



The European Interoperability Reference Architecture (EIRA)

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Warsaw, Poland

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The context of EIA in the ISA Programme



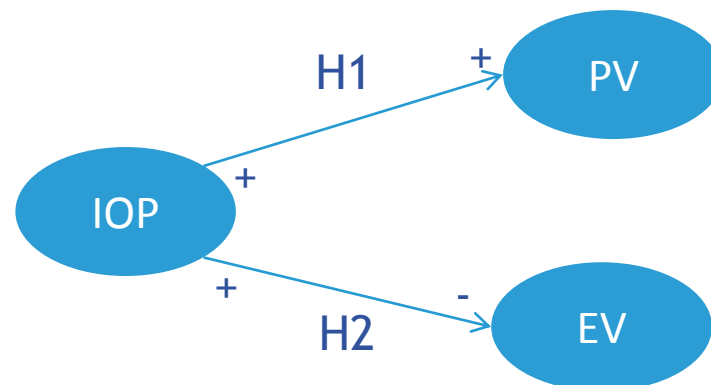


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IOP is the independent variable [of performance/economic variables]

H1: “There is a positive correlation between IOP and [performance variable] of **public service delivery** to public administrations citizens and businesses”

H2: “There is a negative correlation between IOP and costs of **public service delivery** for public administrations, businesses and citizens”



List of ISA actions (1/3)



European
Commission

Action number	Action name
1.1	Promoting semantic interoperability amongst the European Union Member States
1.2	Access to base registries
1.3	Catalogue of services
1.4	ECAS-STORK Integration
1.5	STORK Sustainability
1.6	Common Infrastructure for Public Administrations Sustainability
1.7	ePRIOR
1.8	Trusted Exchange Platform (E-TrustEx)
1.9	Supporting tools for TSL and e-signature creation/verification
1.10	Internal Market Information (IMI) systems
1.11	Interoperable and Generic Notification Services (GENIS)
1.12	Open Source Software platform for online collection of statements of support for European citizens' initiatives
1.13	LEOS - Legislation Editing software
1.14	Cross Sector SOLVIT
1.15	Open Government Data
1.16	Development of key IT components for the establishment of the Common information sharing ENVIRONMENT (CISE) for the surveillance of the EU maritime domain

List of ISA actions (2/3)



European
Commission

Action number	Action name
1.17	Re-usable Inspire reference platform
1.18	Federate Managed Authentication Services for ECAS
1.19	PEPPOL Sustainability
1.20	Application of EU law: provision of cross-sector communication and problem solving tools
1.21	European Legislation Identifier
2.1	Elaboration of a common vision for an European Interoperability Architecture (EIA)
2.2	CAMSS - Common Assessment Method Standards and Specifications
2.3	PKI Services
2.4	Data communication network service (sTESTA)
2.5	CIRCABC
2.6	Interactive Policy Making (IPM)
2.7	Your Europe - Facilitating the re-use of content from National portals
2.8	Machine Translation Service by the European Commission
2.9	Document repository services for EU policy support
2.10	Multisectorial crisis and business continuity services
2.11	Promoting consistent EU e-procurement monitoring and performance
2.12	eHealth European Interoperability Framework

Project

Study

Acc. measure

List of ISA actions (3/3)



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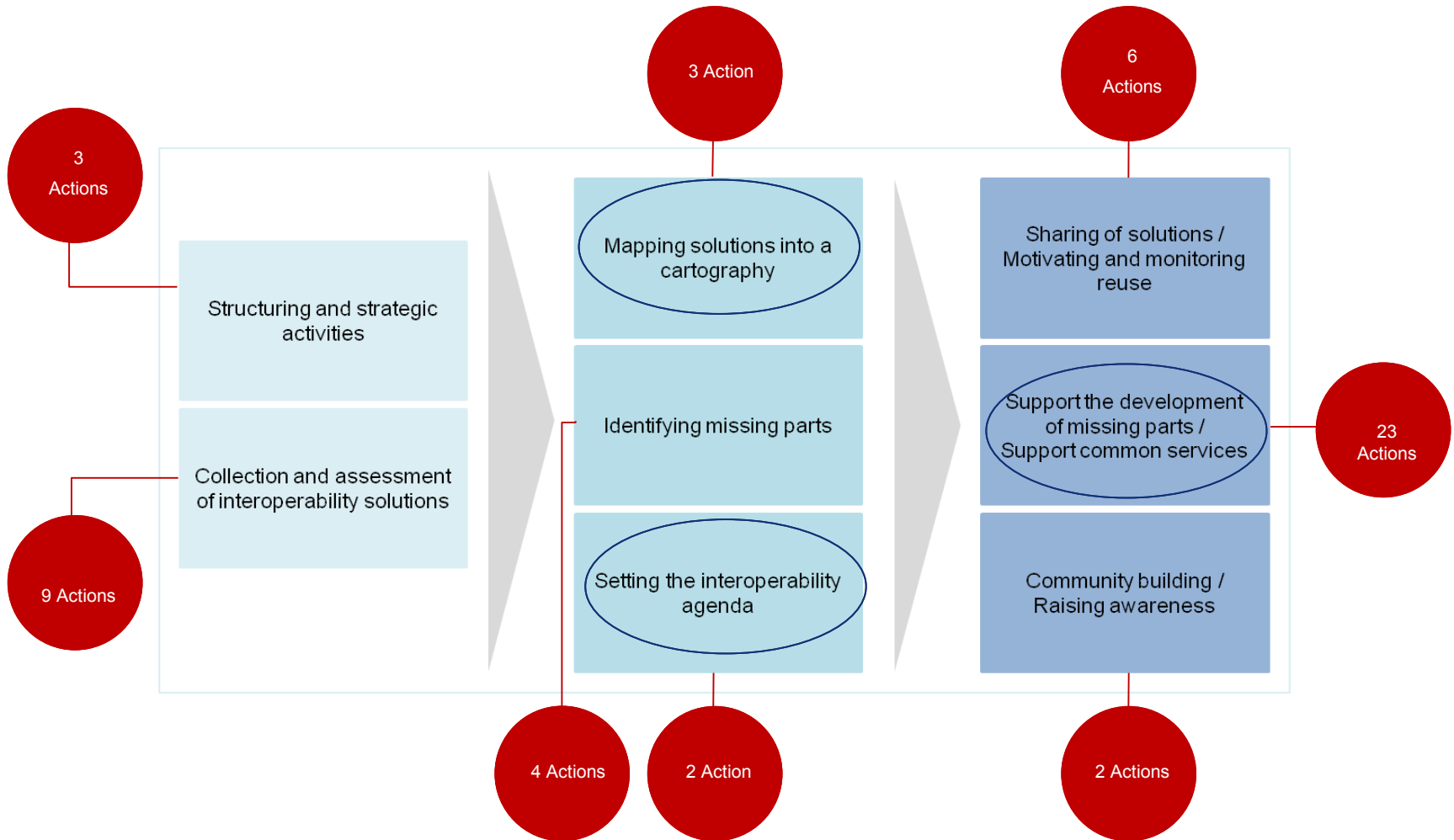
Action number	Action name
2.13	Establishment of a European Union Location Framework
2.14	Assessment of trans-European systems supporting EU policies
2.15	Interoperability agreements on electronic document and electronic file
3.1	Assessment of ICT implications of EU legislation
4.1.1	Raising Interoperability Awareness - Communication activity
4.1.2	Interoperability Maturity Model
4.2.1	Integrated Collaboration Platform - Joinup
4.2.2	Community building and effective use of the collaborative platforms
4.2.3	National Interoperability Framework Observatory (NIFO)
4.2.4	European Federated Interoperability Repository (EFIR)
4.2.5	Sharing and re-use strategy
4.2.6	Interoperable test beds

2.1 EIA Elaboration of a common vision for an EIA in ISA Value chain



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MAPPING OF ISA ACTIONS TO THE ISA VALUE CHAIN

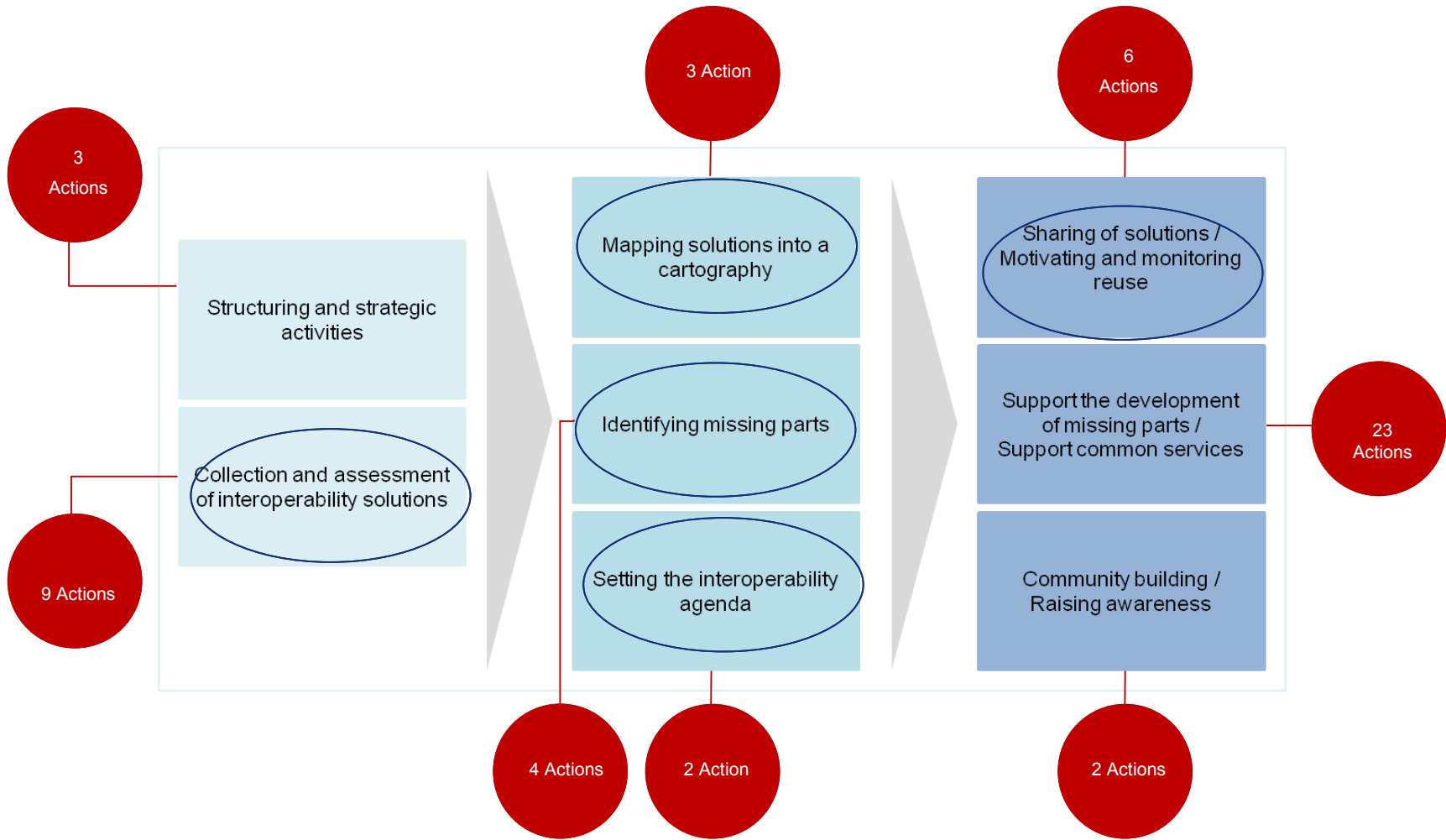


2.14 TESS Assessment of Trans-European networks supporting EU policies in ISA Value chain



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MAPPING OF ISA ACTIONS TO THE ISA VALUE CHAIN



ISA



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CONTENTS



ABOUT THIS ISSUE

The six cover features in this issue highlight the technical, semantic, syntactical, organizational, and legal aspects of Europe's e-government interoperability challenges, as well as success stories.

