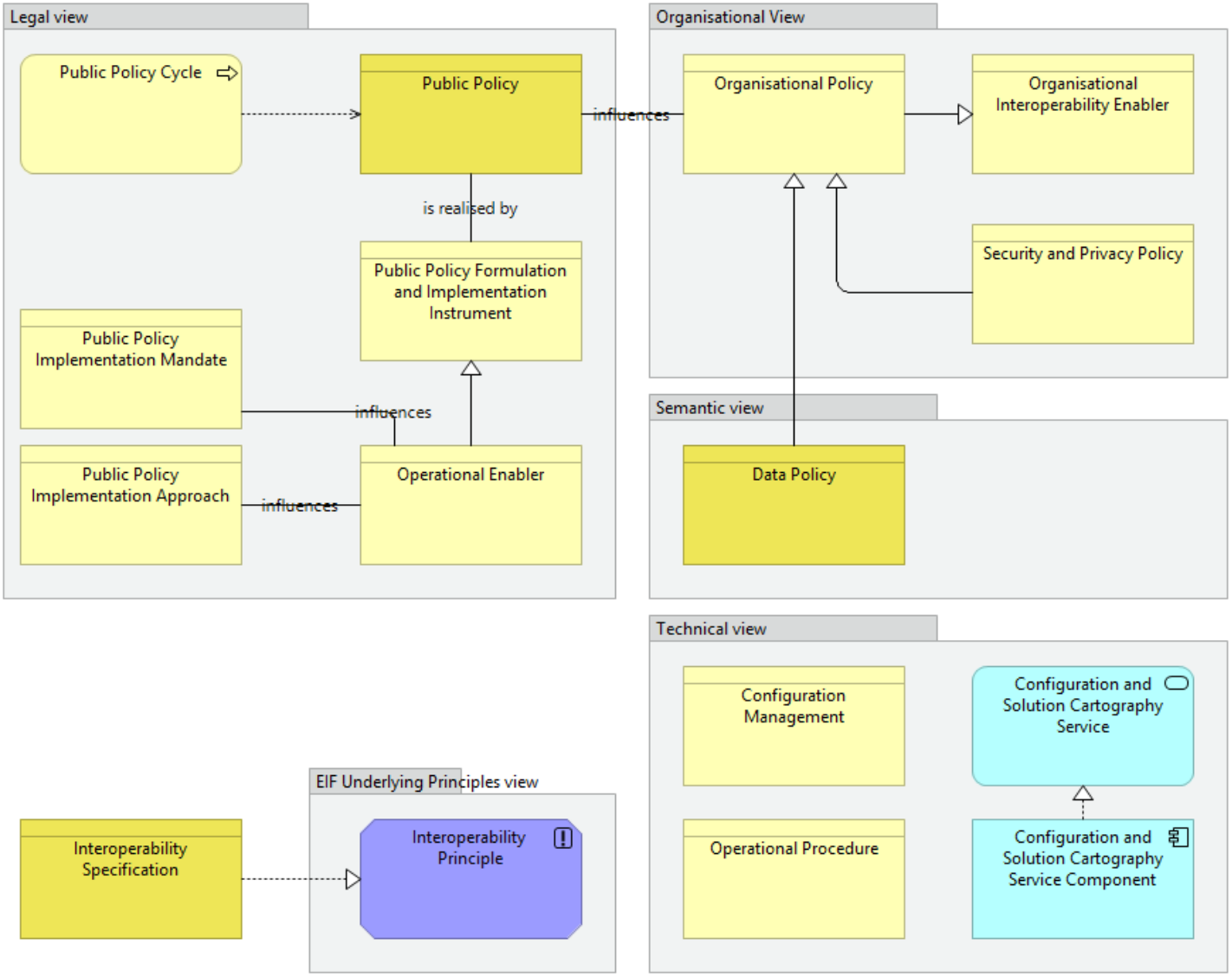
European Interoperability Framework underlying principles view



