



The European Interoperability Reference Architecture (EIRA)

Dr. Raul Abril, European Commission
Warsaw, Poland
24th November 2015

The context of EIA in the ISA Programme

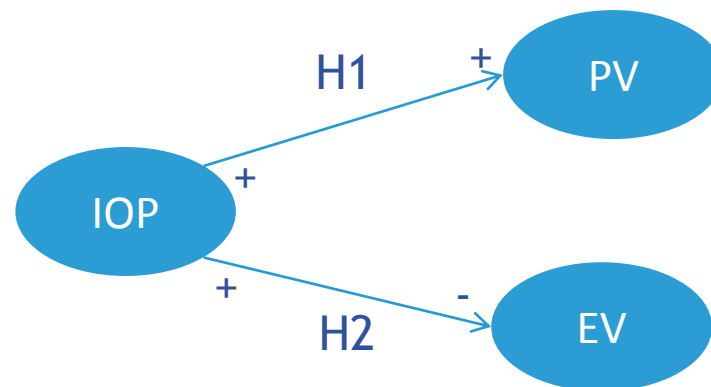




IOP is the independent variable [of performance/economic variables]

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)



| 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)



| 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 |

List of ISA actions (3/3)

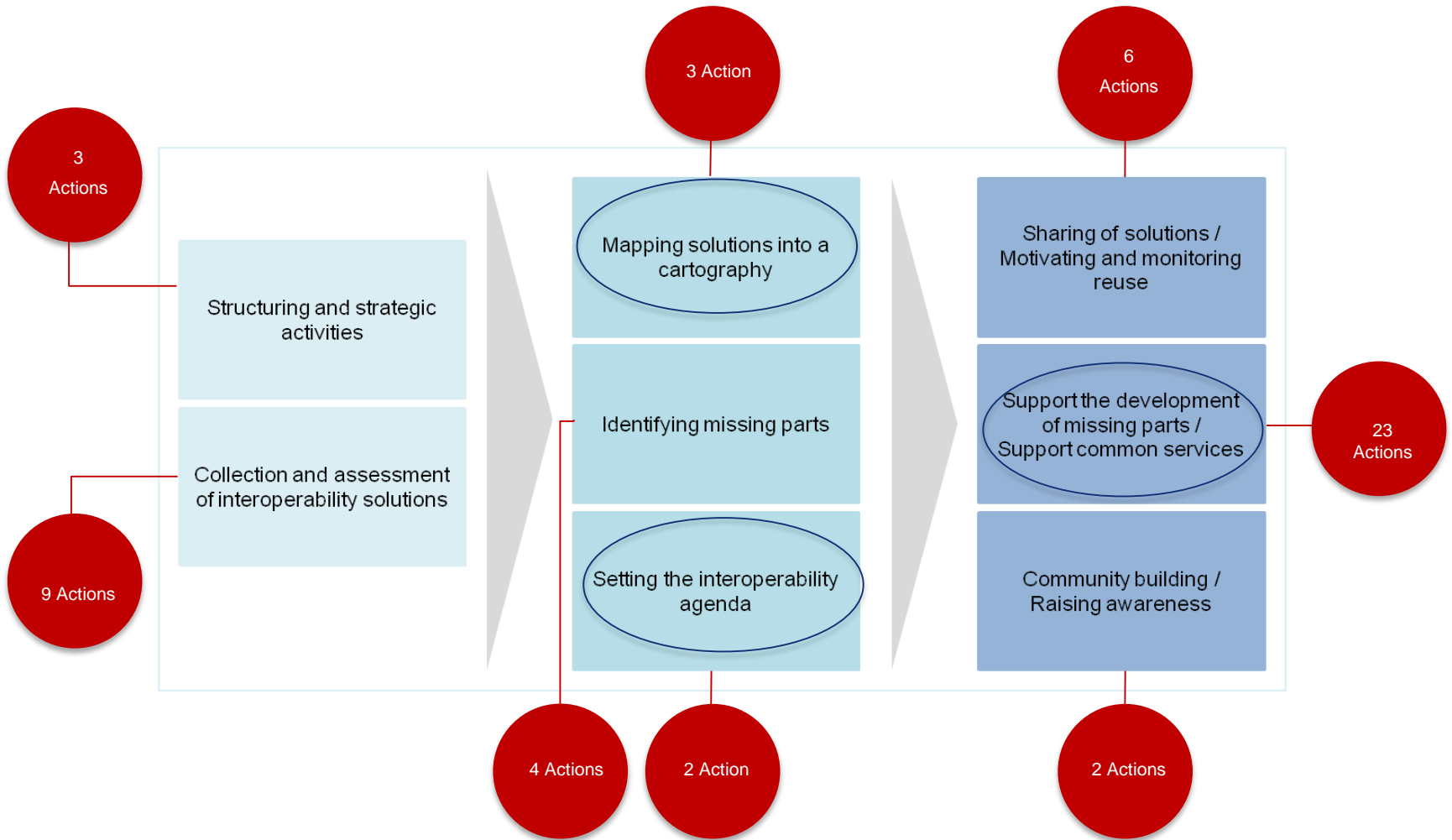


| Action number | Action name |
|---------------|--|
| 2.13 | Establishment of a European Union Location Framework |
| 2.14 | Assessment of trans-European systems supporting EU policies |
| 2.15 | Interoperability agreements on electronic document and electronic file |
| 3.1 | Assessment of ICT implications 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



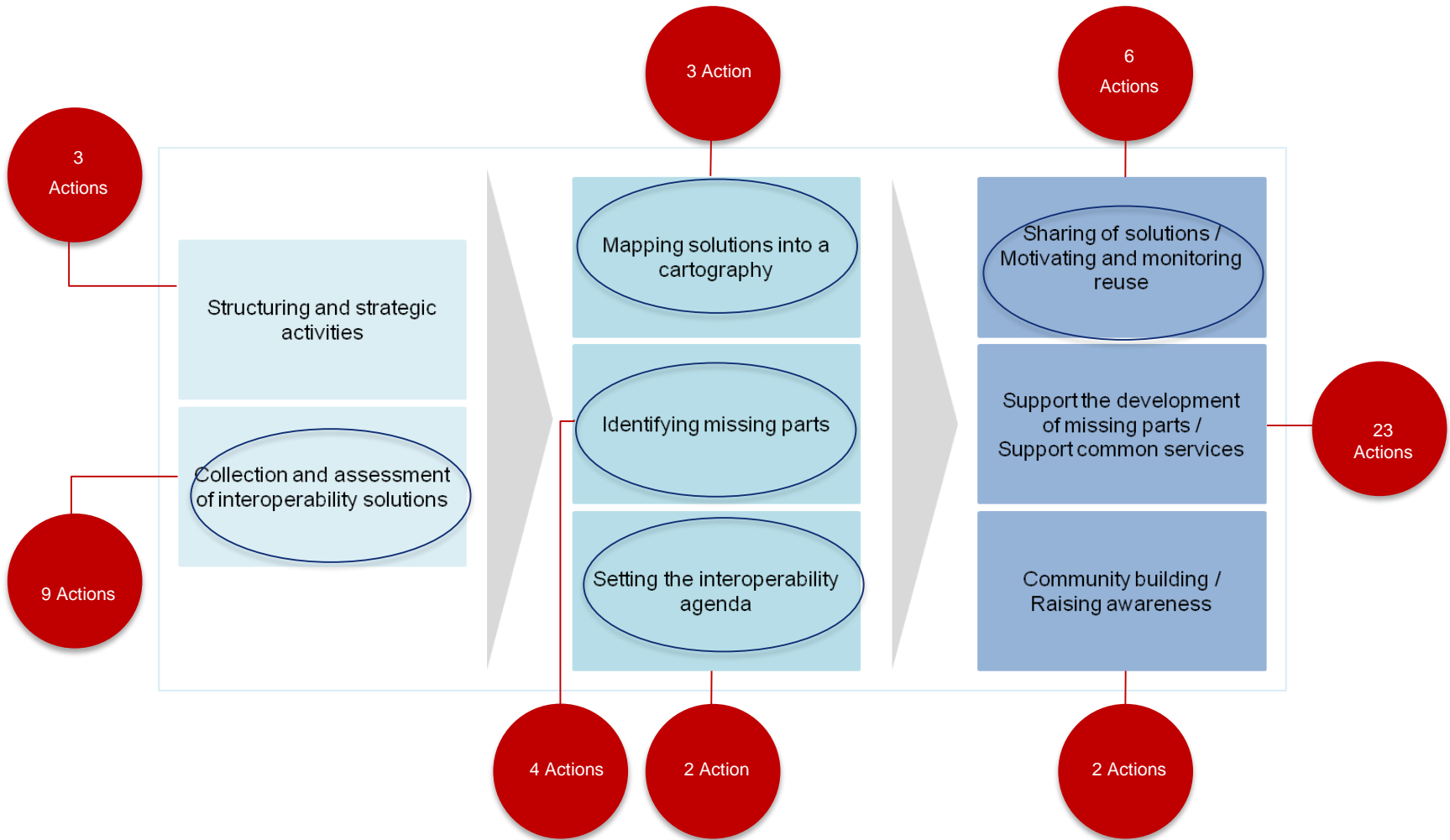
MAPPING OF ISA ACTIONS TO THE ISA VALUE CHAIN



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



MAPPING OF ISA ACTIONS TO THE ISA VALUE CHAIN





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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, Agusti 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**

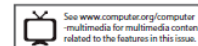
Martin le Vrang, Agis Papanтониou, Erika Pauwels, Pieter Fannes, Dominique Vandendriessche, and Johan De Smedt

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.



Update on pilots



EIRA/CarTool pilots - Pilot invitation

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.