COVER FEATURES

GUEST EDITORS' INTRODUCTION

- 22** **E-Government Interoperability: Linking Open and Smart Government**
Carlos E. Jiménez, Agustí Solanas, and Francisco Falcone

Our ability to move from an information society to a "smart" society will increasingly rely on improvements and expansion in e-government interoperability.

- 25** **Promoting Interoperability in Europe's E-Government**
Konstantinos Bovalis, Vassilios Peristeras, Margarida Abecasis, Kaul-Mario Abril-Jimenez, Miguel Alvarez Rodriguez, Corinne Gattegno, Athanasios Karalopoulos, Ioannis Sagias, Szabolcs Szekacs, and Suzanne Wigard

Europe's Interoperability Solutions for Public Administrations (ISA) program has created a model for implementing interoperability solutions across technical, semantic, organizational, and legal levels.

- 34** **E-Health Demystified: An E-Government Showcase**
Mario Kovač

E-health, a priority for governments worldwide, involves multiple stakeholders and requires a complex framework, as the Croatian National Healthcare System exemplifies.

- 44** **Interoperability in Big, Open, and Linked Data—Organizational Maturity, Capabilities, and Data Portfolios**
Marijn Janssen, Elsa Estevez, and Tomasz Janowski

Defining their interoperability maturity level, expanding capabilities, and developing a data portfolio can help organizations as they move toward ubiquitous information sharing.

- 50** **Quantifying the Interoperability of Open Government Datasets**

Pieter Colpaert, Mathias Van Compernelle, Laurens De Vocht, Anastasia Dimou, Miel Vander Sande, Ruben Verborgh, Peter Mechant, and Erik Mannens

A proposed technique quantifies the semantic interoperability of open government datasets with three metrics calculated using a set of statements that indicate for each pair of identifiers in the system whether or not they represent the same concept.

- 57** **ESCO: Boosting Job Matching in Europe with Semantic Interoperability**

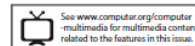
Martin le Vrang, Agis Papanтониou, Erika Pauwels, Pieter Fannes, Dominique Vandendesteen, and Johan De Smedt

The multilingual European Skills, Competences, Qualifications, and Occupations classification will help address the chronic mismatch between unemployed workers' skills and companies' needs.

- 65** **Distributed Framework for Electronic Democracy in Smart Cities**

Jesús Cano, Roberto Hernández, and Salvador Ros

Citizen and government participation platforms provide a viable way to implement, standardize, and scale services and information exchange—functions essential to citizens' participation in a smart city democracy.



See www.computer.org/computer-multimedia for multimedia content related to the features in this issue.



Update on pilots





We invited 3 MSs and 3 DGs to conduct a pilot of EIRA and CarTool:

- To gain general **insight** and **hands-on experience** with the EIRA and the CarTool (PoC) in their specific environment;
- To work with a **use case** that they selected to maximise the value that they can obtain from their participation in the pilot. For example, **potential benefits** can include a) the documentation of an existing interoperable solution or b) the acceleration of the design of a new interoperable solution or c) to the rationalization of your IT portfolio:
 - They will have the opportunity to **influence** and **contribute** to a joint vision of the EIRA and the EUCart by providing feedback to the EIRA and the CarTool (PoC) and by providing **visibility** to their reusable solution building blocks by including them in the EUCart;
- To provide **visibility** to their activities within the ISA Programme and, if convenient for them, to a broader audience (published on Joinup).



Examples of feedback statements we captured from the pilot participants:

"A richer metamodel on top of ArchiMate in relation to IOP"

"Helps to differentiate between a public service's provider and consumer and to model the agreement(s) between them"

"Awareness of the relationships between ABBs on different views"

"Checklist for core IOP ABBs"

"Stronger than TOGAF with respect to IOP: 4 levels and their alignment"

"Useful structure and definition of an SAT"

"Controlled vocabulary (e.g. for procurement)"

"Guidelines to think about all IOP levels when modelling"

"It was a very valuable modelling experience"

"Standard for the IOP part of solutions"

"A data mining tool → automatic and proactive suggestions for portfolio management"

"Promotes IOP"

"Modelling in Archi was very helpful"

"Helps to identify commonalities among solutions"

"Helps reuse"



All change request for the EIRA and the CarTool (PoC) are captured on JIRA issue tracer*.

RfC type	EIRA	CarTool (PoC)
Resolved	144	10
Open	16	60**
Total	160	70

* We can provide the analysis of change requests on request.

** The identified functionalities of the CarTool (PoC) will be implemented as Joinup Cartography services.



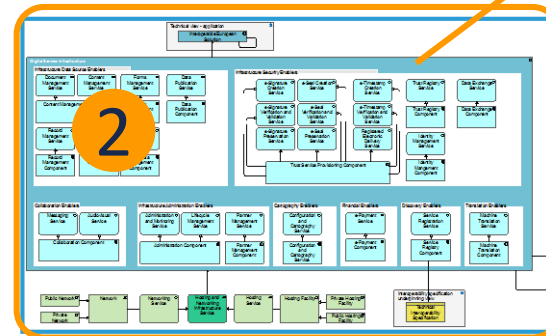
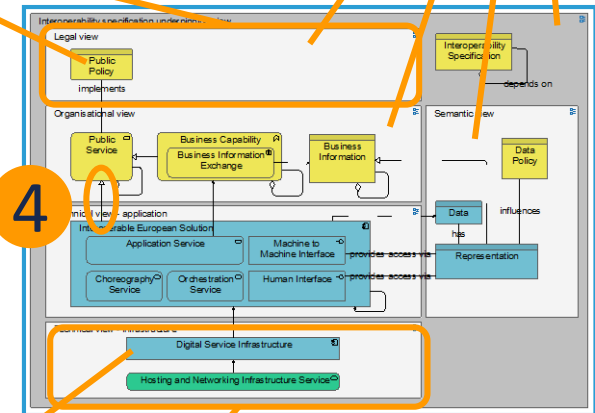
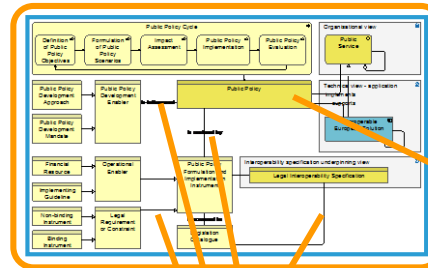
- **ArchiMate alignment:** EIRA is aligned with ArchiMate 2.1 and its concepts and relations. Usage of Archi as a modelling tool (syntax error-free model).
- **Two new views:** EIRA high-level overview and interoperability specification underpinning view.
- **Restructuring of views:** Organisational and semantic views have been restructured. Several architecture building blocks were moved from the Technical application view to the Technical infrastructure view.
- **Improved definitions:** Definitions of architecture building blocks have been enhanced and aligned.
- **ADMS alignment:** Attributes of the building blocks are aligned with ADMS-AP properties.
- **Improved EIF alignment:** The EIRA now offers the possibility to capture how interoperability specifications are aligned to EIF principles.
- **EIRA overview document:** Provides an overview on the EIRA, including definitions of the EIRA's underlying key concepts, ArchiMate notation and modelling guidelines.
- **EIRA model for Archi and as an HTML-version:** replace the simple Visio diagrams (views) and Excel spreadsheet (ABB definitions).
- **EU regulation:** the EIRA is compliant with EU regulation.

EIRA v0.9.0 beta

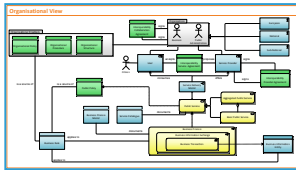
The EIRA in numbers



- 6 diagrams:** 4 views (Legal, Organisational, Semantic, Technical (Apps & Infra), 1 high-level overview and 1 interoperability specification underpinning view
- 140 Architecture Building Blocks (ABBs):** e.g. Public Policy, Public Service, Interoperability Agreement, Data and Interoperable European Solution
- 200 relationships** between different ABBs.
- 18 links** between the different views: ABBs are related across the different EIF interoperability levels
- 76 pages:** EIRA overview document.



EIRA v0.9.0 beta Comparison to v0.8.0



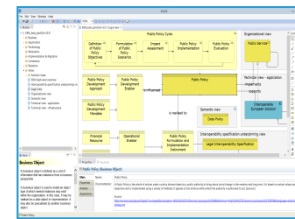
Views modelled in Visio, using some ArchiMate shapes.



Views modelled in Archi, ensuring ArchiMate compliance. HTML version.

View	Building block	Definition	Source of definition
...

Separate Excel file containing definitions.



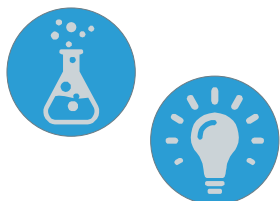
Definitions are integrated in Archi model. ADMS-compliant properties. Ability to export



Simple PowerPoint providing an introduction.



Extensive EIRA overview documentation.



Initial draft that has not been tested.



More mature version that has been tested and improved.

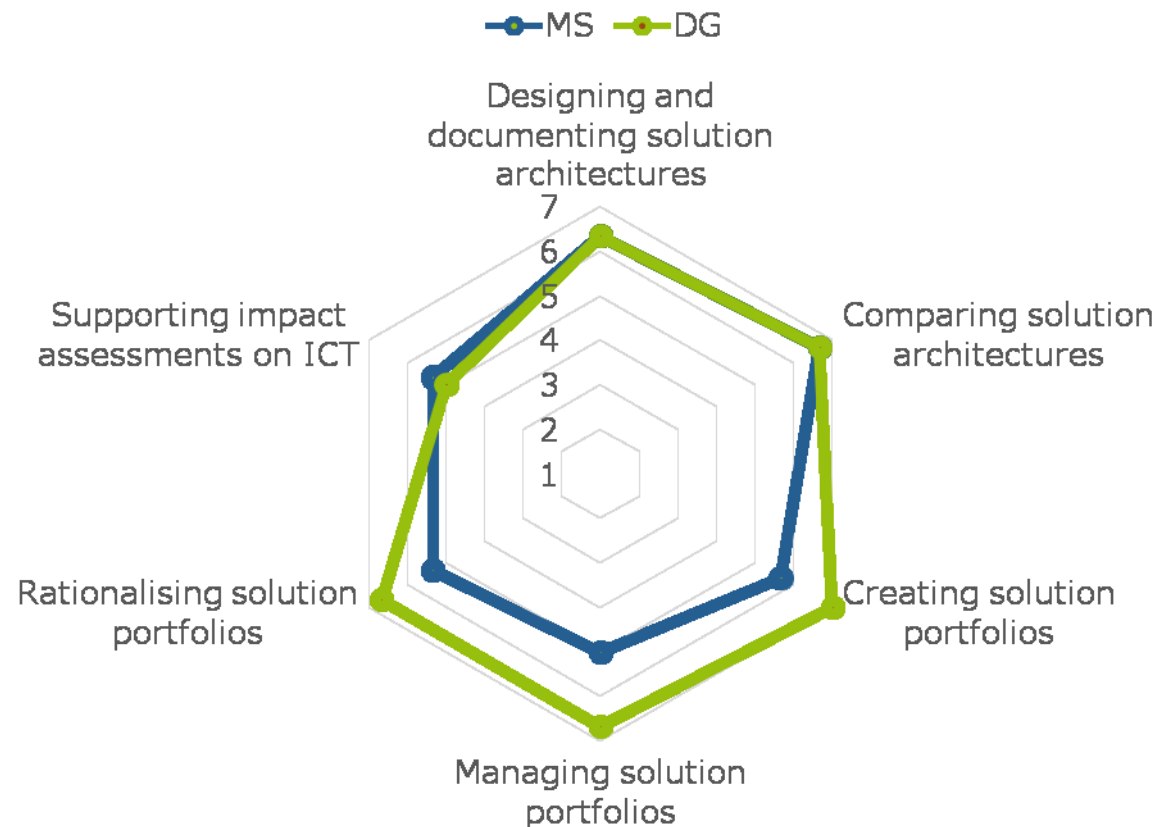


1. The pilot participants' beliefs on the potential value of the EIRA

Scale

7	Strongly Agree
6	Agree
5	Somewhat agree
4	Neither agree or disagree
3	Somewhat disagree
2	Disagree
1	Strongly disagree

Based on my pilot experience, I believe that the EIRA has potential value for...

