



D03.02 – eDelivery SAT

**eDelivery Solution Architecture Template (SAT)
v1.0.0**

Specific Contract No 442 under Framework Contract DI/07172 – ABCIII

ISA Action 2016.32 – European Interoperability Architecture

Change control

Modification	Details
Version 1.0.0	
Migration to EIRA 2.0.0	The model has been migrated from EIRA 1.1.0 to EIRA 2.0.0
Validation by the Policy Owner	The SAT has been validated by the policy owner
Removal of the "Future work" paragraph	
Version 1.0.0 Beta	

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1 INTRODUCTION

This document contains the description for a Solution Architecture Document (SAT) for Electronic Delivery (eDelivery).

This SAT is based on EIRA v2.0.0

The ArchiMate source are embedded in this document in the "Archi format" as well as in "The Open Group ArchiMate Model Exchange File Format".

1.1 Purpose of this document

Enterprise and Solution architects can use this document to design solution architectures in the domain of eDelivery.

1.2 List of acronyms used in this document

Table 1-1

ABB	Architecture Building Block
BDXL	Business Document Metadata Service Location
DNS	Domain Name System
eIDAS	Electronic Identification and Trust Services for Electronic Transactions in the Internal Market
EIRA	European Interoperability Reference Architecture
ETSI	European Telecommunications Standards Institute
EU	European Union
IP	Internet Protocol
OASIS	Organization for the Advancement of Structured Information Standards
PKI	Public Key Infrastructure
SAT	Solution Architecture Template
SML	Service Metadata Locator
SMP	Service Metadata Provider
SBB	Solution Building Block
TLS	Transport Layer Security

2 GOAL, DESCRIPTION AND TARGET AUDIENCE

This chapter gives the goals and a description on eDelivery and indicates the target audience and their potential use of this Solution Architecture Template (SAT).

2.1 Goal

The purpose of this SAT is to provide guidance by defining a minimal, but holistic (legal, organisational, semantic and technical) interoperability architecture to implement the technical component of eDelivery. The eDelivery SAT should allow businesses and public administrations to have a common understanding of the most salient building blocks from the perspective of interoperability.

2.2 What is eDelivery

eDelivery helps public administrations to exchange electronic data and documents with other public administrations and businesses, in an interoperable, secure, reliable and trusted way. Through the use of eDelivery, every participant becomes a node in the network using standard transport protocols and security policies. eDelivery is based on a distributed model, allowing direct communication between participants without the need to set up bilateral channels. Once implemented, eDelivery works as a collection of distributed nodes that are conformant to the same technical rules and therefore capable of interacting with each other.