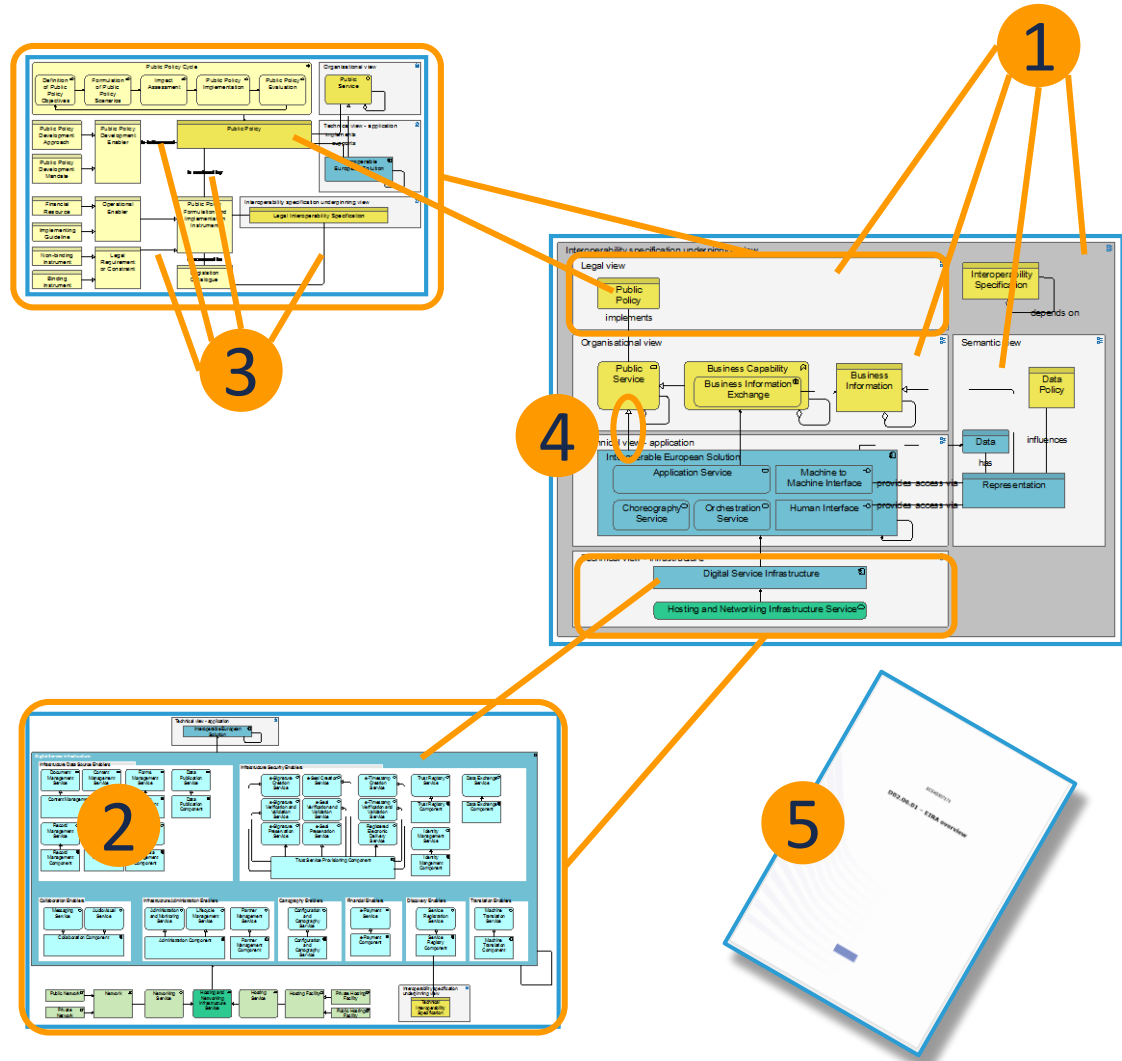


EIRA v0.9.0 beta

- What's new?

- **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.

1. **6 diagrams:** 4 views (Legal, Organisational, Semantic, Technical (Apps & Infra), 1 high-level overview and 1 interoperability specification underpinning view
2. **140 Architecture Building Blocks (ABBs):** e.g. Public Policy, Public Service, Interoperability Agreement, Data and Interoperable European Solution
3. **200 relationships between different ABBs.**
4. **18 links between the different views:** ABBs are related across the different EIF interoperability levels
5. **76 pages:** EIRA overview document.

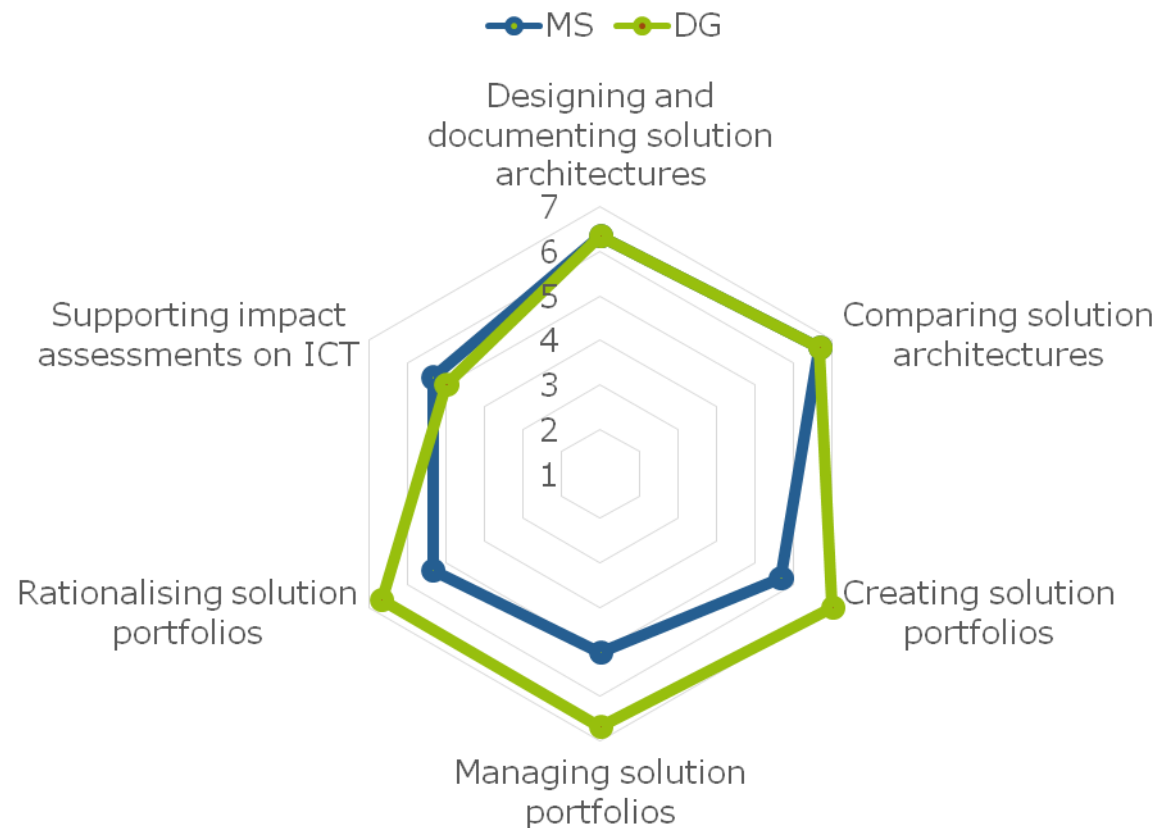


1. The pilot participants' beliefs on the potential value of the EIRA

Scale

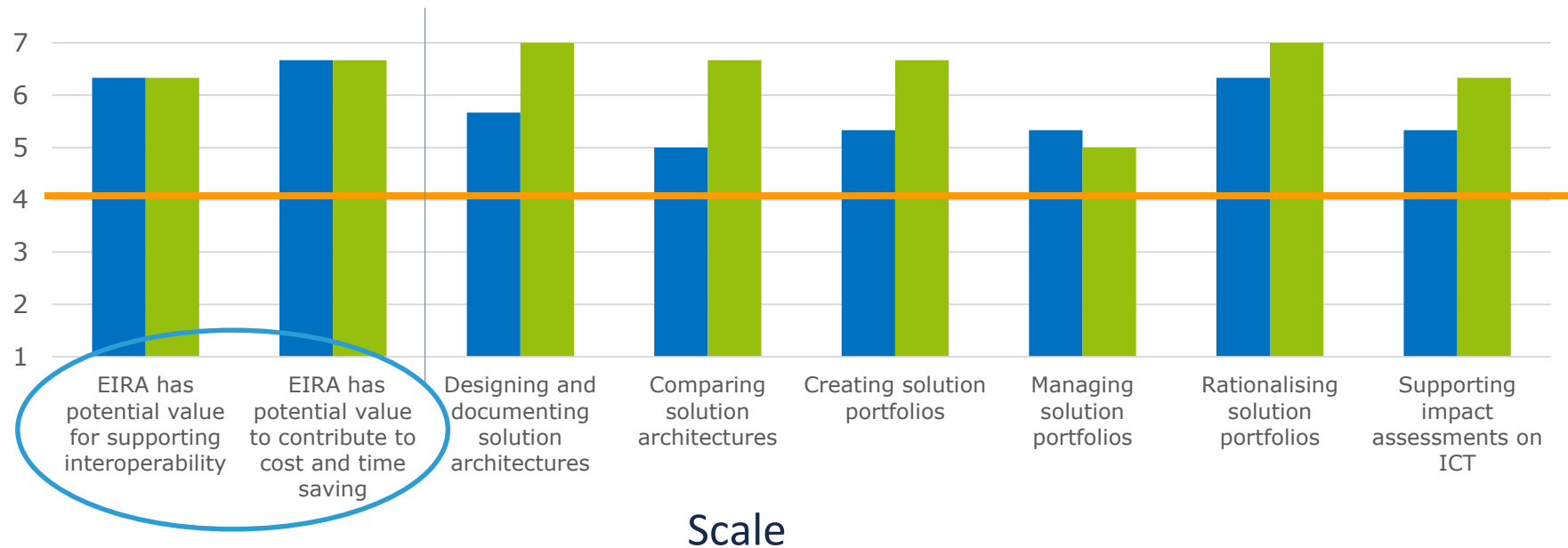
| | |
|---|---------------------------|
| 7 | Strongly Agree |
| 6 | Agree |
| 5 | Somewhat agree |
| 4 | Neither agree or disagree |
| 3 | Somewhat disagree |
| 2 | Disagree |
| 1 | Strongly disagree |

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



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



European Interoperability Strategy (EIS)

Governance and strategy



European Interoperability Framework (EIF)

Framework and principles



European Interoperability Reference Architecture (EIRA)

Guidelines and Implementation

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
Legislative Alignment

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

Organisational Interoperability
Organisation and Process Alignment

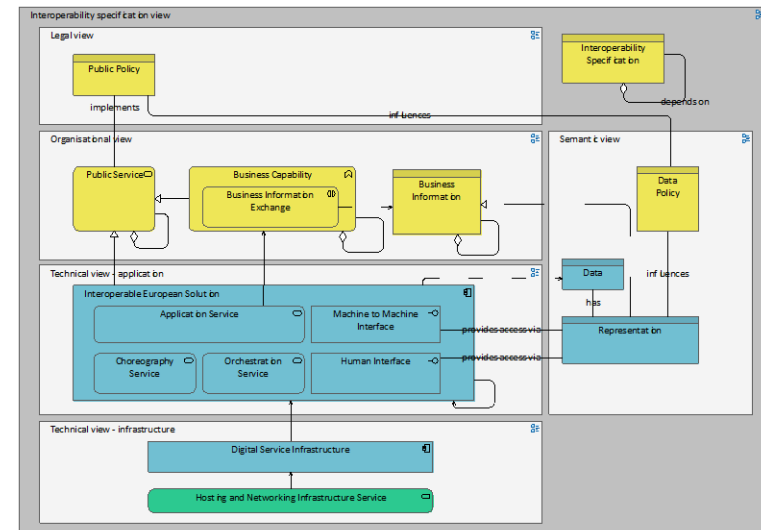
Precise meaning of exchanged information which is preserved and understood by all parties