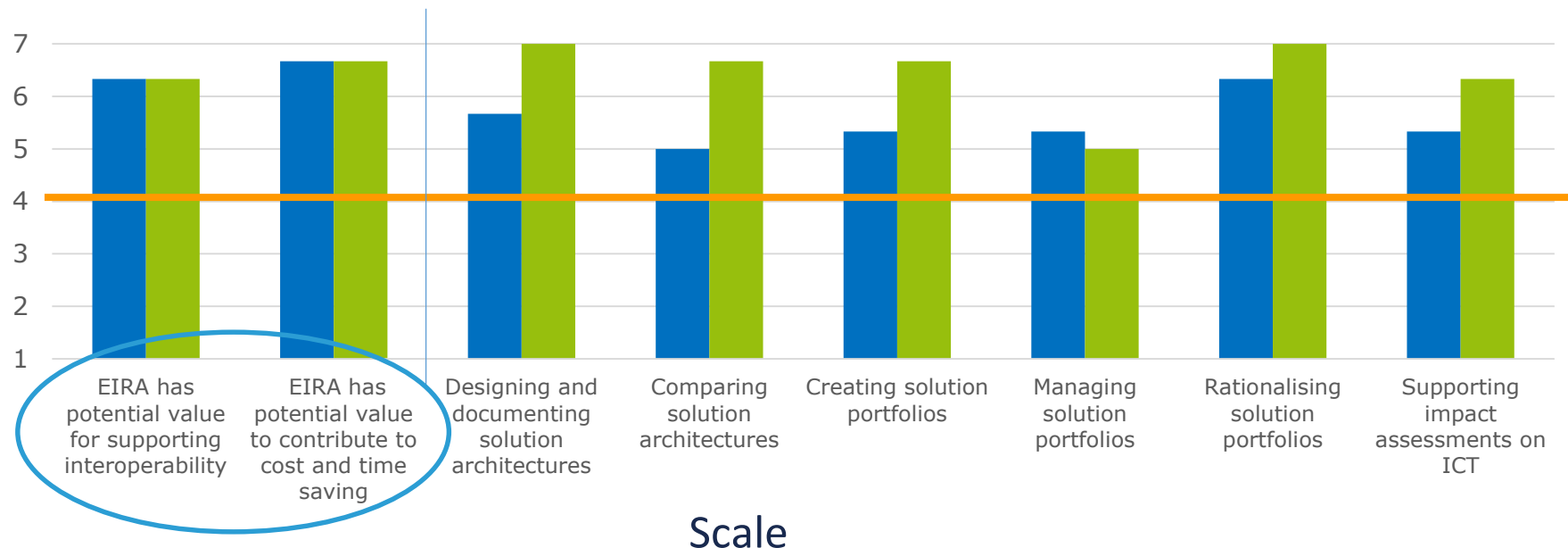




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2. The pilot participants' beliefs on the potential value of the EIRA supporting interoperability and to contribute to cost and time saving (includes previous results for comparison).

Based on my pilot experience, I believe that the EIRA has potential value for... ■ MS ■ DG



1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree



EIRA presentation





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European Interoperability Strategy (EIS)

Governance and strategy



European Interoperability Framework (EIF)

Framework and principles



European Interoperability Reference Architecture (EIRA)

Guidelines and Implementation



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Alignment between EIF and EIRA

EIF Framework

Cooperating partners with compatible visions, aligned priorities, and focused objectives

Political Context

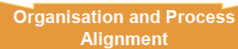
Aligned legislation so that exchanged data is accorded proper legal weight

Legal Interoperability



Coordinated processes in which different organisations achieve a previously agreed and mutually beneficial goal

Organisational Interoperability



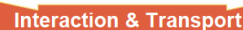
Precise meaning of exchanged information which is preserved and understood by all parties

Semantic Interoperability

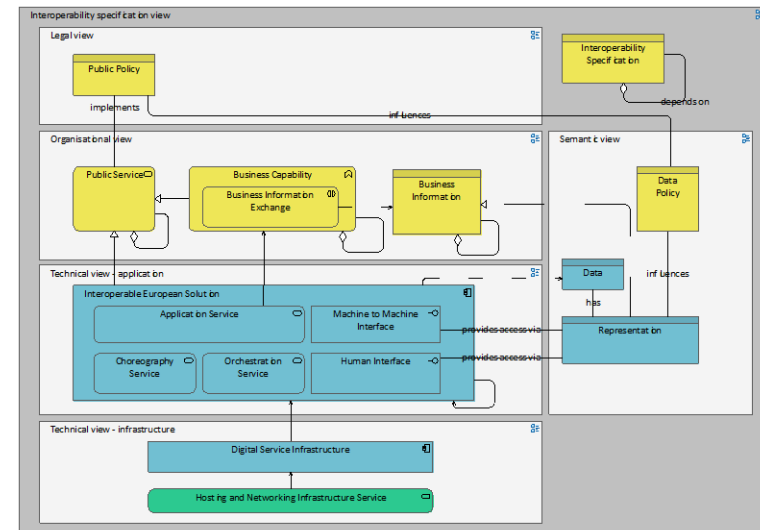


Planning of technical issues involved in linking computer systems and services

Technical Interoperability



EIRA Guidelines





EIRA v0.9.0 beta

Release components

The EIRA v0.9.0 beta consists of the following release components:

1. **EIRA_v0.9.0_beta_ArchiMate_model.ARCHIMATE**: Archi file containing the EIRA ArchiMate model.
2. **EIRA_v0.9.0_beta_ArchiMate_model.HTML**: HTML version of the EIRA ArchiMate model.
3. **EIRA_v0.9.0_beta_Overview.PDF**: PDF document containing an introduction to the EIRA, including its key concepts, used ArchiMate notation, tool support, and views.
4. **EIRA_v0.9.0_beta_Release document set.ZIP**: Zip file containing each of the above mentioned files.
5. **EIRA_v0.9.0_beta_Release_notes.PDF**: PDF document containing the release notes.

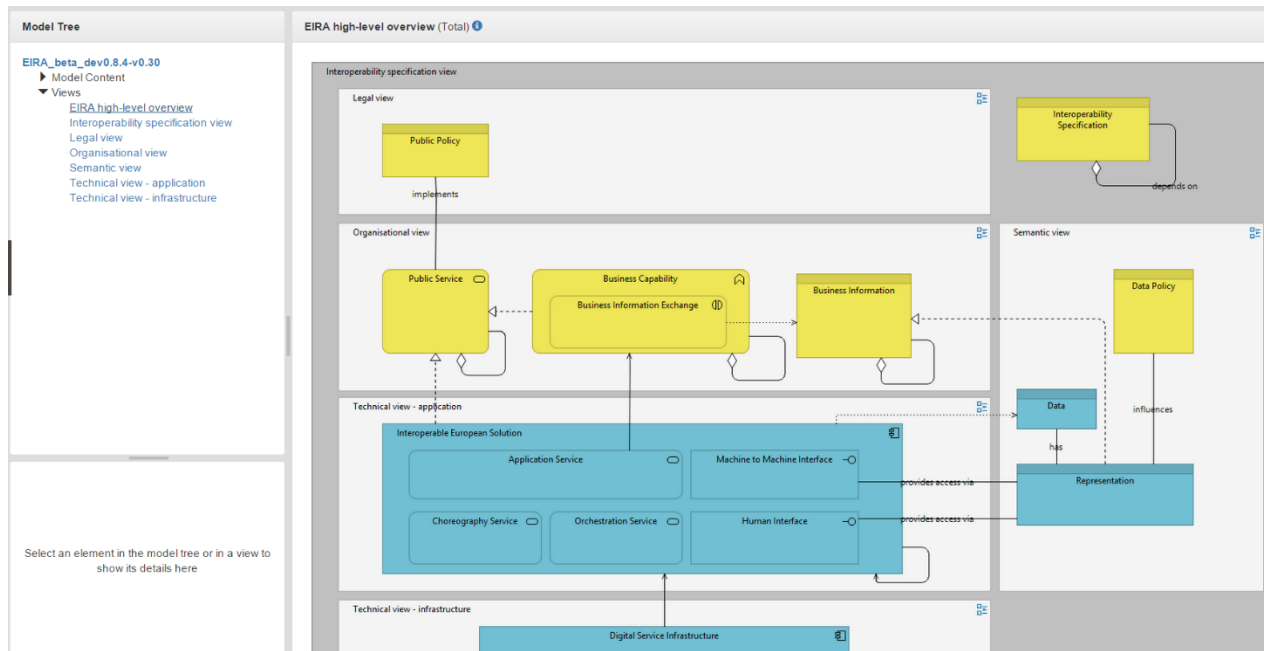
The release components can be found in the respective release folder under the following link*: <https://joinup.ec.europa.eu/asset/eia/description#release>

* The link points to a directory containing all EIRA releases, including the development version (e.g. 0.9.0).



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EIRA v0.9.0 beta - HTML version



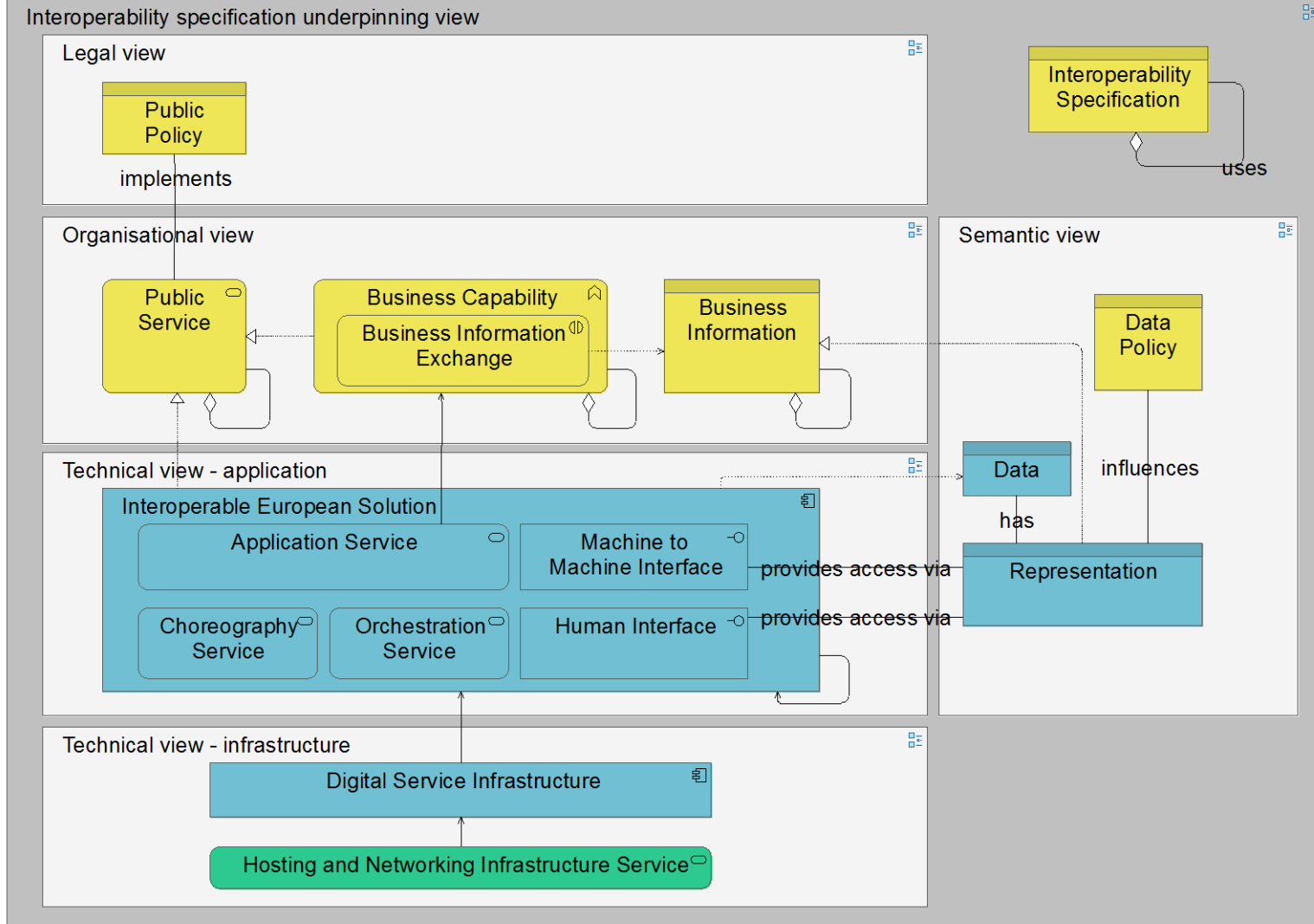
Online website :