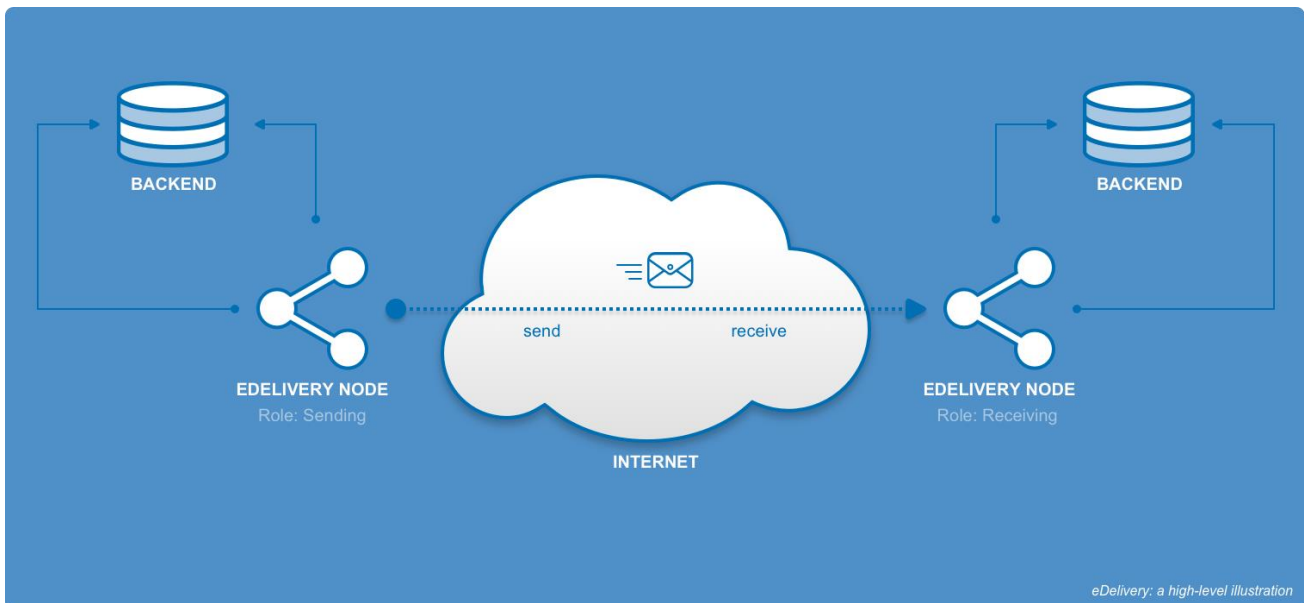


Figure 1 High level view¹²

The technical architecture of eDelivery is based on a conceptual model called 'four-corner model'.

¹ <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eDelivery+Background>

² For a more technical representation, see sections 3.6 and 3.7

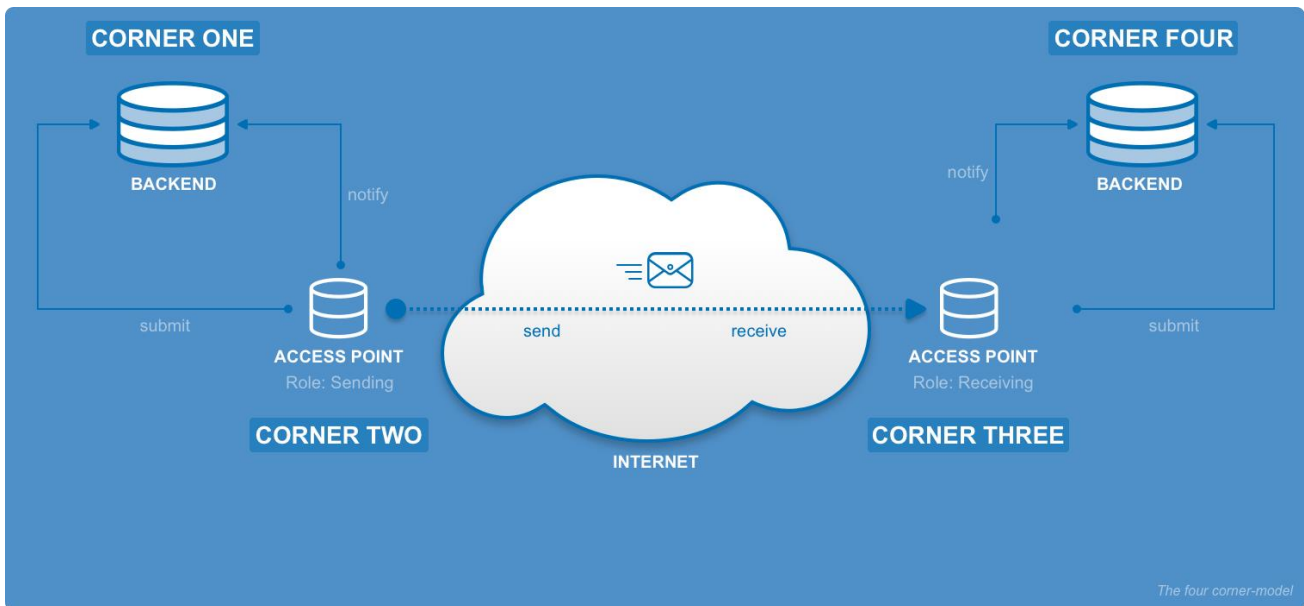


Figure 2 Four corner model³

This means that Backend systems (corners one and four) do not exchange messages directly with each other but via eDelivery nodes (corners two and three) that, in any given exchange, play the sender or receiver role. eDelivery's main goal is to ensure that Public Administrations can exchange any type of data and documents across borders. This means enabling Administration to Administration communication contributing to the creation of a EU single market which is fit for the digital age. eDelivery can also be used in Administration to Business and Business to Administration data exchange scenarios.