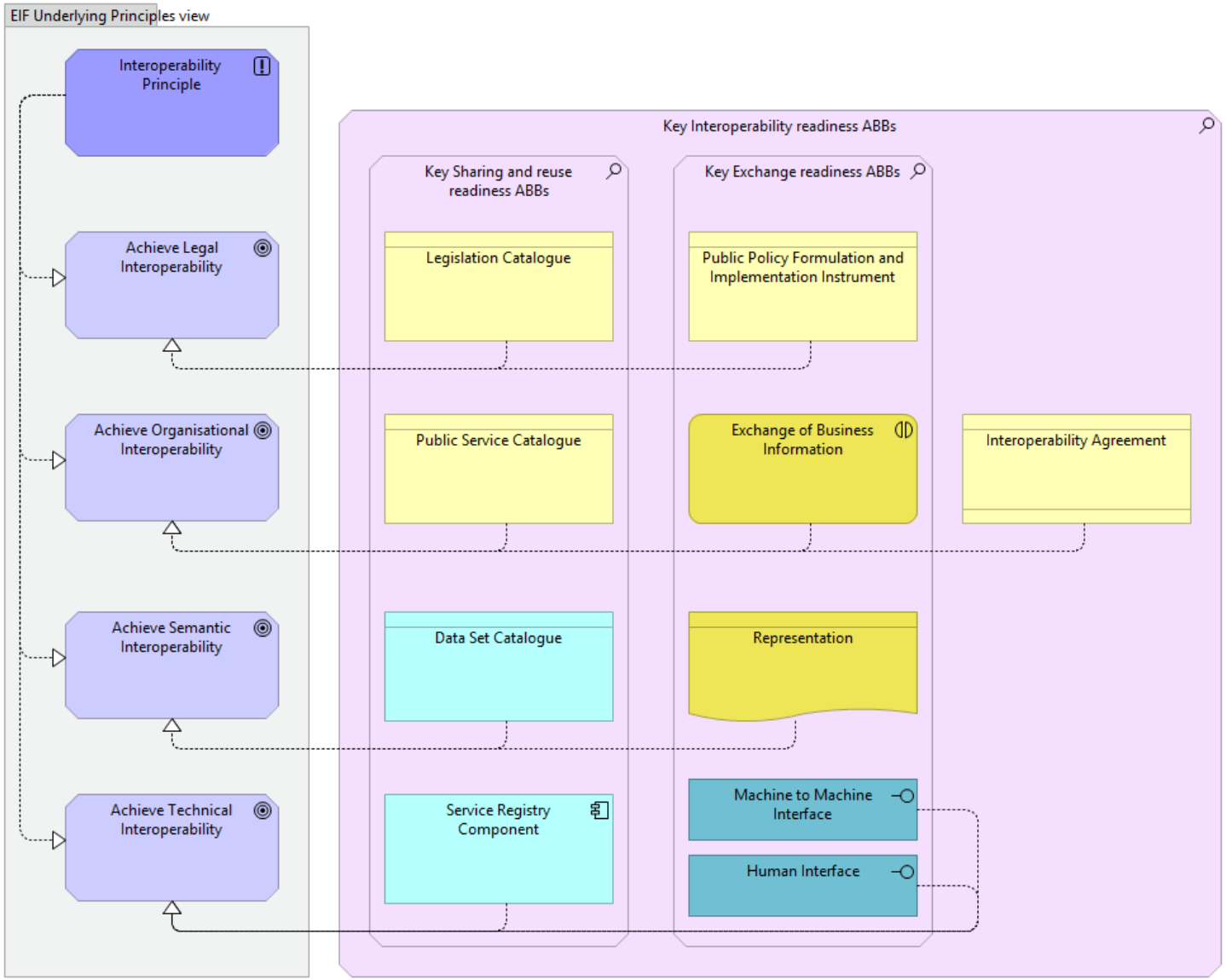
Interoperability specification viewpoint