https://joinup.ec.europa.eu/site/eia/EIRA/EIRA_beta_dev/HTML/model.html

EIRA v0.9.0 beta - High-level overview

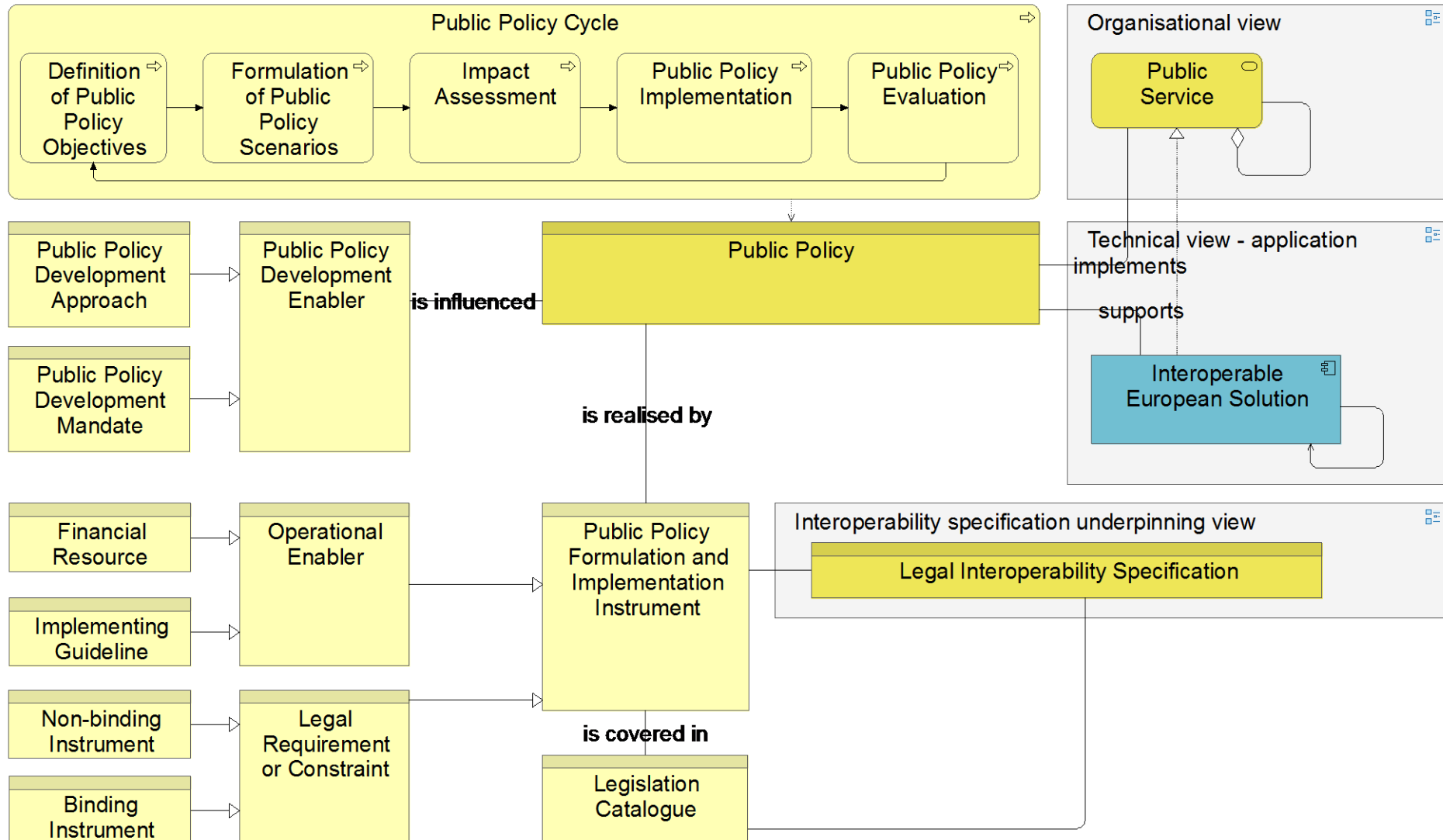


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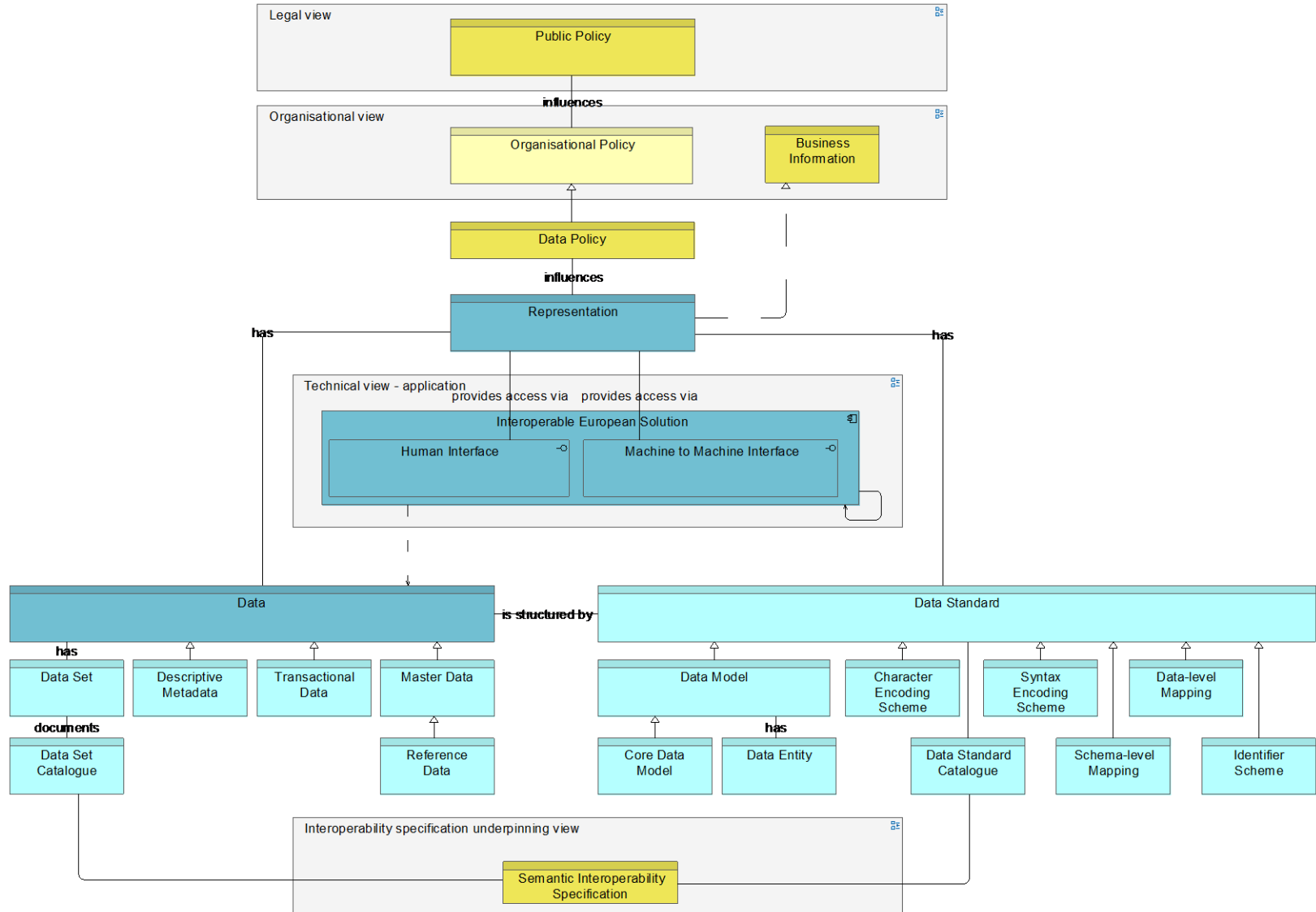
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EIRA v0.9.0 beta - Semantic view



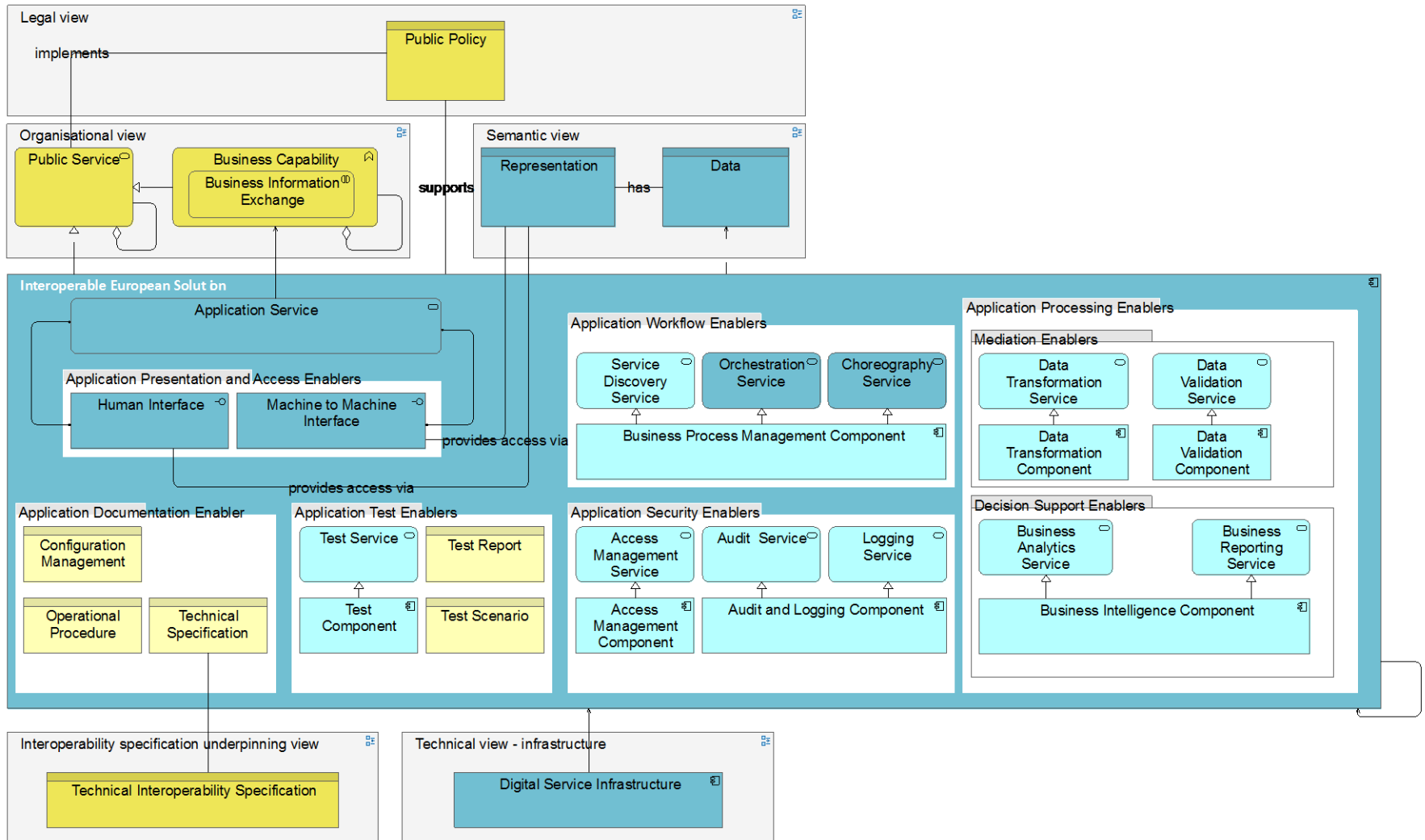
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EIRA v0.9.0 beta tech. application view