2.3 What is a solution architecture template (SAT)

A Solution Architecture Template (SAT) is a specification extending the EIRA providing support to solution architects in a specific solution domain. An SAT contains a motivation (principles, requirements), a goal and a description of the supported functionalities, a sub-set of the EIRA core Architecture Building Blocks (ABBs) covering the four views, a set of specific ABBs extending EIRA's views enabling specific functionalities to be provided by implementations derived from the SAT and the interoperability specifications of selected ABBs and a narrative for each EIRA view.

The benefits of a SAT are the following:

- Provides architects with a common approach to cope with a specific interoperability challenge. It also places the focus on the key-points you need to consider.
- An architect can create a solution architecture by mapping existing Solution Building Blocks (SBBs) to an SAT, based on the interoperability specifications that are provided. This is done by providing SBBs for the ABBs identified in the SAT.
- When an architect creates an SAT, he/she can define the interoperability specifications for the SAT's ABBs and moreover recommend specific SBBs which produces faster and more interoperable results.
- An SAT can be created within and across the different views of the EIRA. An SAT can then support architects specialised in different interoperability levels."

³ <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Message+Exchange>

2.4 Target audience

This document has the following target audience:

Table 2-1

Audience	Description
Architect	Enterprise/solution architects involved in the design and operation of document and data exchange systems such as eDelivery.
Policy officer	Policy officers involved in the roll out of EU or national policies that require the secure exchange of documents and data.
Service providers	Service providers involved in the implementation and roll-out of eDelivery.

3 EDELIVERY INTEROPERABILITY MAPPED TO THE EIRA


This chapter contains for each EIRA view the corresponding ArchiMate model and narrative. Next to the SAT's EIRA architecture building blocks, the ArchiMate model includes, where applicable, the related specifications, principles and requirements.

The models have been scaled down to fit with the text, they are included in bigger format in the appendix.

3.1 ArchiMate motivation extension

In addition to the standard EIRA concepts, the diagrams use the following concepts coming from the ArchiMate motivation extension

Table 3-1

Non-EIRA concept	Description
	<p>A goal is defined as an end state that a stakeholder intends to achieve.</p>

The following goals are used in this SAT:

- **Scalability and performance:** Enabling the number of participants in the data exchange network to grow as well as the number of exchanged messages.
- **Interoperability:** Implementing common technical specifications that enable diverse organisations to exchange data and documents.
- **Legal assurance and accountability:** Promoting a high level of transparency and confidence among all participants in the message exchange network.
- **Security:** Enabling an atmosphere of trust among all participants in the message exchange network.

3.2 How to use this SAT

An architect that uses this SAT typically wants to perform a gap analysis between an existing solution and this Solution Architecture Template, or he/she wants to build a solution in the domain of eDelivery and uses this document as guidance.

3.2.1 Gap Analysis

Using this SAT for gap analysis, the architect can map the building blocks of the solution to the ones in this SAT and identify which building blocks are missing. These building blocks can either indicate missing functionality or missing interoperability specifications.

3.2.2 Building a solution

When building a solution, the architect is expected to use the four different EIRA views and provide a solution in the form of Solution Building Blocks (SBBs) for the Architecture Building Blocks (SBBs) that are indicated. This is done by replacing the Architecture Building Block (ABB) with an annotated Solution Building Block. The existing Solution Building Blocks (SBB) in this SAT should

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not be removed and replaced, however, the acknowledgement of reusing these building blocks can be done by removing the ABBs which they specialise.