Semantic Interoperability
Semantic Alignment

Planning of technical issues involved in linking computer systems and services

Technical Interoperability
Interaction & Transport

EIRA Guidelines





EIRA v0.9.0 beta

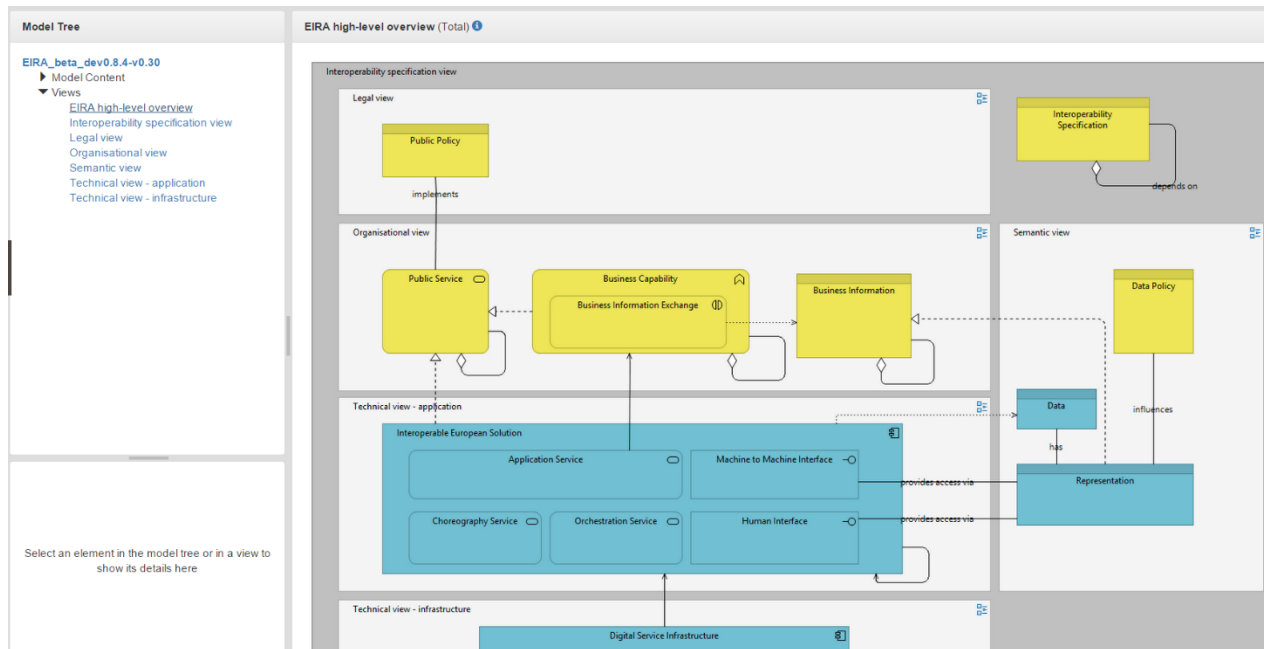
Release components

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).



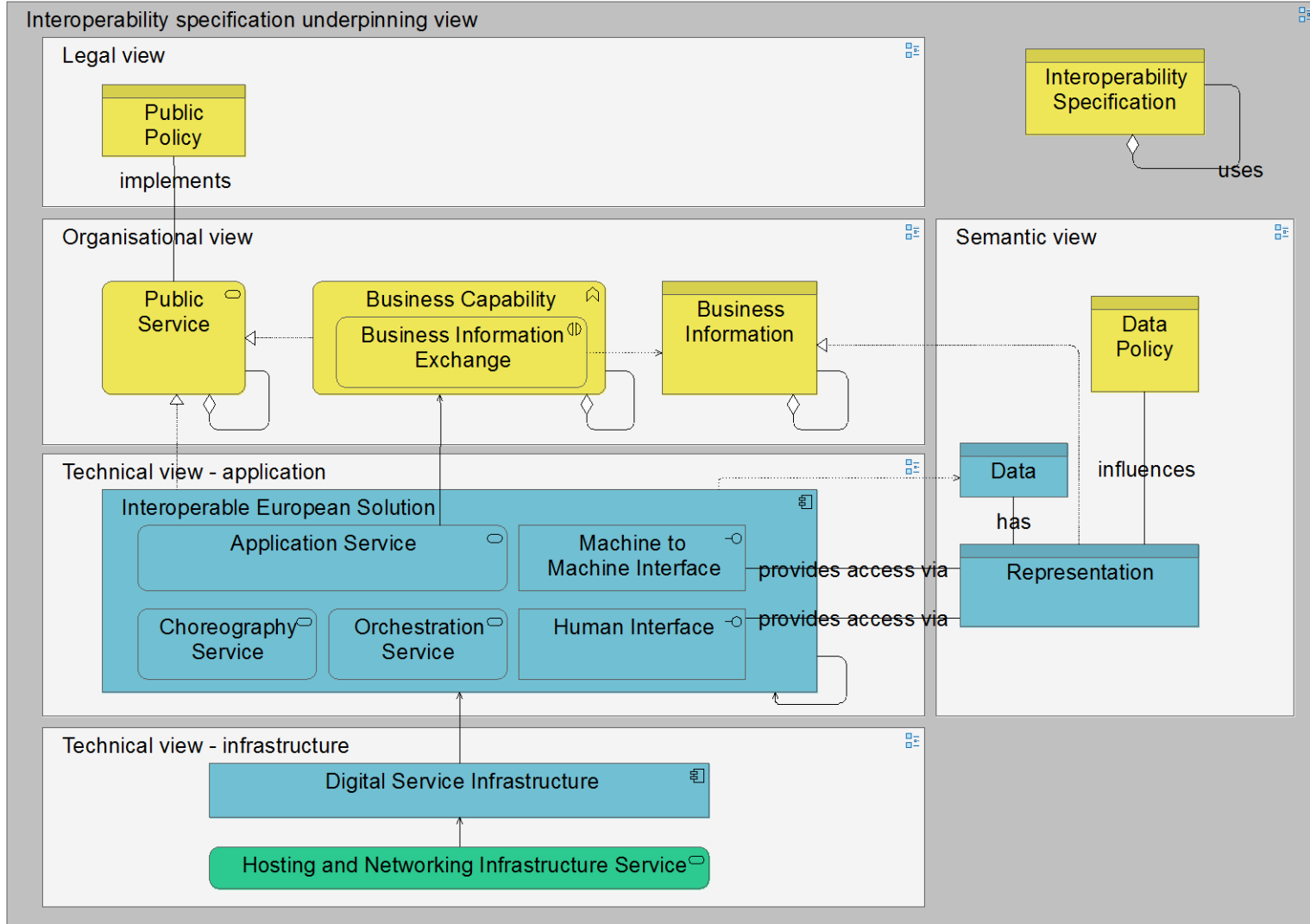
Online website :