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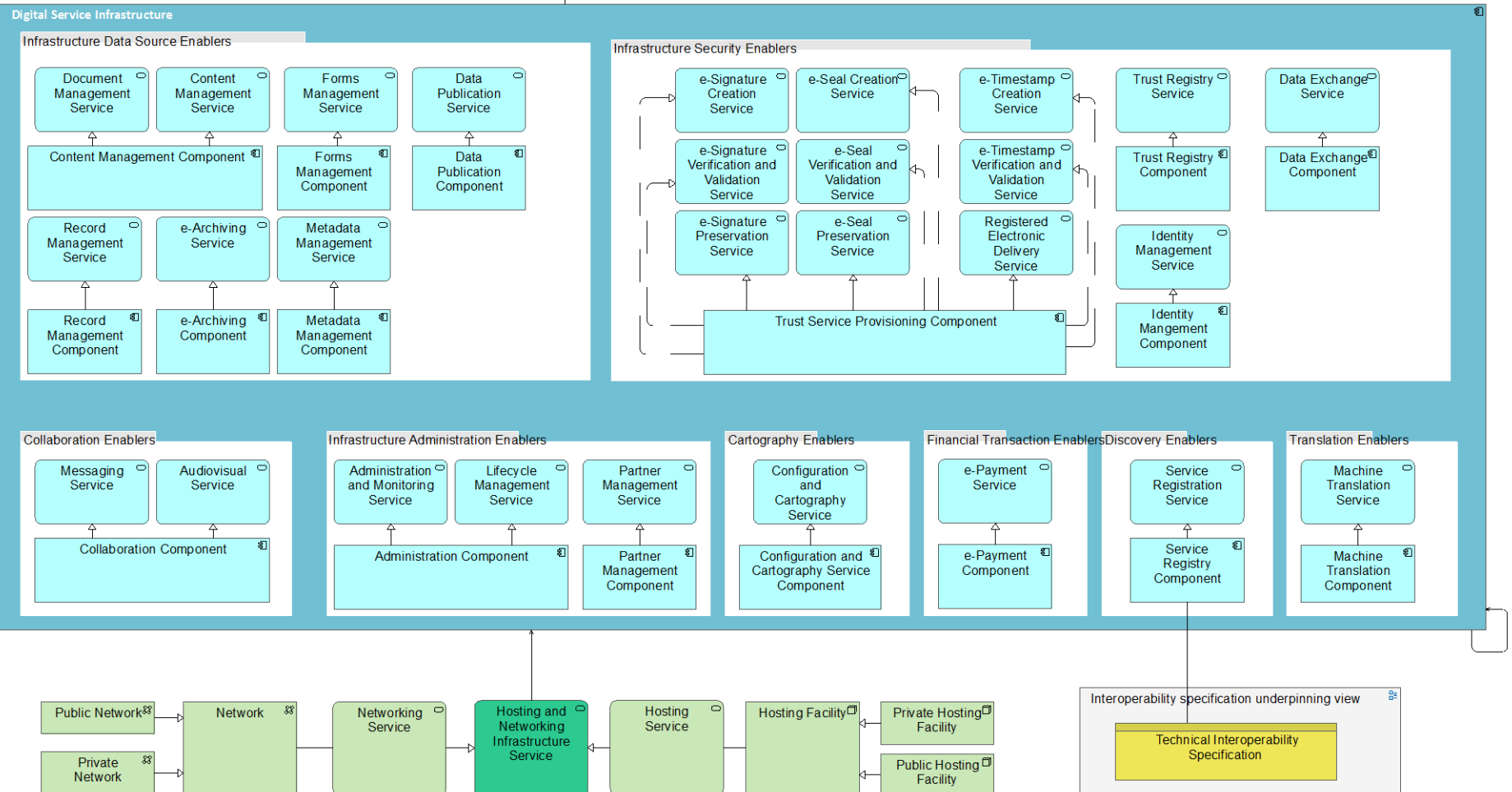
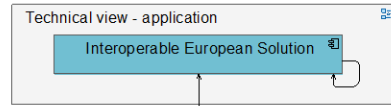


EIRA v0.9.0 beta

ch. infrastructure view



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EIRA v0.9.0 beta spec. underpinning view



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Specification

Interoperability Specification

Legal Interoperability
Specification

Organisational Interoperability Specification

Semantic Interoperability
Specification

Technical Interoperability Specification

Legal view

Organisational view

Semantic view

Technical view -
application

Technical view -
infrastructure

Public Policy
Formulation and
Implementation
Instrument

Public Service
Catalogue

Data
Standard
Catalogue

Technical
Specification

Service
Registry
Component

is covered in

Legislation
Catalogue

Interoperability Agreement

Interoperability
Collaboration
Agreement

Interoperability
Provider
Agreement

Interoperability
Service
Agreement

Data Set
Catalogue

depends on



Overview on the Cartography (EUCart and CarTool)

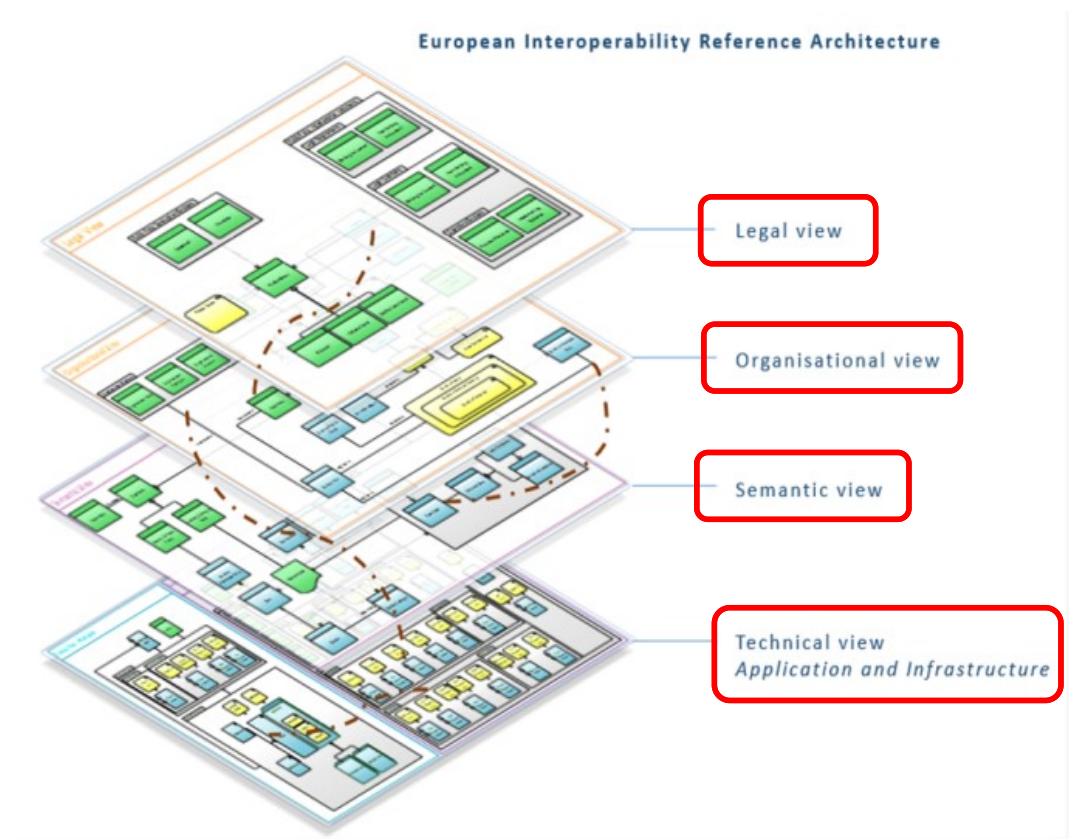




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Active elements

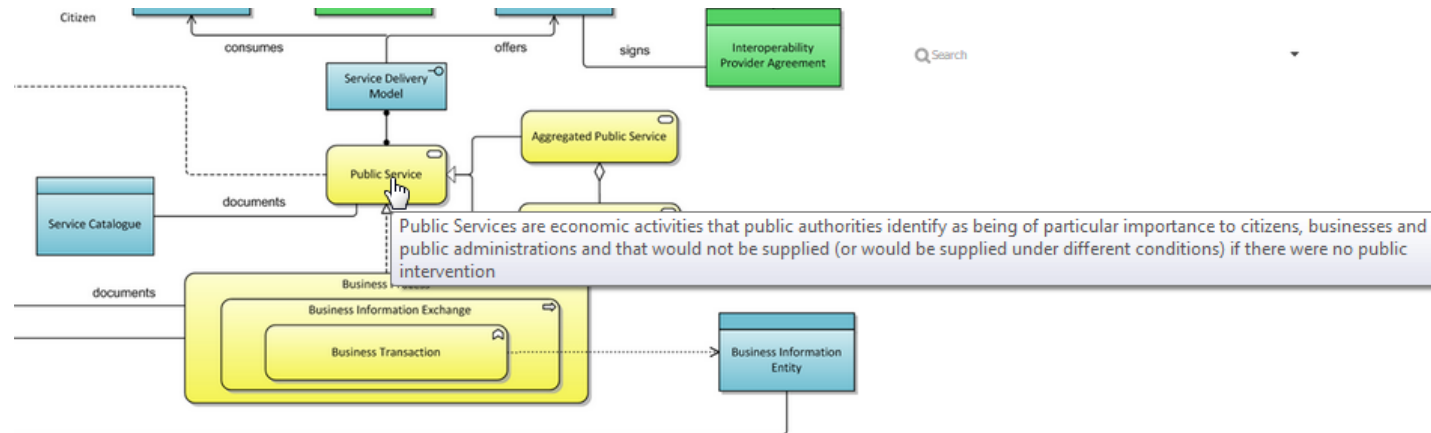
- Integrates the different views as active elements
- Clicking a view's name opens the corresponding zoomed view