Interoperability Specifications (IoP specs) are added as specialisation of an Interoperability ABB, implemented in the form of an SBB and attached to an ABB as interoperability requirements. The final solution should only contain the implementation (the SBB) of the IoP Spec

The result will be a solution architecture that will contain only SBBs, all ABBs should have been removed (in the case this SAT already provides SBBs for this ABB) or replaced by SBBs (solutions that implement that ABB).



The SAT is a document describing the needed Architecture Building Blocks for a desired solution. This should not be taken as restrictive but as advisory. When an Architecture Building Block (ABB) is present for which there is no implementation foreseen in the form of a Solution Building Block (SBB), it is *strongly* recommended, but not mandatory, to take this ABB into consideration in the final solution.

3.3 Legal View

The Legal view of the eDelivery SAT consists of the following sub-set of EIRA Architecture Building Blocks (ABBs) as well as some predefined Solution Building Blocks (SBBs):

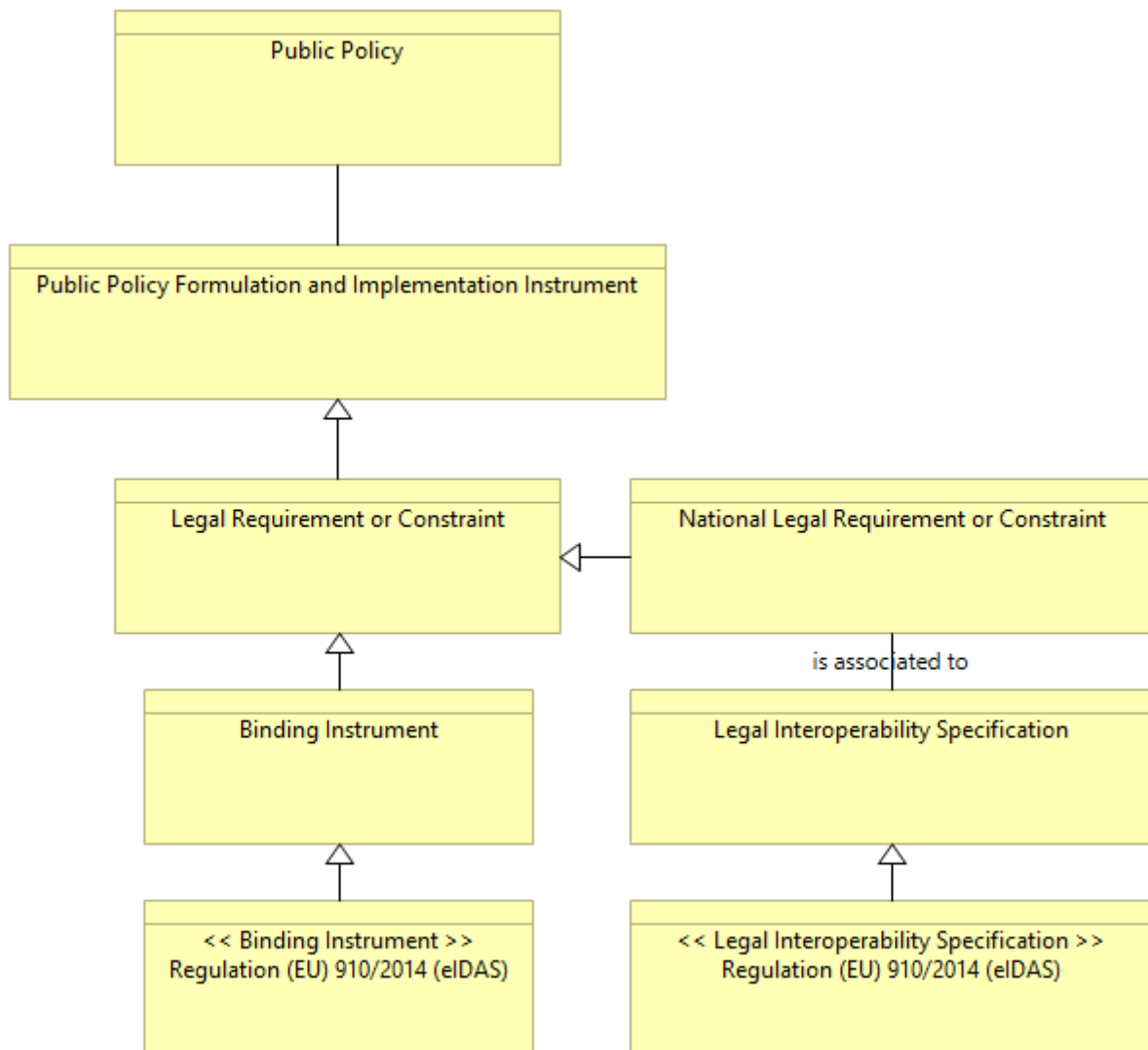


Figure 3 Legal view

eDelivery has strong links to Regulation (EU) 910/2014 on Electronic identification and trust services, commonly known as 'eIDAS'.

In its conclusions of 27 May 2011, the Council invited the Commission to contribute to the digital single market by creating appropriate conditions for the mutual recognition of key enablers across borders, such as electronic identification, electronic documents, electronic signatures and electronic delivery services, and for interoperable e-government services across the European Union.

The resulting leading-edge regulation, of which most articles shall apply from 1 July 2016, establishes the principle that an electronic document should not be denied legal effect on the grounds that it is in an electronic form.

eDelivery supports this fundamental principle of the Digital age by promoting the alignment between its technical specifications and the eIDAS regulatory framework.