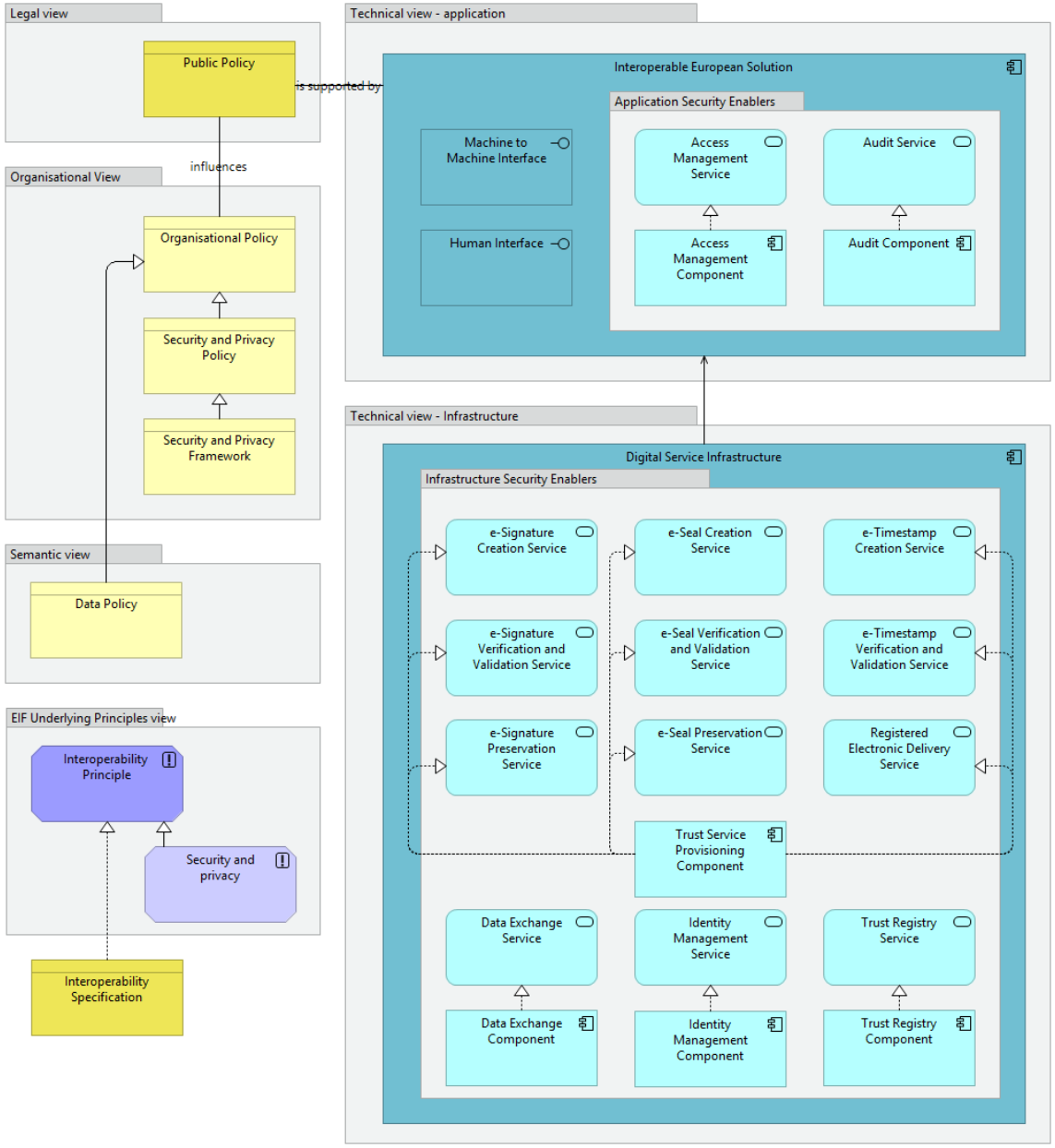
Interoperability Governance Viewpoint



Integrated Public Service Governance viewpoint



Interoperability Security and Privacy viewpoint



8.2 Architecture Building Blocks definitions

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
Financial Resource		A stock or supply of money. Based on the Oxford Dictionary https://en.oxforddictionaries.com/definition/resource
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
Legislation Catalogue		Inventory of legal documents. This ABB is a key interoperability enabler (*) enabling sharing/PROVISIONING and reusing/CONSUMPTION LEGAL documents Based on IATE (definition of catalogue, entry Documentation [COM]) http://iate.europa.eu/ (*)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

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
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/
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

Name	Status	Definition
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
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
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
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. 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 (*)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.