Hover over

- Definitions displayed when hovering over a building block

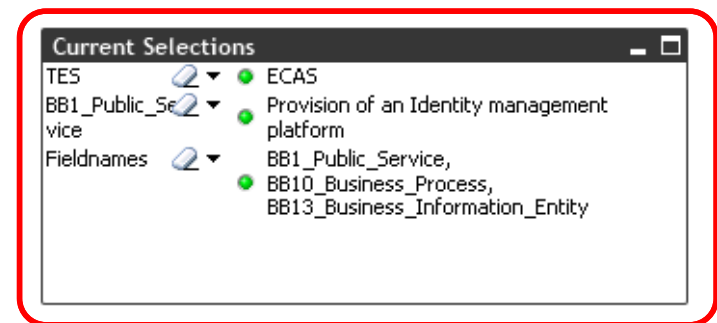


Active elements to build a query

- Each zoomed view shows a set of building blocks
- Building blocks can be added to and removed from query by clicking them

Query builder

- Track the current selection
- Validate the query before launching it
 - Fieldnames for the selected building blocks
 - Additional rows to filter active selection
- Add or remove elements using dropdown list
 - Current selection in green, others in grey
 - “Ctrl” to select multiple building blocks
 - “Eraser” icon to remove entire sections
- Lookup elements using search box
 - Match elements as you type
 - Add elements directly to query builder



Launch Query

Toggle instances





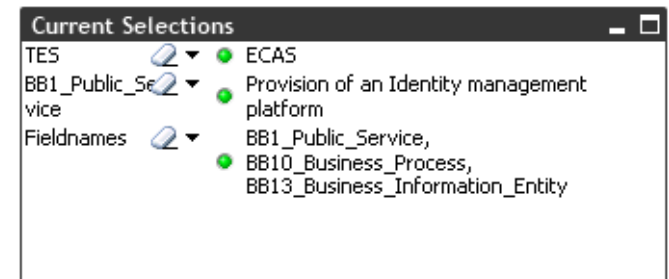
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Launch query

- Execute query for selected building blocks
- Switch to output view to display the solutions matching the selected criteria

Toggle instances

- Display matching solutions on the building blocks of the current zoomed view itself
- Only advised when filtering is performed as this reduces the number of values



Launch Query

Toggle instances



Search



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Update query

- Select the building blocks in the selection menu (“Ctrl” and “Shift” for multiple)
- The query built via the zoomed views’ query builder is re-executed
- “Clear Selection” to remove all current query elements
- “Toggle building block descriptions” to show the selected building blocks’ description in a separate table (same information as the “Hover over” function)

The screenshot displays the European Commission's building block selection interface. At the top, there is a search bar and two buttons: "Clear selections" and "Toggle building block descriptions". Below the search bar, a grid of building blocks is shown, with a red box highlighting the selection menu. The grid contains the following building blocks:

Building Block Name	Building Block Description
BB60 - Interoperable Europe...	
BB41 - Machine Translation Service	
BB43 - Data Exchange Service	
BB66 - Business Intelligence Component	

The table below shows the details of the selected building blocks:

Building Block Name	Building Block Description
BB66 - Business Intelligence Component	Application component that encapsula...
BB43 - Data Exchange Service	The Data Exchange Service enables th...
BB41 - Machine Translation Ser...	No description



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Drag and drop

- Customise output table by moving columns to a preferred order

Filtering

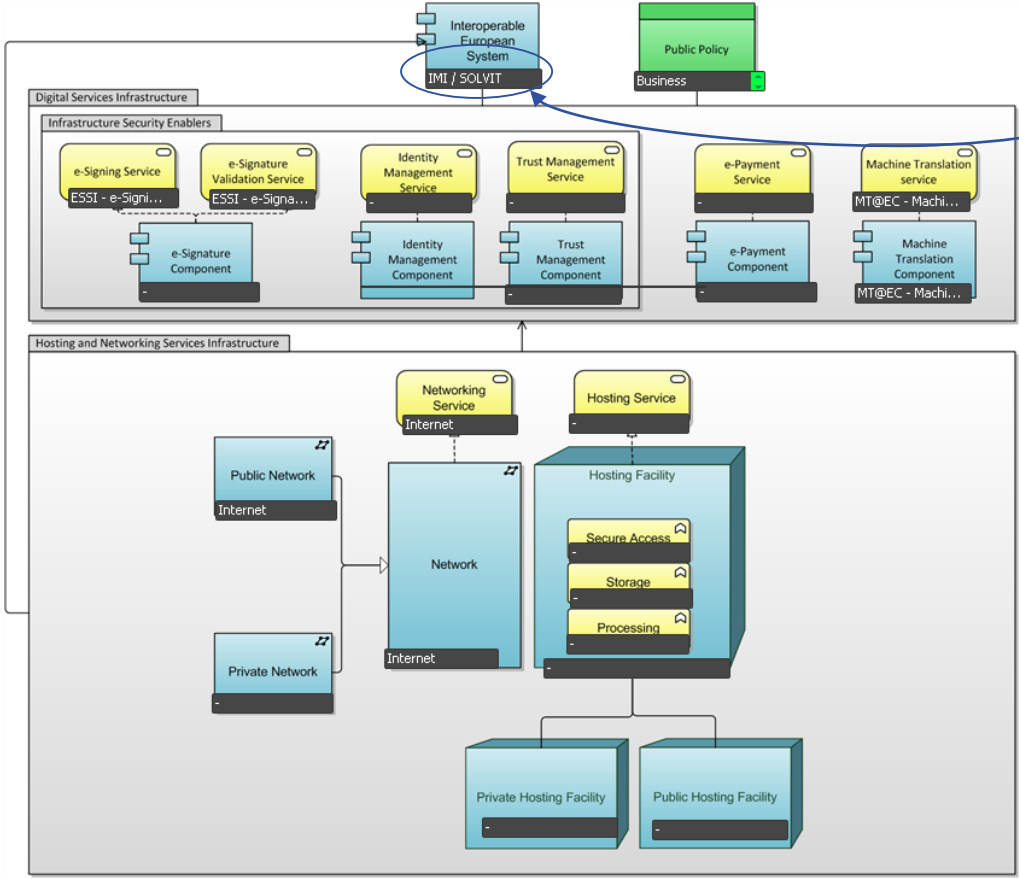
- Create specific reports filtered according to parameters
- Select specific values in the retrieved data (undo by clicking “eraser”)

Building Block Name	Building Block Description
BB60 Interoperable Europe...	
BB41 Machine Translation Service	
BB43 Data Exchange Service	
BB66 Business Intelligence Component	



Archimate modelling notation legend:

- active structure element
- behaviour element
- passive structure element
- motivation extensions



Current Selections

- BB60_Interop... ▾
- able_European System
- IMI / SOLVIT

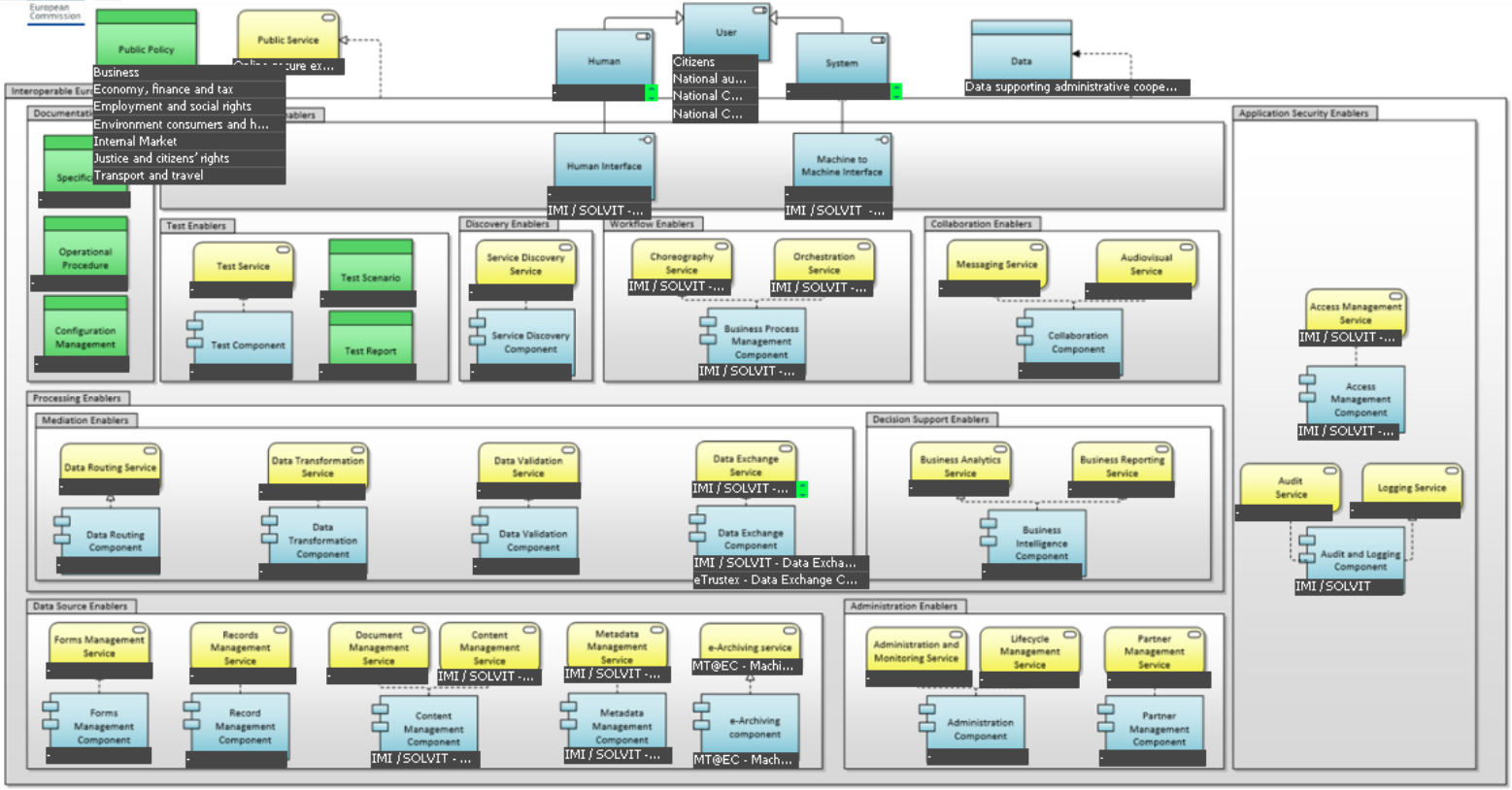
Launch Query

Toggle Instances

Search

Archimate modelling notation legend:

- active structure element
- behaviour element
- passive structure element
- motivation extensions