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



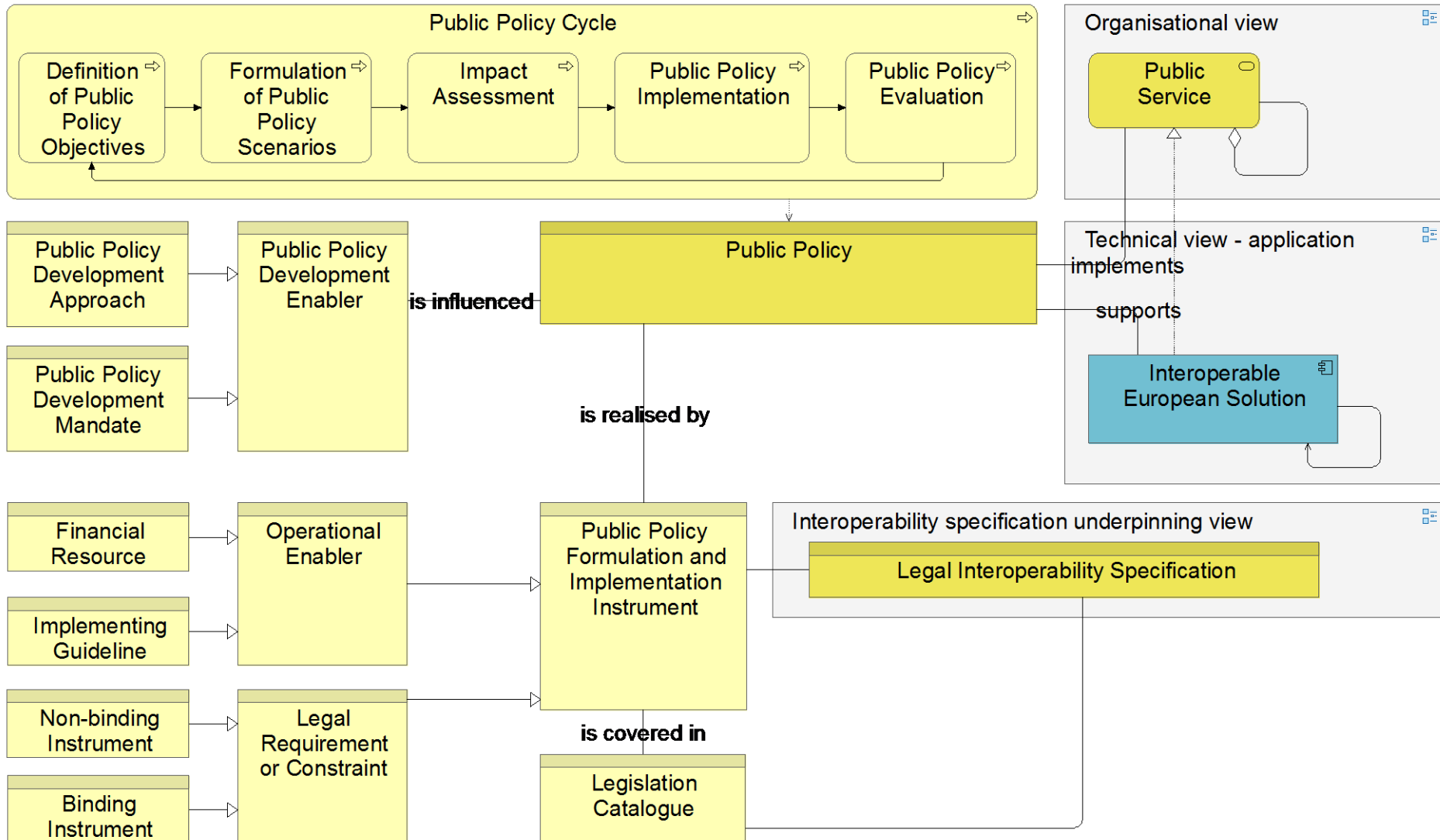
EIRA v0.9.0 beta

- High-level overview



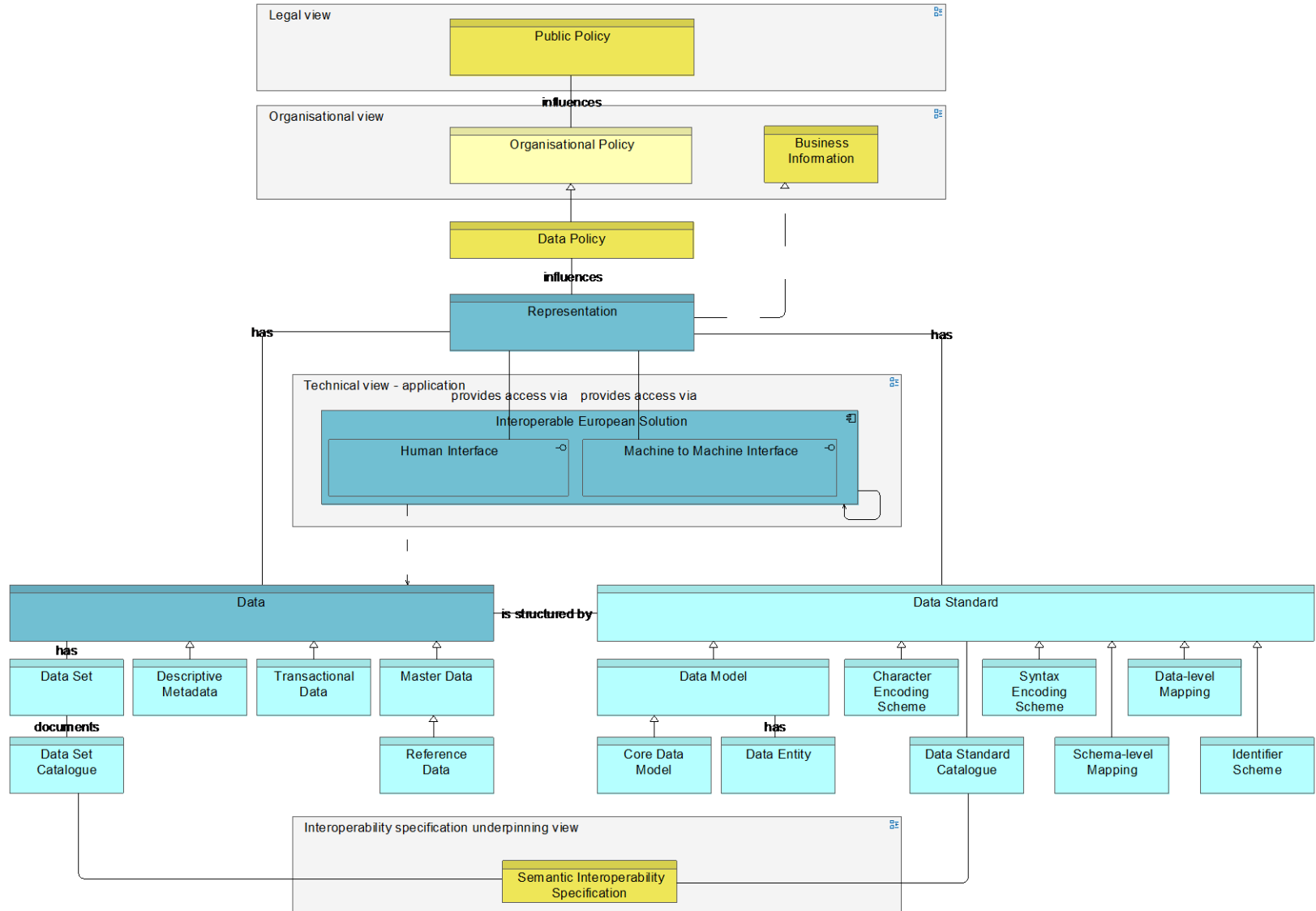
EIRA v0.9.0 beta

- Legal view





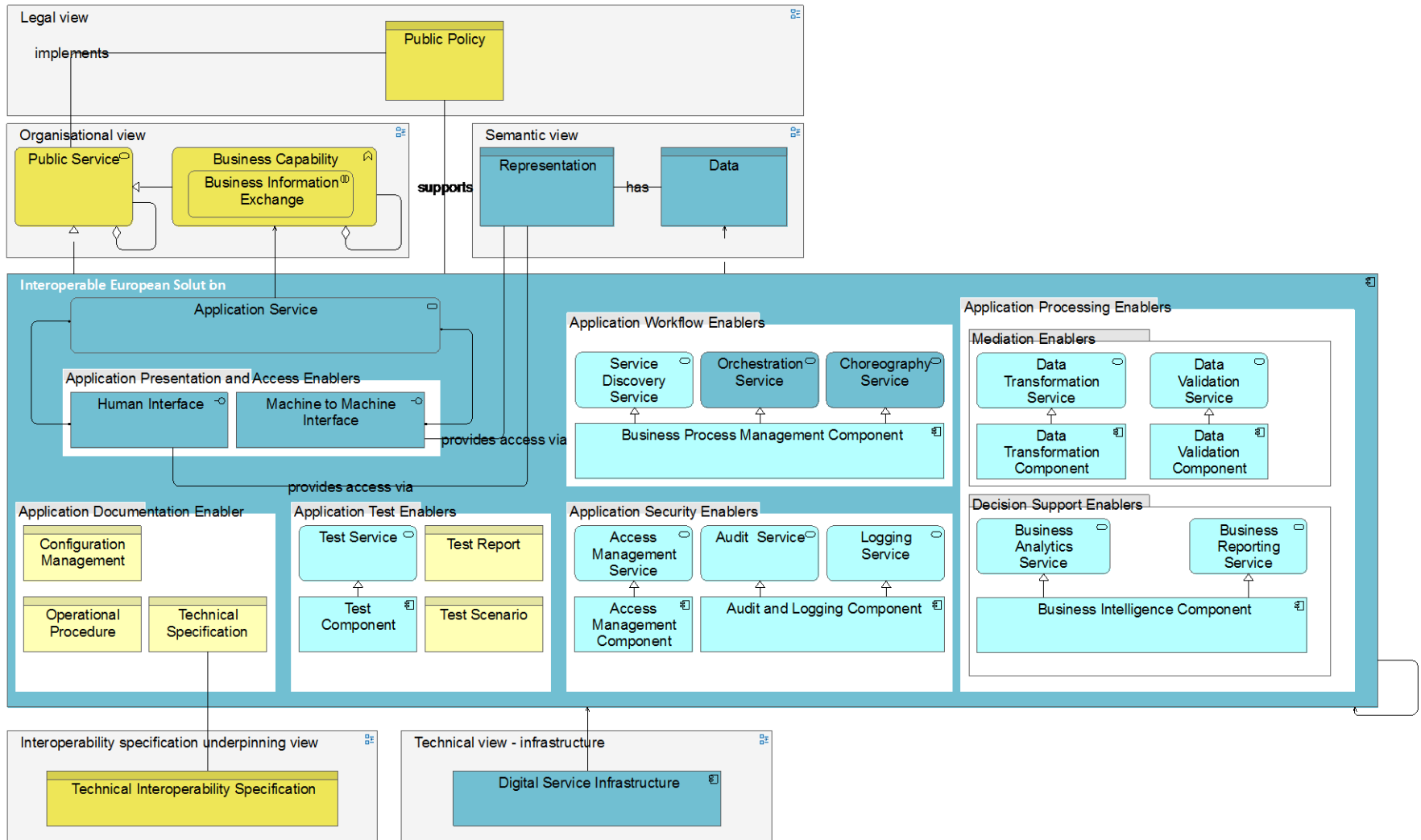
EIRA v0.9.0 beta - Semantic view





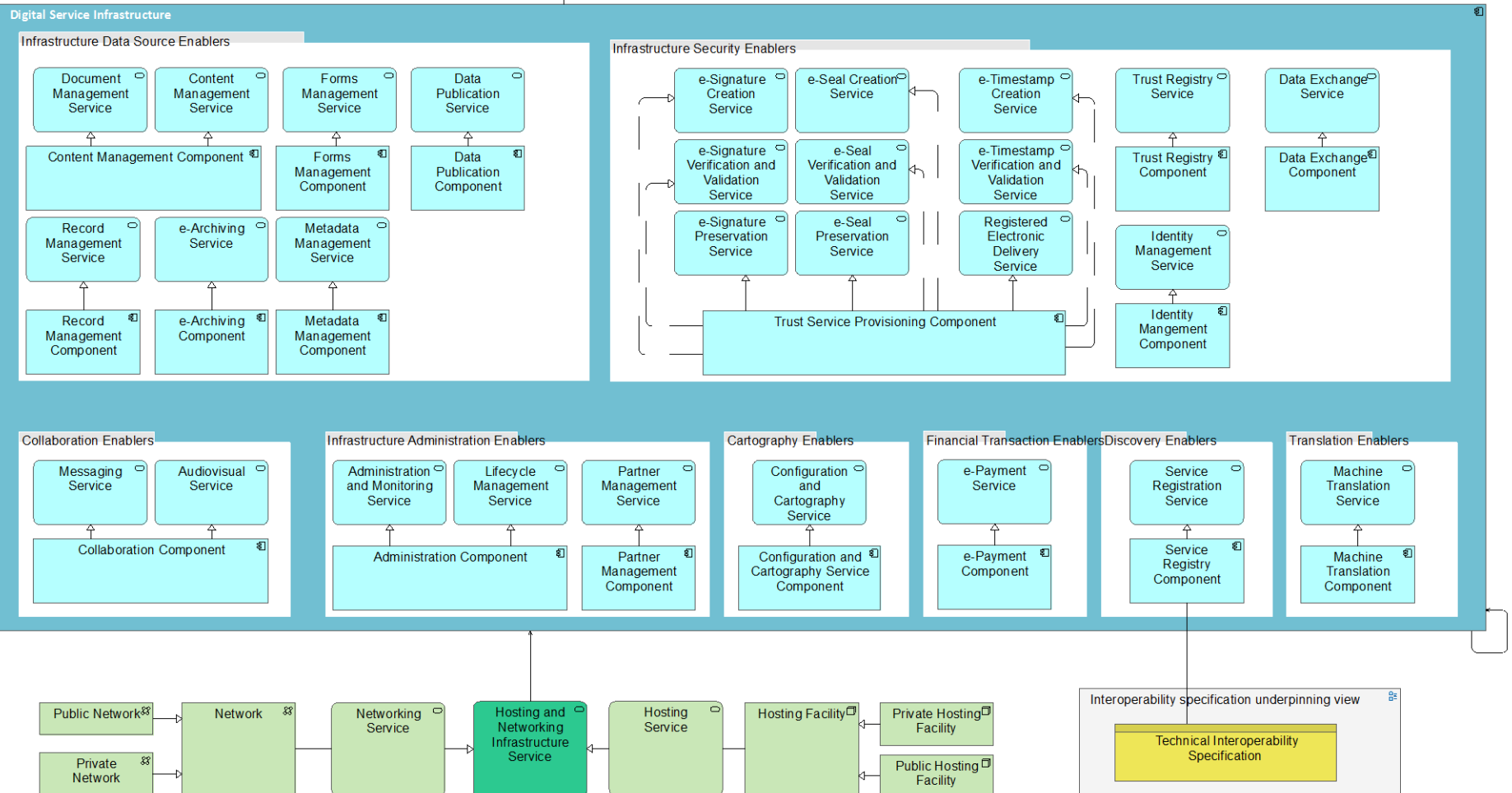
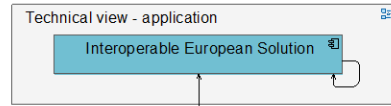
EIRA v0.9.0 beta