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
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
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
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]

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/
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
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/
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/

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
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.

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).
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
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

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
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
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
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
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
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

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. 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/
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
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
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
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

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
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.
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

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
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/
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
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/
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

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
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/
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/
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
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
Data Level Mapping		A Data-level Mapping is a mapping between specific data elements (or data values).

Name	Status	Definition
		Source: ISO/DIS 25964-2 https://www.iso.org/standard/53658.html
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
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
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
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
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
Identifier Scheme		Defines the values of an identifier. Source: CEN BII http://spec.cenbii.eu/

Name	Status	Definition
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
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
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].
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
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

Name	Status	Definition
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
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
Transactional Data		Data that covers the business information related to business transactions and information exchanges. Based on DAMA DM_BOK http://www.dama.org
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.

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
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
Application Service		Represents an explicitly defined shared application behavior. Based on ArchiMate v3 http://pubs.opengroup.org/architecture/archimate3-doc/chap09.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
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
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/

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/
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/
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
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/
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
Data Transformation Component		Implements the functionality of conversion of data from one data format to another. Source: ISA2 – EIA Action

Name	Status	Definition
Data Transformation Service		Shares the functionality of conversion of one data format to another. Source: ISA2 – EIA Action
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
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
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.
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
Logging Service		A Logging Service traces 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. Source: ISACA https://www.isaca.org

Name	Status	Definition
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.
Operational Procedure		Defines the process of operating a solution, how the procedures are implemented and the rules for operating it. Source: ISA2 – EIA Action
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/
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/
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/
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

Name	Status	Definition
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
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
Test Report		Data from testing activities and subsequently consolidated in a report to inform stakeholders. Based on ISTQB http://glossary.istqb.org/search/test
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
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

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
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
Audiovisual Service		Shares the functionality of broadcasting of "audio and video" content over the internet or satellite. Source: ISA2 - EIA Action
Collaboration Component		Implements the functionalities of i) transmission of text and/or ii) broadcasting of "audio and video" content. Source: ISA2 - EIA Action
Configuration and Solution Cartography Service		Shares the functionality of documenting the configuration and architecture of solutions. Source: ISA2 - EIA Action
Configuration and Solution Cartography Service Component		Implements the functionality of documenting the configuration and architecture of solutions. Source: ISA2 - EIA Action
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/
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/

Name	Status	Definition
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
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
Data Publication Component		Implements the functionality of making data available for common use. Based on DAMA http://www.dama.org/
Data Publication Service		Shares the functionality of making data available for common use. Based on DAMA http://www.dama.org/
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
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

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

Name	Status	Definition
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
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
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

Name	Status	Definition
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
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
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
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

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
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
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
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
Forms Management Component		Implements the functionalities of i) dynamic creation, ii) distribution and ii) analysis of forms and online surveys. Source: ISA2 - EIA Action

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
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
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
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
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
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

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
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
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
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
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
Messaging Service		Shares the functionalities of i) transmission of text and/or ii) broadcasting of "audio and video" content. Source: ISA2 - EIA Action
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/

Name	Status	Definition
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/
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
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
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
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
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

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
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
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
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
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
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.

Name	Status	Definition
		http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2014.257.01.0073.01.ENG
Service Registration Service		Shares the functionality of registering the system service within a catalogue to be discovered by other services. Source ISA2 - EIA Action
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.
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
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

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
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

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.

Name	Status	Definition
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.
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.

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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.

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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.