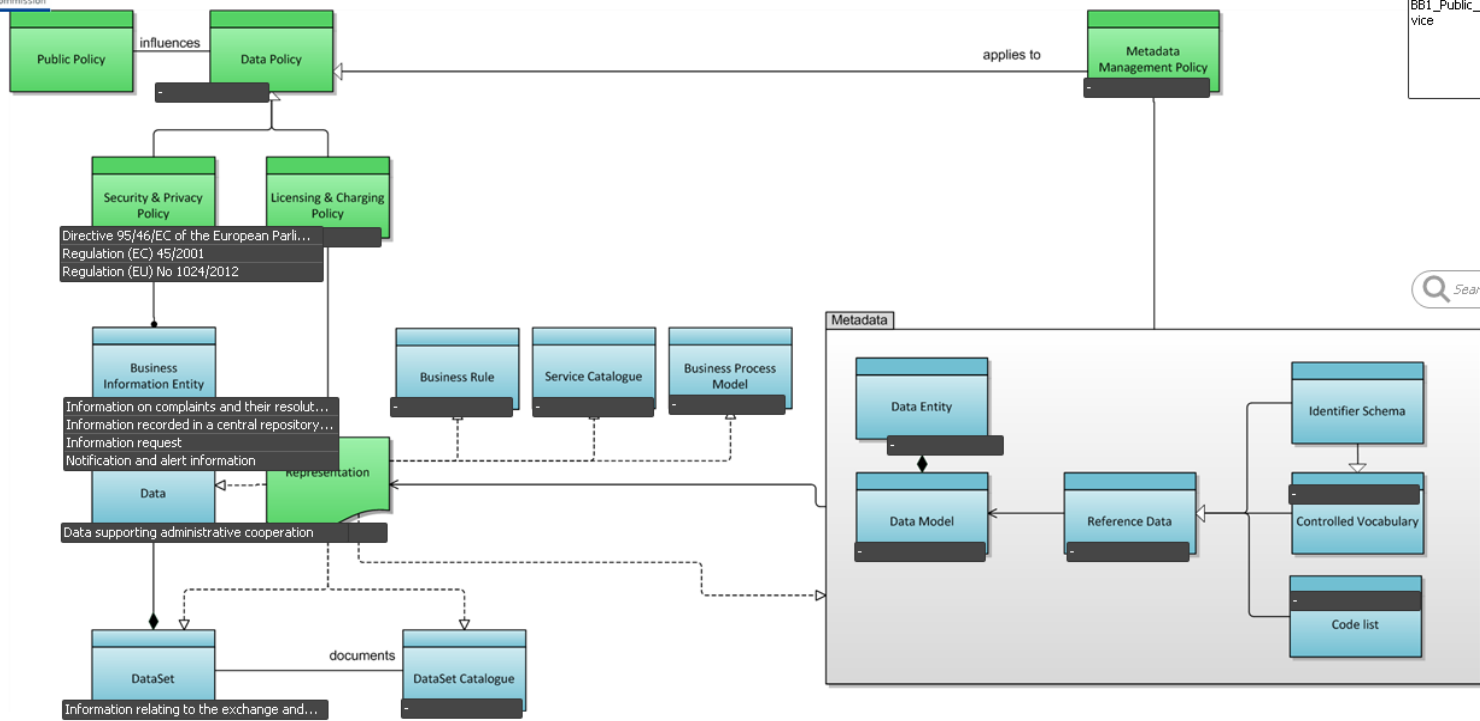
Launch Query

Toggle instances

Search

Archimate modelling notation legend:

- active structure element
- behaviour element
- passive structure element
- motivation extensions



Current Selections

- BB60_Interoperable_European_System
 - IMI / SOLVIT
- BB1_Public_Se2
 - Online secure exchange and sharing of information as required by administrative cooperation provision set out in EU legislation.

Launch Query

Toggle instances

Search



Archimate modelling notation legend:

- active structure element
- behaviour element
- passive structure element
- motivation extensions

Current Selections

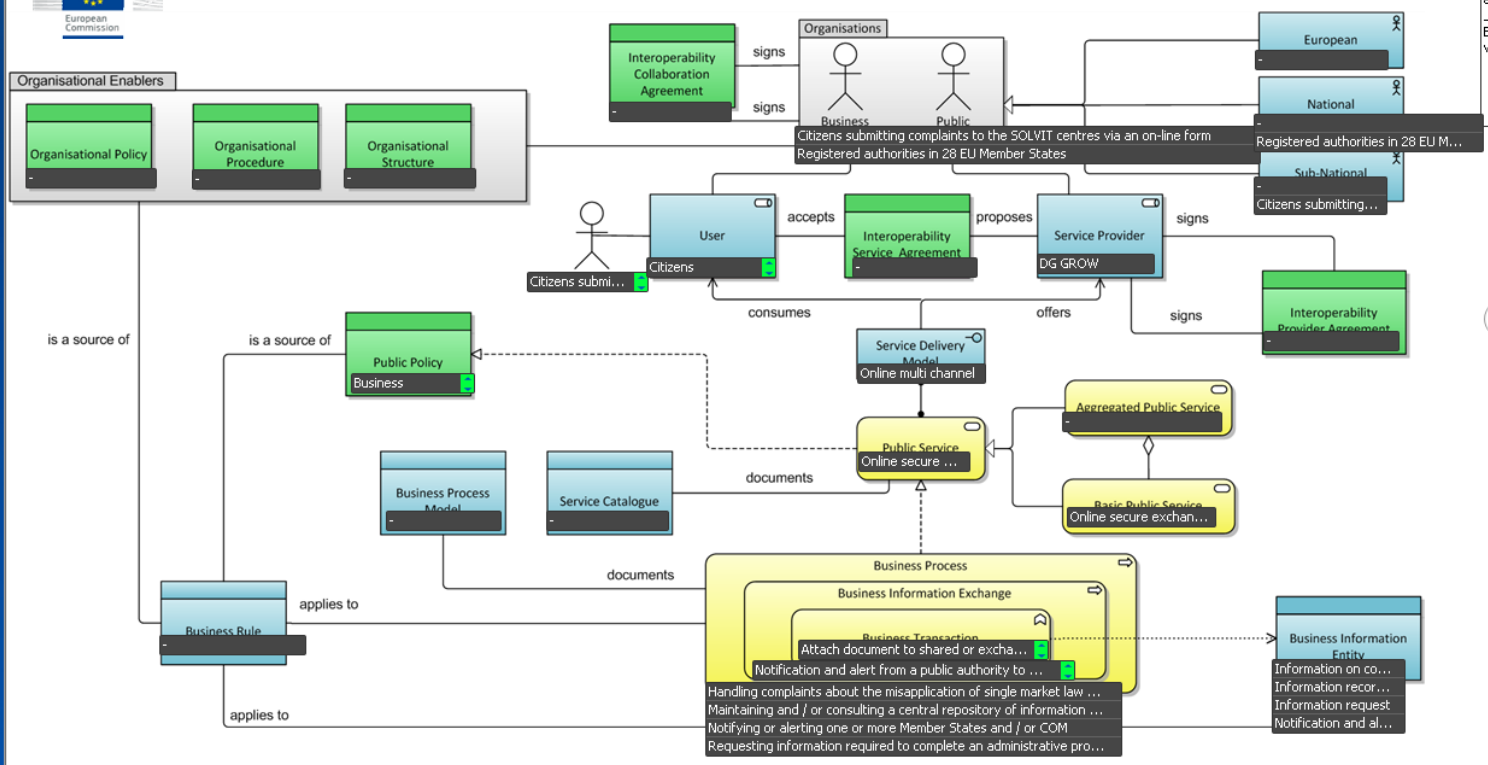
- BB60_Interop... IMI / SOLVIT
- able_Europe... System
- BB1_Public_Se... vice

Online secure exchange and sharing of information as required by administrative cooperation provision set out in EU legislation.

Launch Query

Toggle instances

Search





Archimate modelling notation legend:

- active structure element
- behaviour element
- passive structure element
- motivation extensions

Current Selections

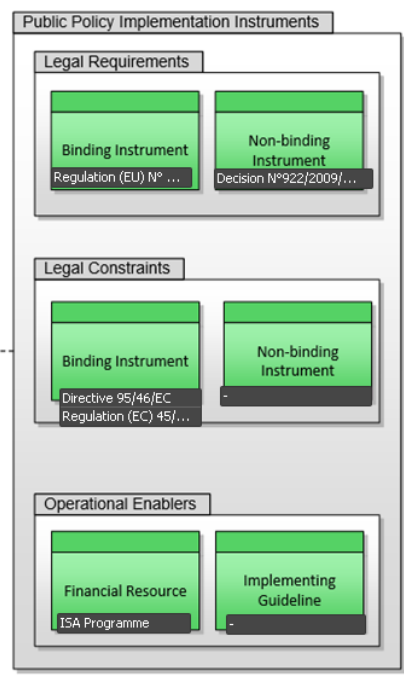
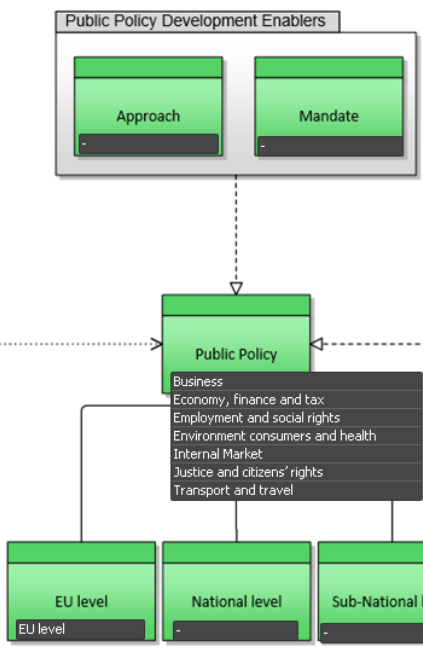
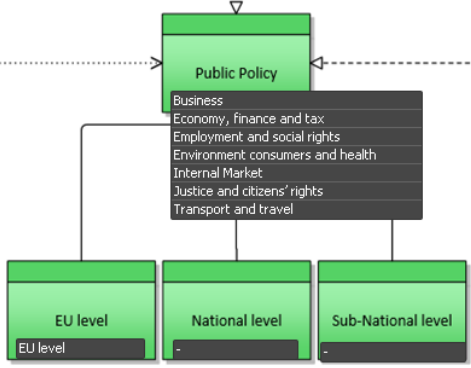
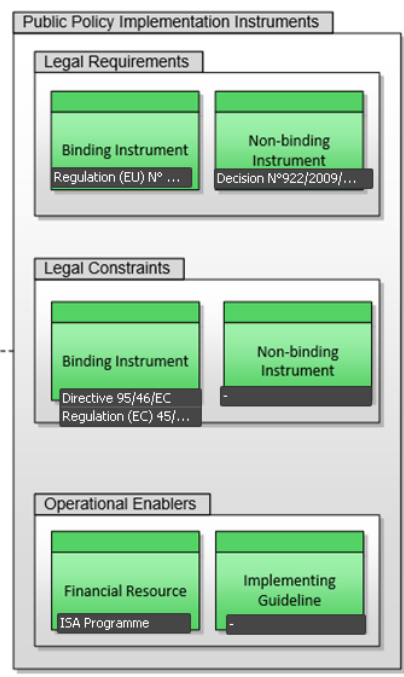
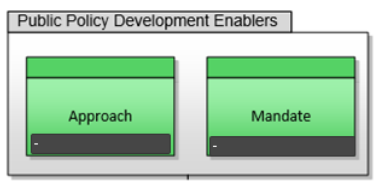
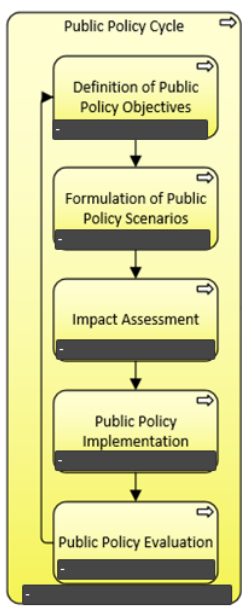
- BB60_Interoperable_European_System
- BB1_Public_Service

IMI / SOLVIT
Online secure exchange and sharing of information as required by administrative cooperation provision set out in EU legislation.