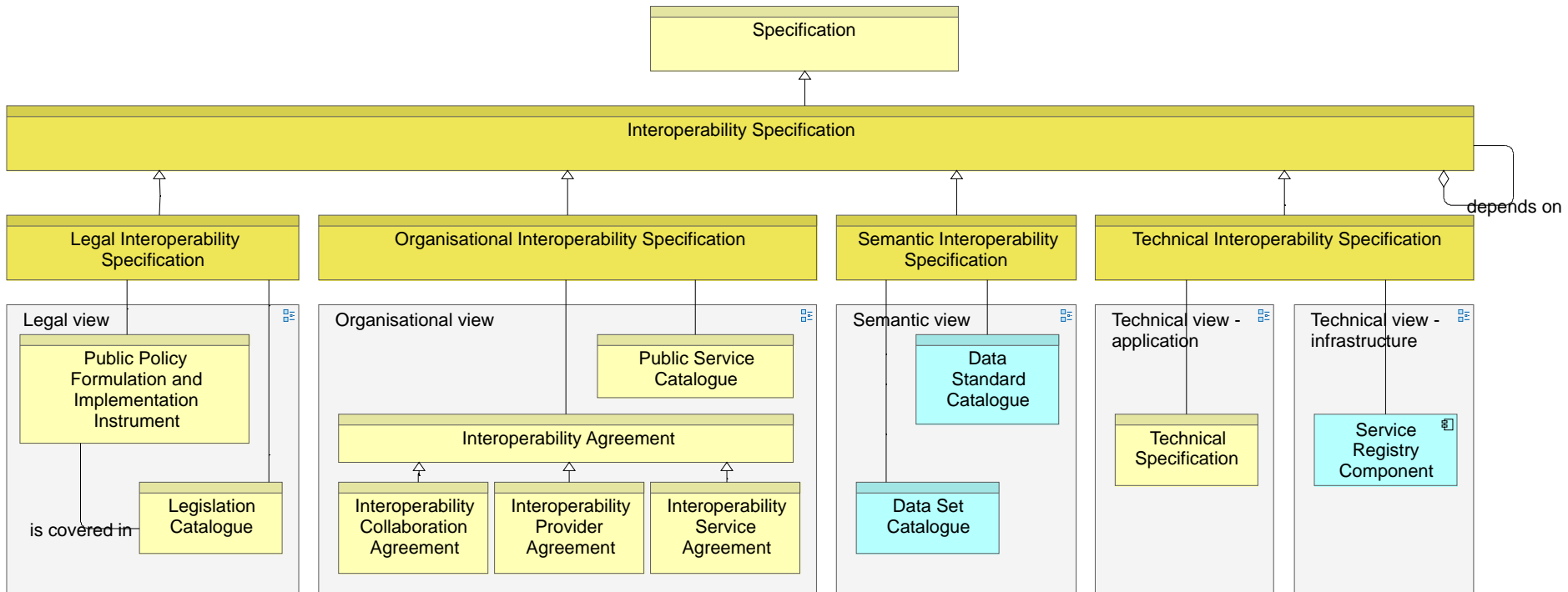
Tech. application view





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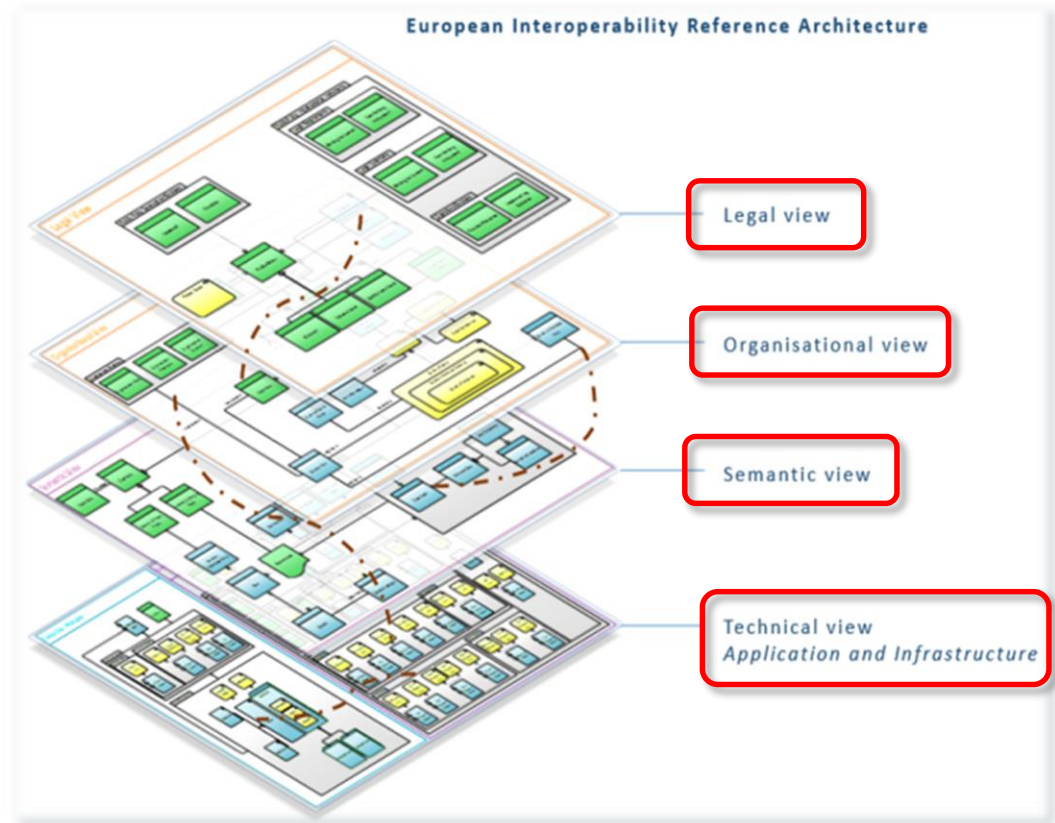


Overview on the Cartography (EUCart and CarTool)



Active elements

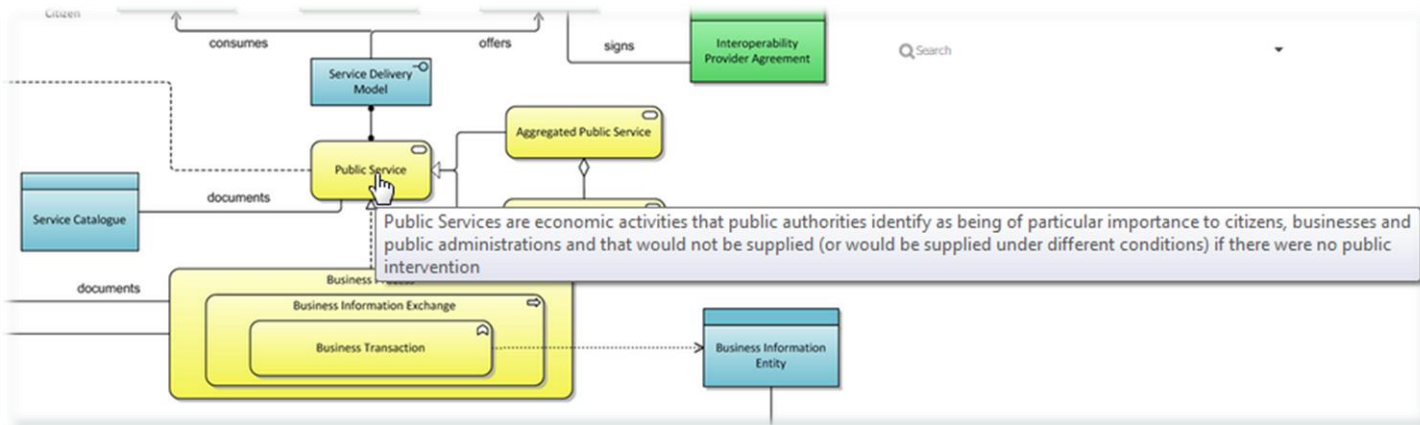
- Integrates the different views as active elements
- Clicking a view's name opens the corresponding zoomed view





Hover over

- Definitions displayed when hovering over a building block

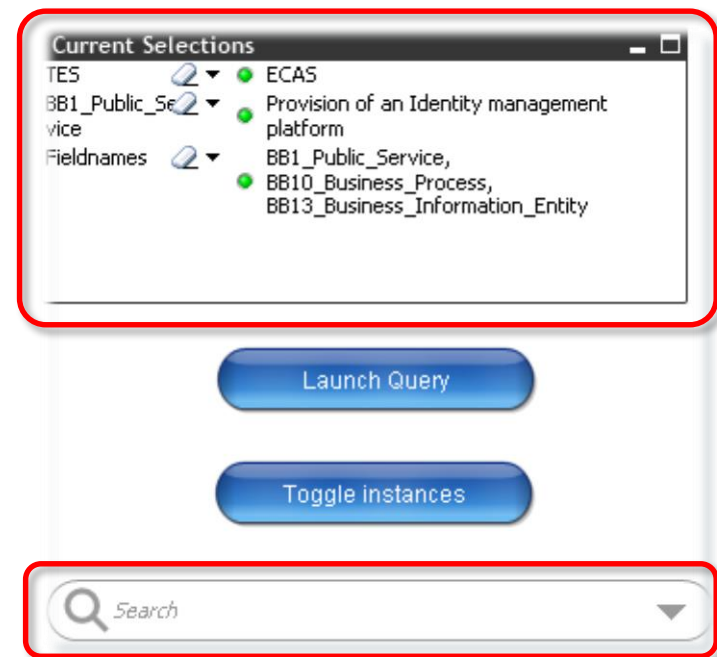


Active elements to build a query

- 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

- 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





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 software interface with two red boxes highlighting key features:

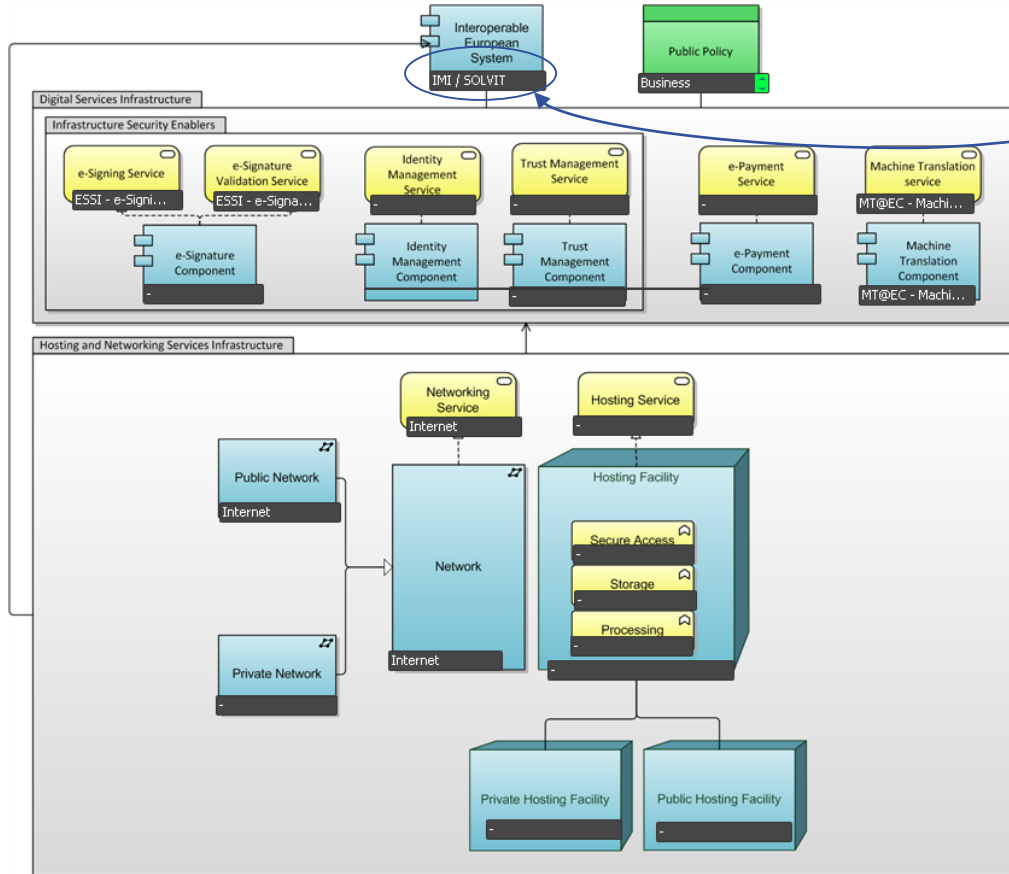
- Selection Menu:** A grid of building block identifiers such as BB158, BB154, BB150, BB144, BB138, BB157, BB153, BB149, BB143, BB137, BB157, BB153, BB149, BB143, BB136, BB156, BB152, BB147, BB141, BB135, BB156, BB151, BB146, BB139, BB134, BB155, BB150, BB145, BB139, BB133.
- Control Panel:** A search bar and two buttons: "Clear selections" and "Toggle building block descriptions".
- Description Table:** A table with columns "Building Block Name" and "Building Block Description".

| Building Block Name | Building Block Description |
|----------------------------------|---|
| BB66_Business_Intelligence_Co... | Application component that encapsula... |
| BB43_Data_Exchange_Service... | The Data Exchange Service enables th... |
| BB41_Machine_Translation_Ser... | No description |



Archimate modelling notation legend:

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



Current Selections

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

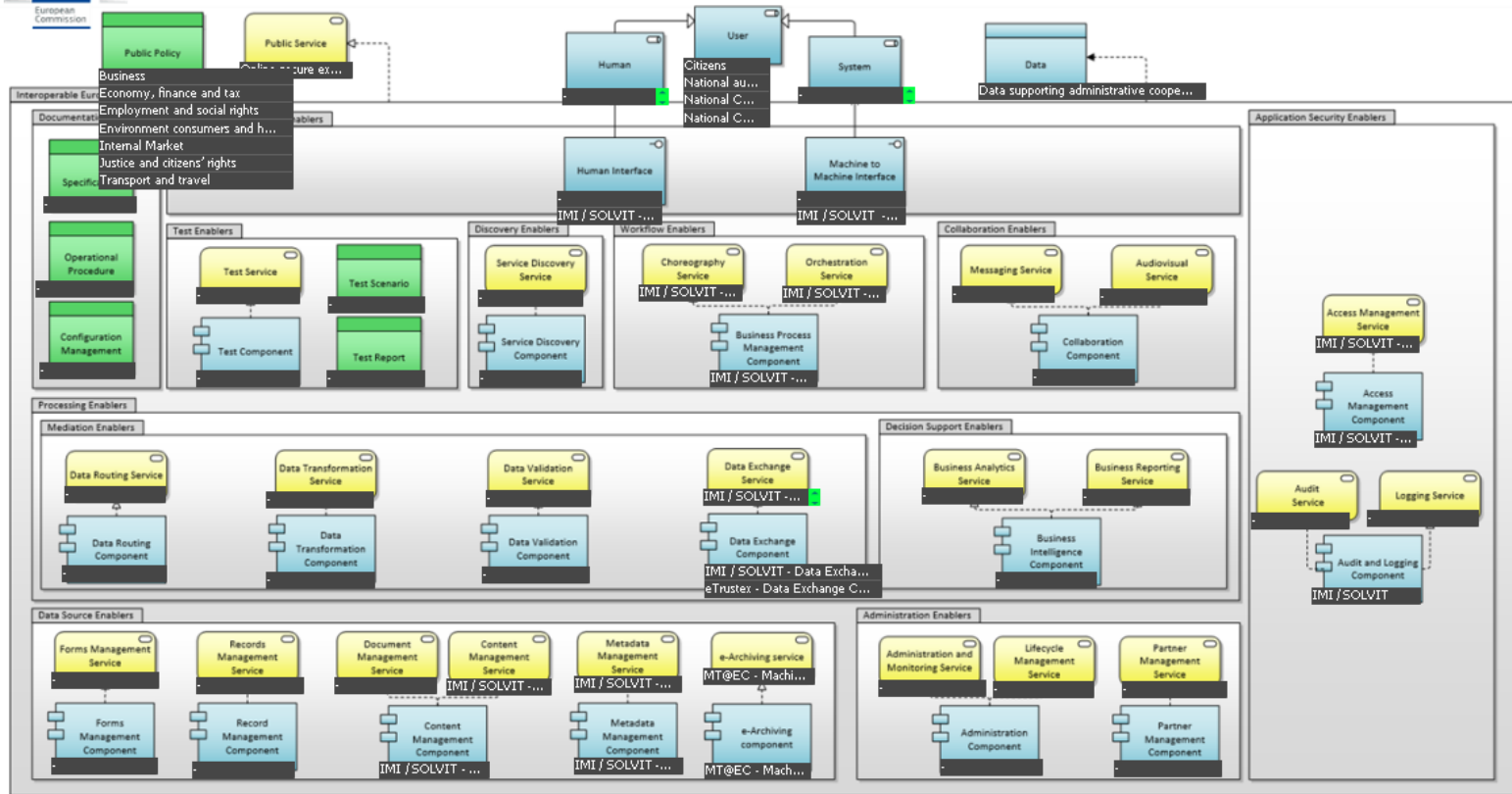
- Launch Query
- Toggle Instances

Search



Archimate modelling notation legend:

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



Launch Query

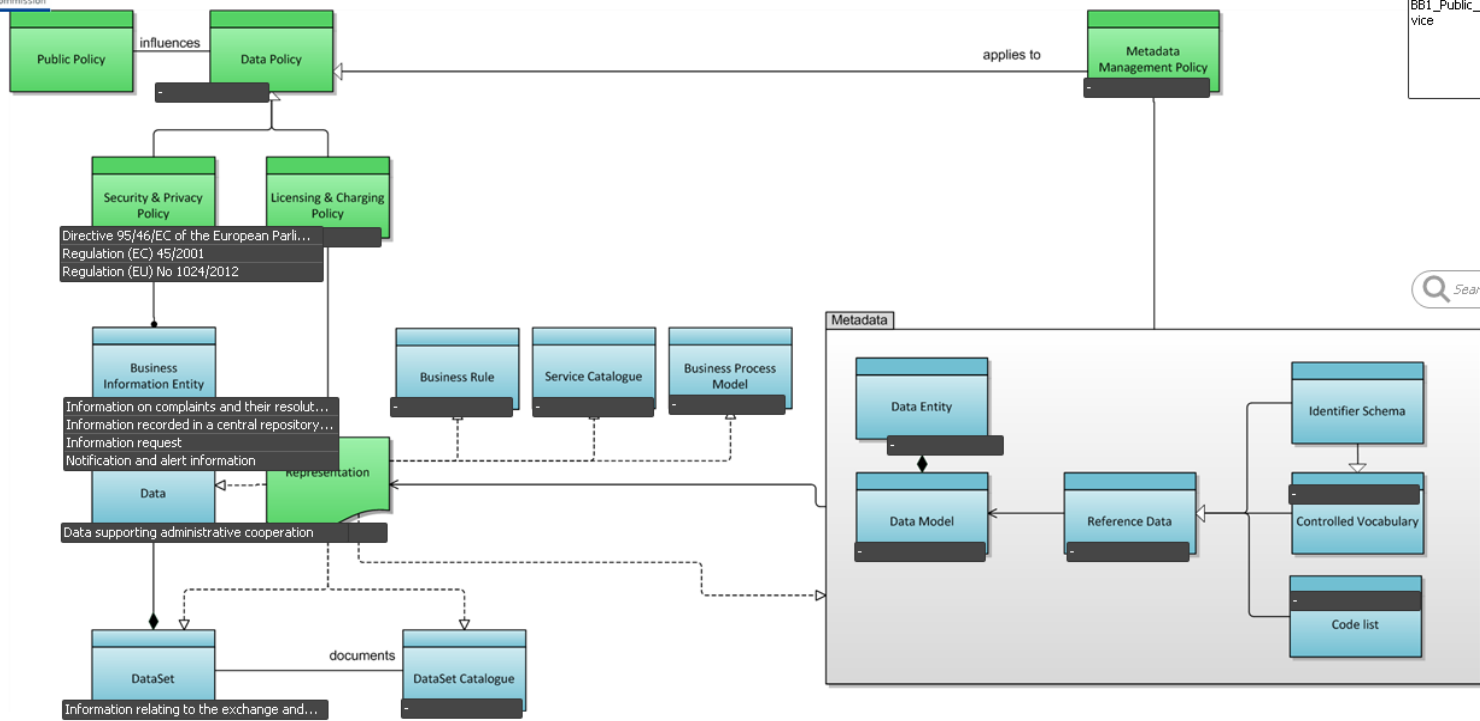
Toggle instances

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

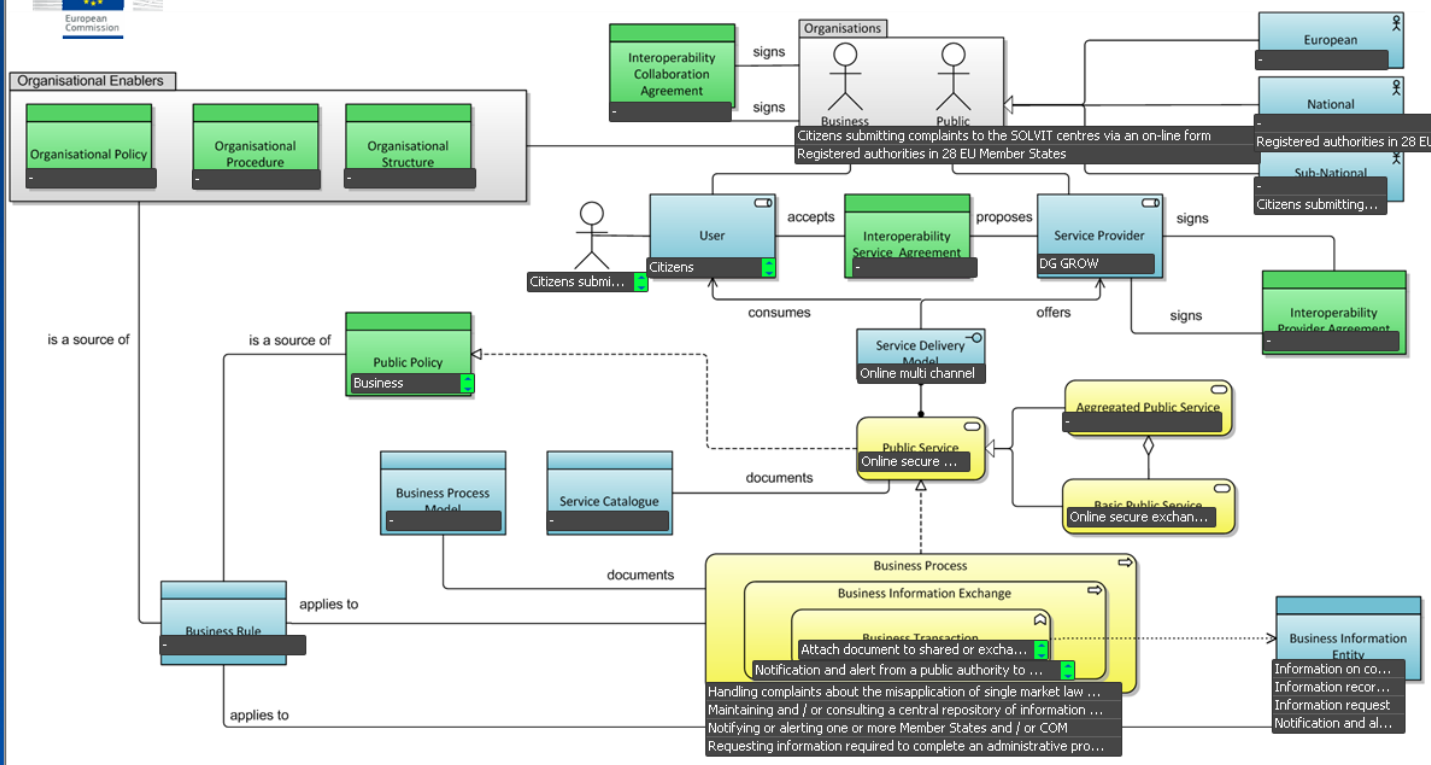
- BB60_Interop... IMI / SOLVIT
- able_Europe... System
- BB1_Public_Se... vice

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:

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- motivation extensions

Current Selections

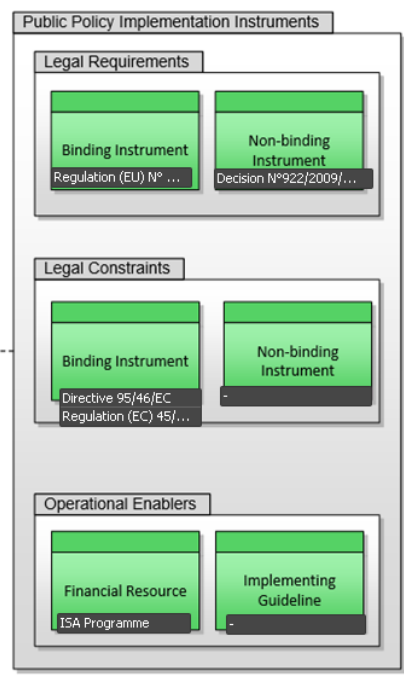
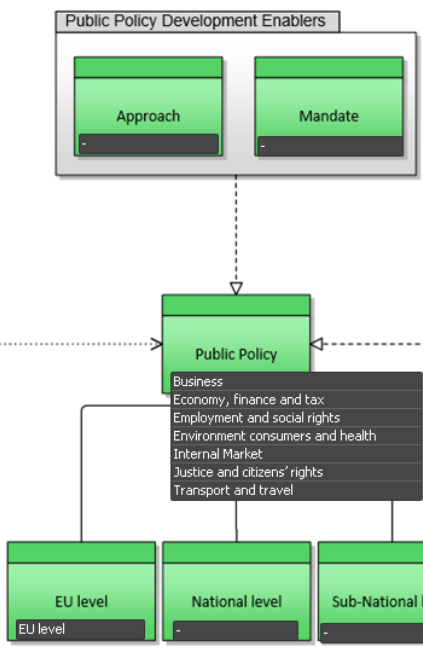
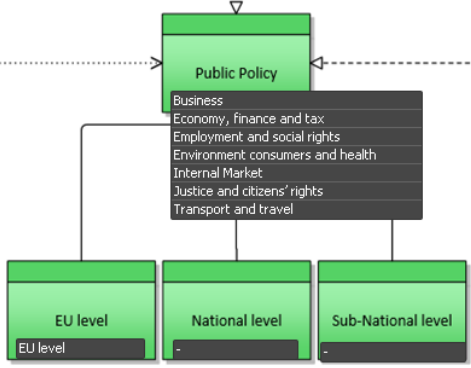
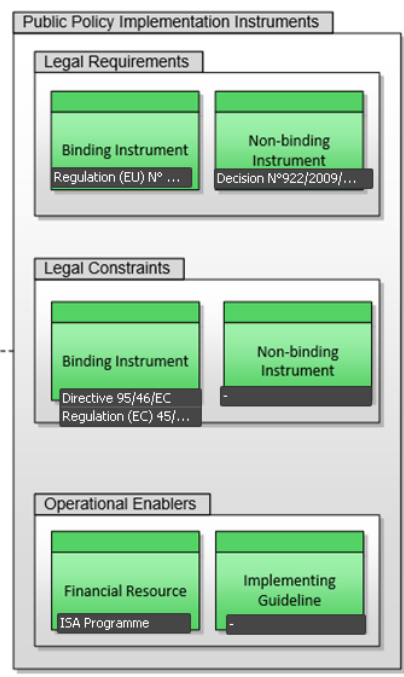
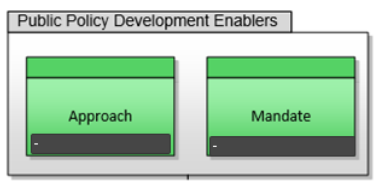
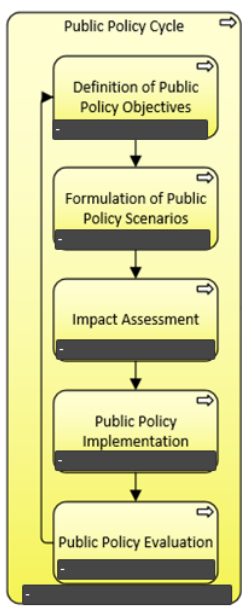
- BB60_Interoperable_European_System
- BB1_Public_Services

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

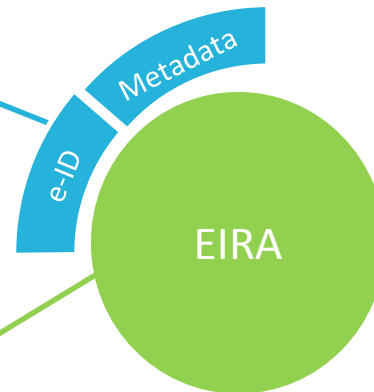


Positioning of the EIRA and the Cartography



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

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



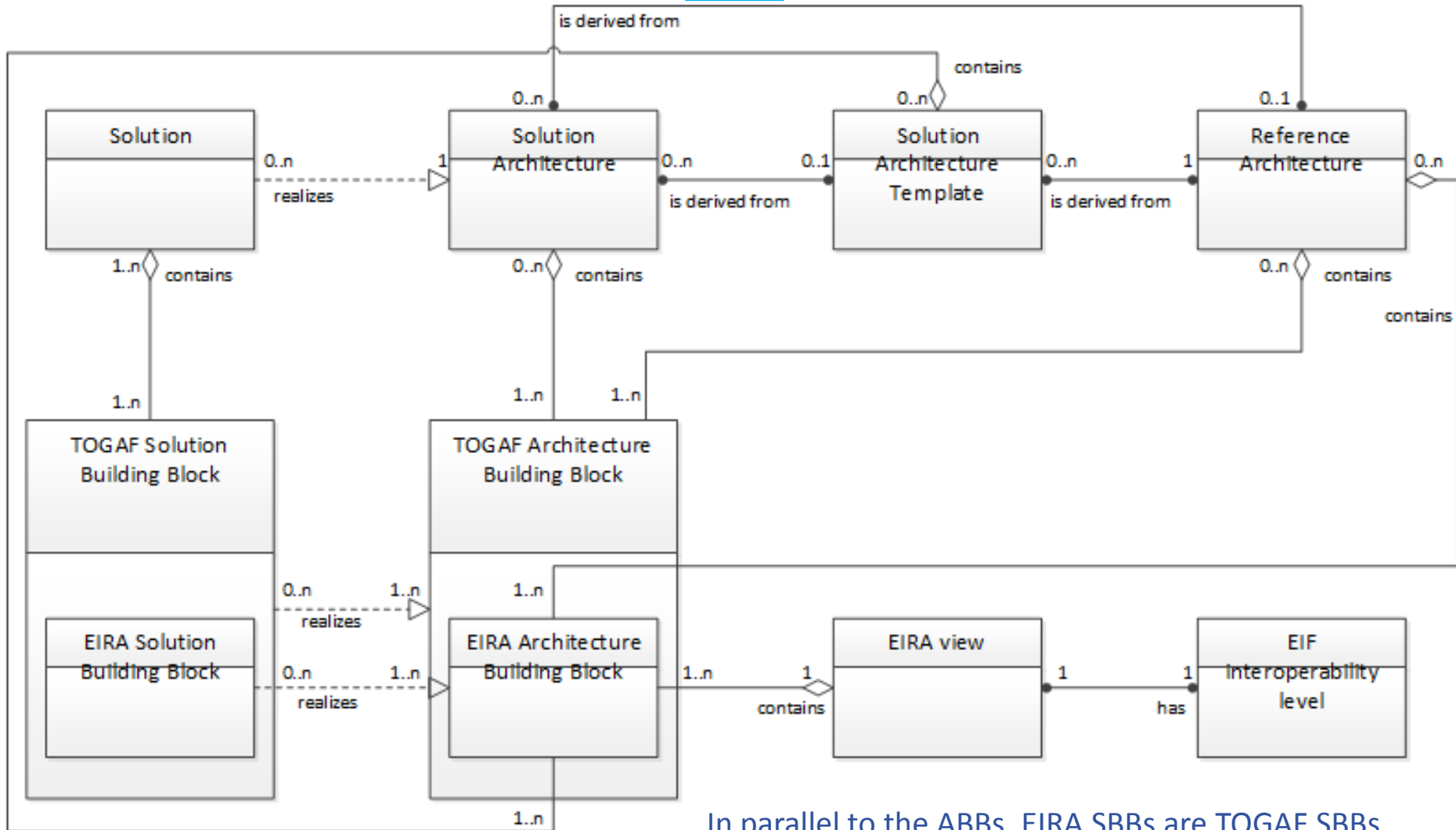
Core Reference Architecture:
EIRA – minimal cross-sector
interoperability