eIDAS Regulation

Some key concepts set forth by eIDAS, directly related to eDelivery:

Article 3 - Definitions

(36) 'electronic registered delivery service' means a service that makes it possible to transmit data between third parties by electronic means and provides evidence relating to the handling of the transmitted data, including proof of sending and receiving the data, and that protects transmitted data against the risk of loss, theft, damage or any unauthorised alterations

Article 43 - Legal effect of an electronic registered delivery service

(1.) Data sent and received using an electronic registered delivery service shall not be denied legal effect and admissibility as evidence in legal proceedings solely on the grounds that it is in an electronic form or that it does not meet the requirements of the qualified electronic registered delivery service.

(2.) "Data sent and received using a qualified electronic registered delivery service shall enjoy the presumption of the integrity of the data, the sending of that data by the identified sender, its receipt by the identified addressee and the accuracy of the date and time of sending and receipt indicated by the qualified electronic registered delivery service."

Article 46 - Legal effects of electronic documents

(1.) "An electronic document shall not be denied legal effect and admissibility as evidence in legal proceedings solely on the grounds that it is in electronic form."

Although eDelivery has strong links to the eIDAS regulation (EU) 910/2014, implementing the technical components of an eDelivery solution is not enough to be an eIDAS-compliant registered eDelivery service. eIDAS regulation (EU) 910/2014 also implies that legal and organisational aspects has to be implemented as well.

3.4 Organisational View

The Organisational view of the eDelivery SAT consists of the following sub-set of EIRA Architecture Building Blocks (ABBs) as well as some predefined Solution Building Blocks (SBBs):