Launch Query

Toggle instances

Search



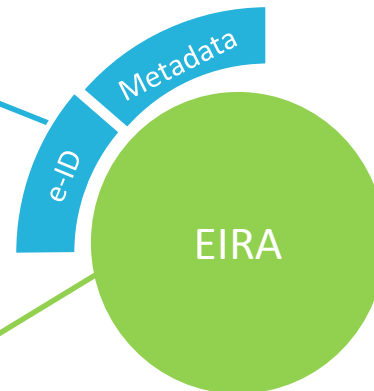


Positioning of the EIRA and the Cartography



EIRA provides a common core of context-neutral architecture building blocks

Solution Architecture templates
(e.g. e-ID) with additional
specific ABBs



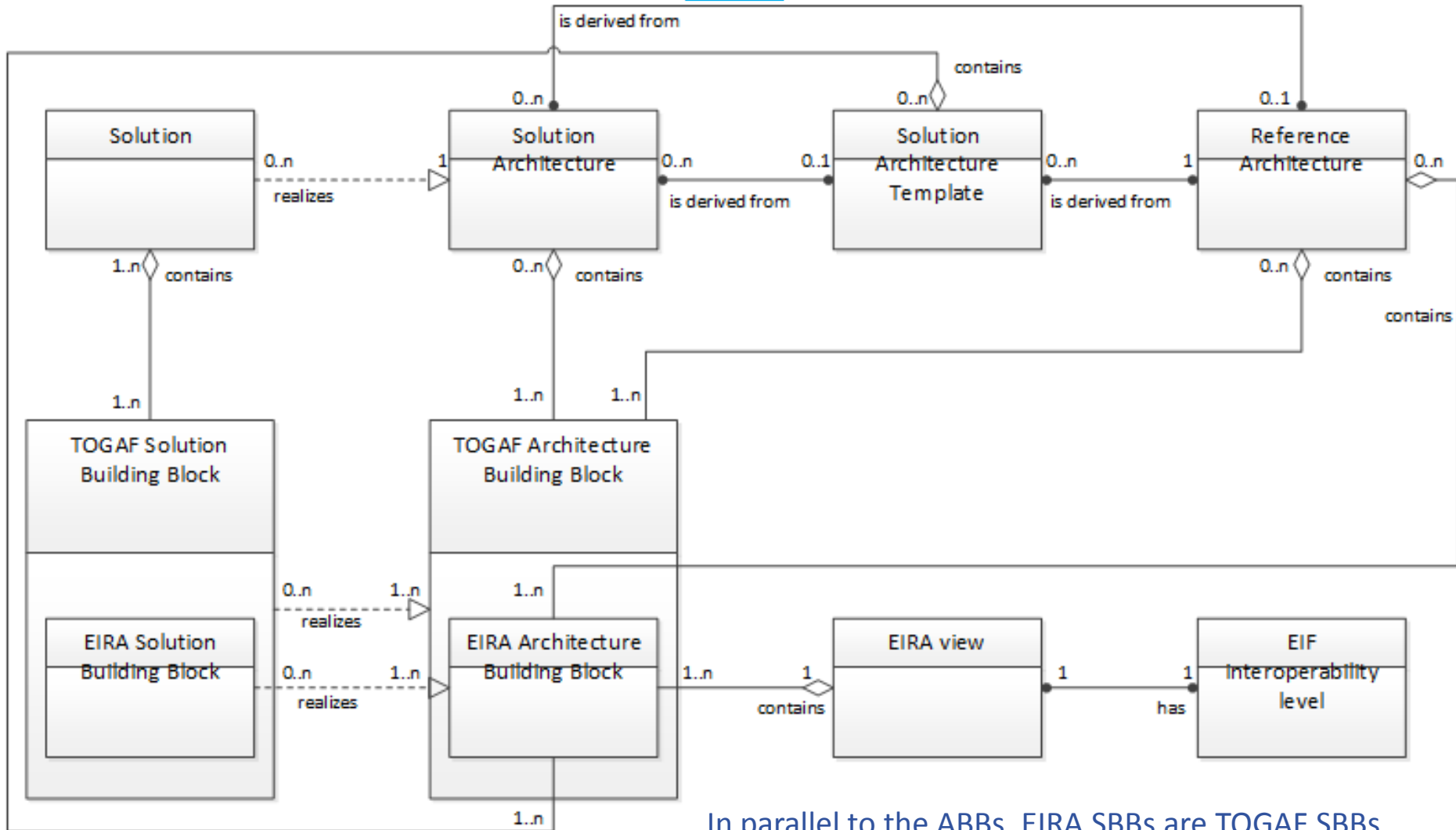
Core Reference Architecture:
EIRA – minimal cross-sector
interoperability

1. **EIRA:** context-neutral architecture building blocks (ABBs). Focused on interoperability.
2. **Solution architecture template:** specific solution adding further details to enable solution designs

EIRA in the context of EA



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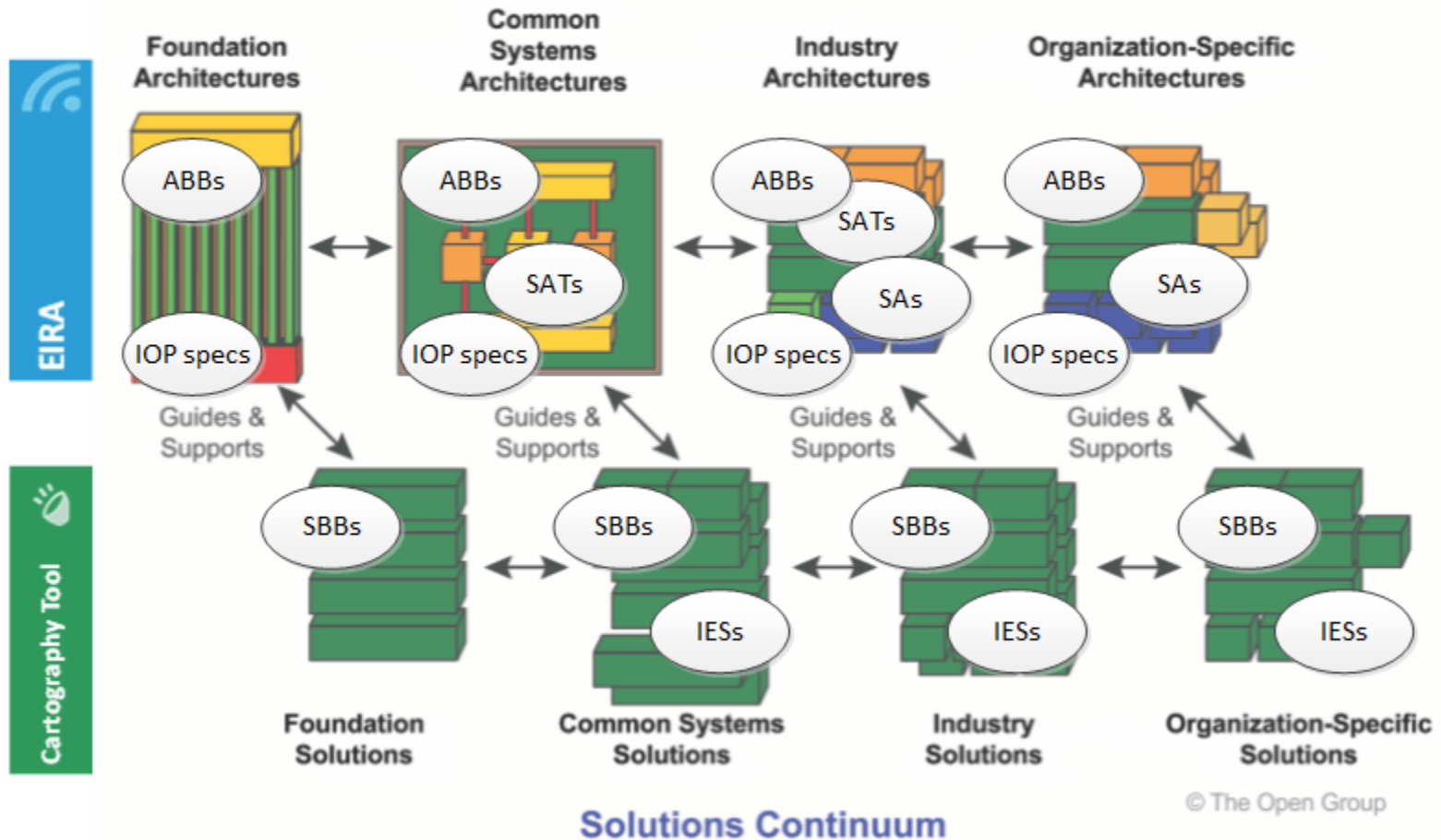
In parallel to the ABBs, EIRA SBBs are TOGAF SBBs.



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EIRA's positioning within TOGAF's Enterprise Continuum

Architecture Continuum





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1. EIRA development

1. Analyze results **public consultation** on EIRA v0.9.0 beta
2. Release of EIRA v1.0.0 stable (*December 2015*)



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European Interoperability Architecture (EIA)

Description | Members list | Issues | Interoperability Solutions | Highlights

EIA_Team on August 06, 2014

ON

using amount of information exchanges between public services (across borders and a need for interoperability in Europe is higher than ever. The ISA Action 2.1 (EIA) a reference architecture to guide public administrations in their work to provide fe European public services to businesses and citizens.

European Interoperability Architecture

an Interoperability Architecture (EIA) Action is part of the Interoperability Solution for Public Administration (ISA). It provides two assets: the European Interoperability Reference Architecture (EIRA) and the Cartography tool.

Cartography Tool stating that they are mature enough to go to public consultation and to be used in

Cartography tool

Cartography tool is a tool that can be used to describe and catalogue the Solution Building Blocks (SBBs) of enterprise architectures and visualise these SBBs according to the Architecture Reference Architecture (ARA) of the EIRA.

Releases

Current version is version 0.8.1 beta (COMING SOON)

Supporting material

in of the project by the European commission*

- Position of Stavros Doukas** (Director General of DG Informatics)
- Dr. of Raulo Aho** (ISA Programme Manager) (Evolution)
- Dr. of Maria Fabiszka** (Lead Architect of the EIRA)
- Position of the EIA Action and the EIRA levels and building blocks (index)**

* that the video were produced for an alpha version of the EIRA. As such some building blocks might be omitted. The political view is no longer part of the EIRA.

Material

- Issues** how to use EIRA and Cartography tool to fulfil the interoperability needs of an organisation.
- Cartography Tool: training materials**
- ISA Architecture templates** with descriptions, solutions and implementations.

Additional material

- ISA 2.1 Specifications** is the official Archimate reference.
- ISA 2.1 Use Cases** helps understand through a video the essential difference between Architecture and Design.
- ISA 2.1 Interoperability Framework (IIF)**
- ISA 2.1 Interoperability Strategy (IS2)**
- ISA 2.1 Interoperability Framework Observatory (INFO)**

Releases

EIRA releases

The current EIRA release is **version 0.8.1 beta**.

Supporting material

General introduction

Overview of the EIRA

EIRA releases

The current EIRA release is **version 0.8.1 beta**.

Supporting material

Releases

Supporting material

<http://joinup.ec.europa.eu/asset/eia/description>



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Expected benefits of the EIRA



Designing

Accelerate the design of systems that support the delivery of interoperable digital public services (across borders and sectors).



Assessing

Provide a reference model for comparing existing architectures in different policy domains and thematic areas, to identify focal points for convergence and reuse.



Communicating and Sharing

Help documenting the most salient interoperability elements of complex systems and facilitate the sharing of reusable solutions.



Discovering and Reusing

Ease the discovery and reuse of interoperability solutions through the Cartography – Cart in Joinup website.



EIRA and CarTool use-cases



Designing

- ● Design solution architecture (templates)
- ○ Design reference architectures
- ● Create portfolio



Communicating and Sharing

- ● Support Impact Assessment on ICT
- ● Document interoperability solutions

EIRA



Cart



Assessing

- ○ Compare reference architectures
- ● Compare solution architectures
- ● Rationalise portfolio
- ● Manage portfolio



Discovering and Reusing

- ● Search for interoperability solutions



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Contact us

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EIRA

European Interoperability Reference Architecture



Cartography tool

European Interoperability Cartography



For more information

EIA Joinup community	https://joinup.ec.europa.eu/asset/eia/description
EIA project collaborative space	https://webgate.ec.europa.eu/CITnet/confluence/display/EIA/EI+A+Home
ISA website	http://ec.europa.eu/isa/index_en.htm
ISA FAQ	http://ec.europa.eu/isa/faq/faq_en.htm



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