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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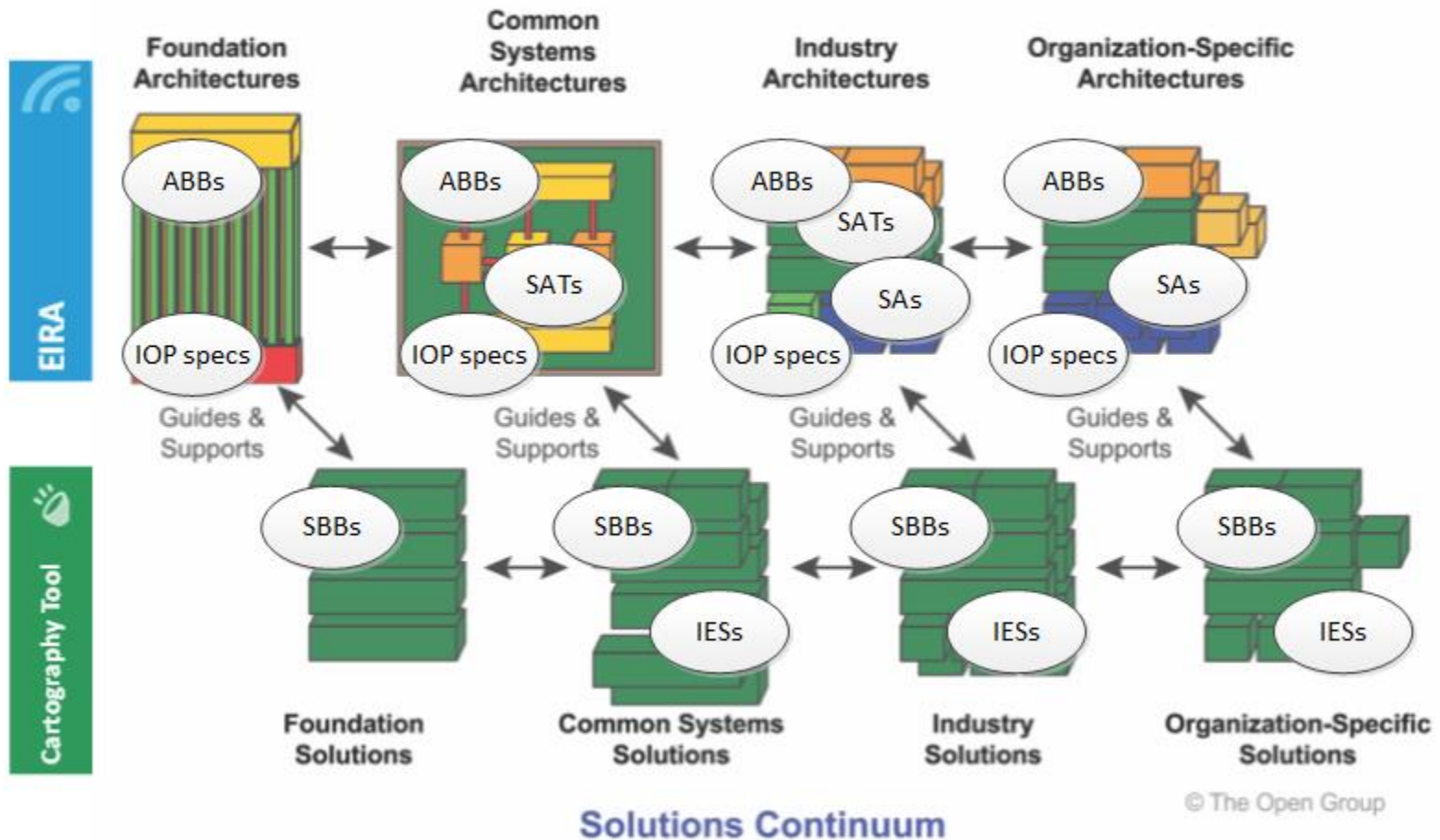


In parallel to the ABBs, EIRA SBBs are TOGAF SBBs.



EIRA's positioning within TOGAF's Enterprise Continuum

Architecture Continuum





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)

General introduction

Overview of the EIRA

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

Supporting material

Releases

isa
About
Joinup
EIA Programme
About us
Contact us

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



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

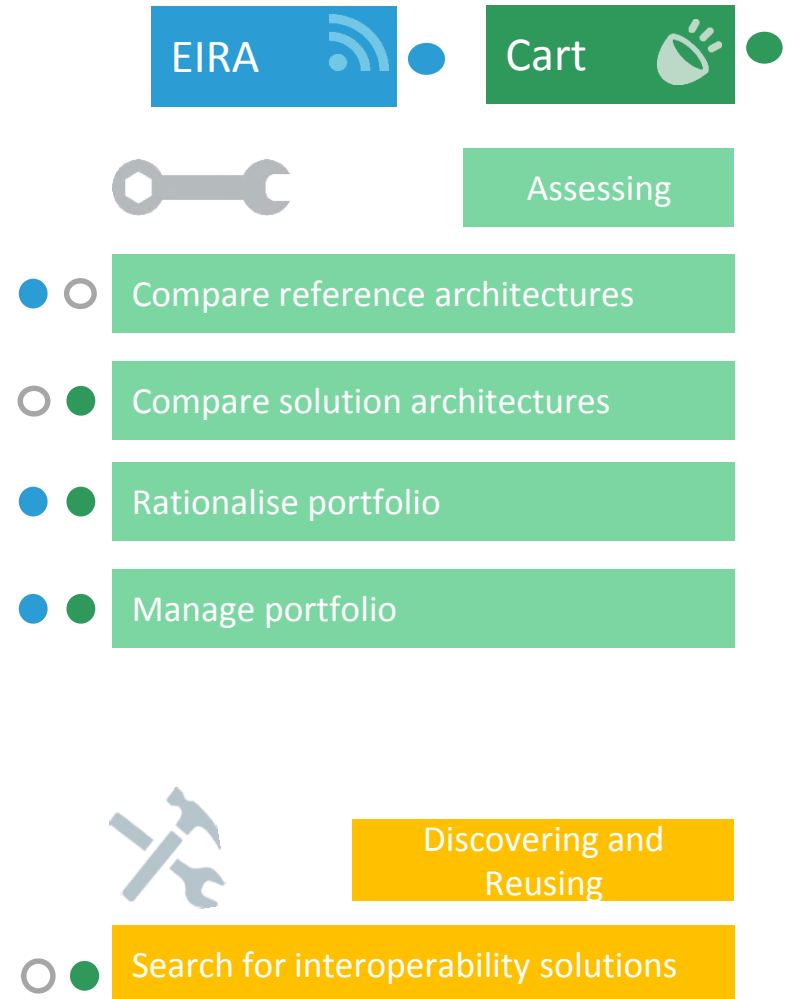
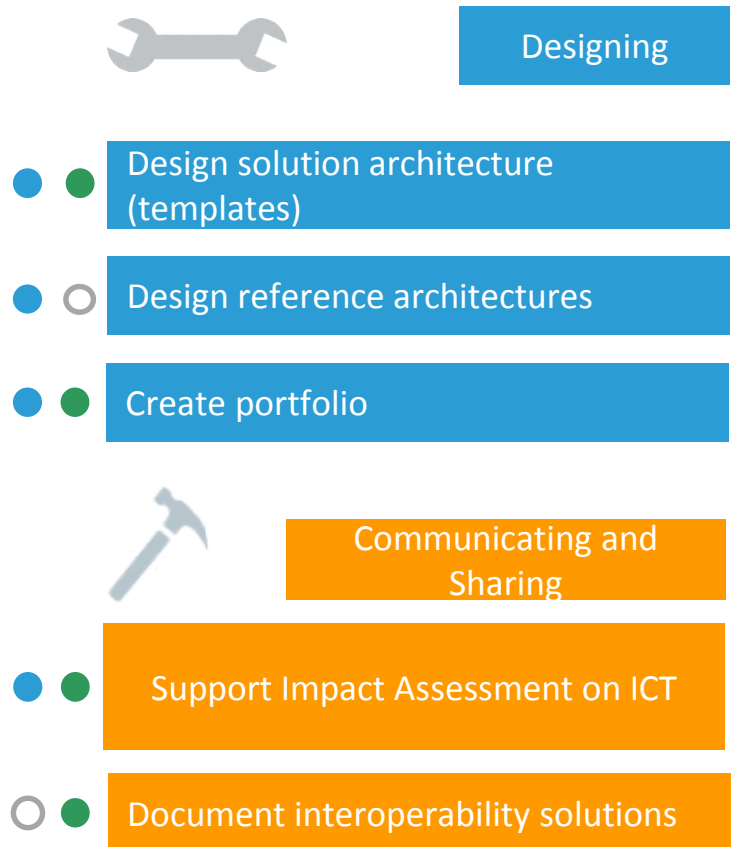
Help documenting the most salient interoperability elements of complex systems and facilitate the sharing of reusable solutions.



Discovering and Reusing

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

EIRA and CarTool use-cases



Contact us

Project Officer

Raul Abril

Raul-Mario.ABRIL-JIMENEZ@ec.europa.eu

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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