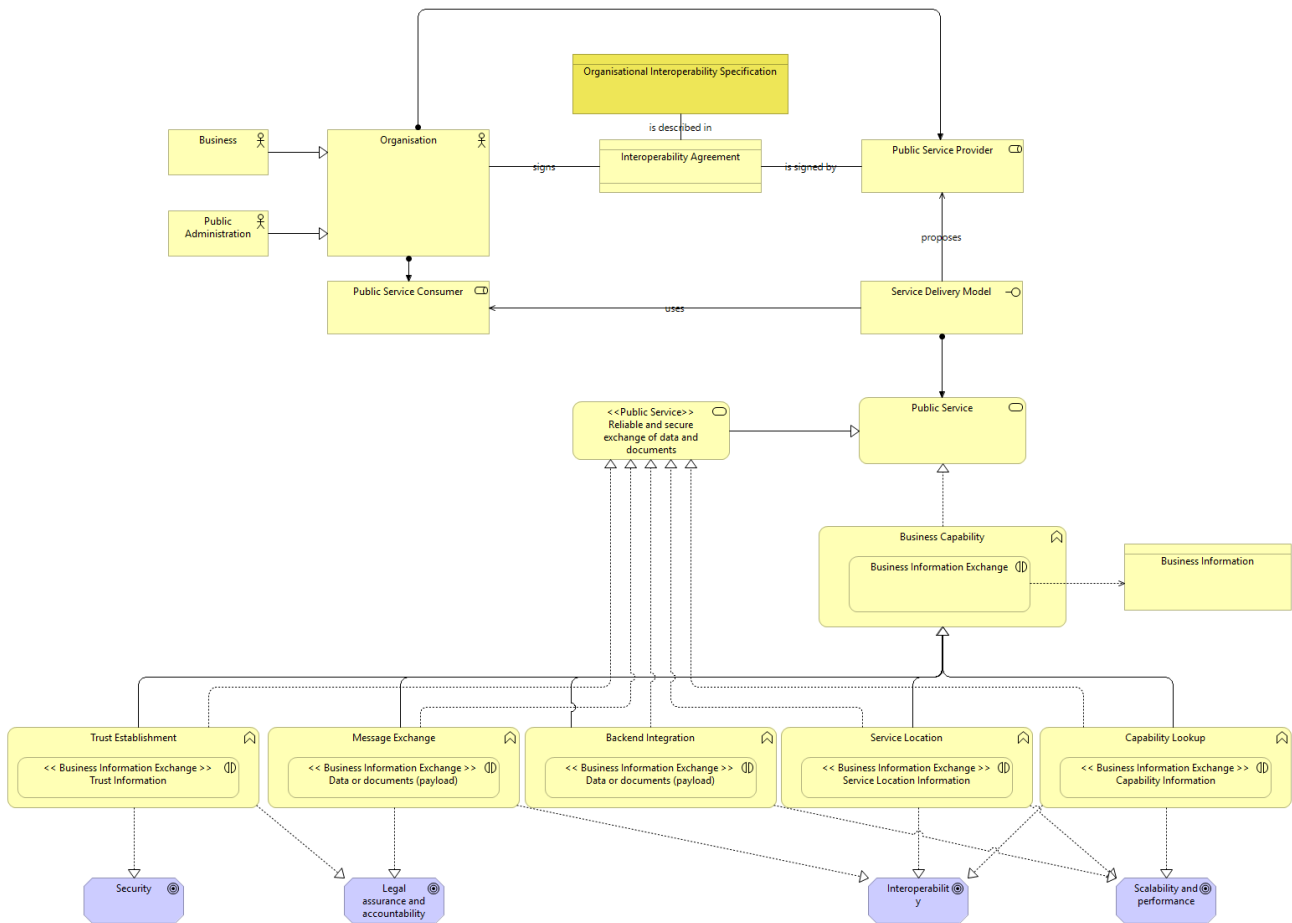


Figure 4 Organisational view

Through the use of eDelivery, every participant becomes a node in the network and therefore sign an interoperability agreement.

The Public Service offered by an eDelivery solution is “Reliable and secure exchange of data and documents” realised by five Business Capabilities : “Trust Establishment”, “Message Exchange”, “Backend Integration”, “Service Location” and “Capability Lookup”.



This SAT is a document describing the needed Architecture Building Blocks for a complete eDelivery solution. One could choose not to implement one Business Capability (for example “Backend Integration” or “Service Location”) while still providing the Public Service of “Reliable and secure exchange of data and documents”. Assessment of the needed business capabilities can be done using the CEF Self-assessment tool⁴.

⁴ <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eDelivery+self-assessment+tool>

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"Trust Establishment"⁵, via digital certificates, between the two parties makes you certain that data and documents are secured against any modification (integrity), that documents are encrypted during the transmission (confidentiality) and that the origin and the destination of the data and documents are trustworthy (non-repudiation).

"Message Exchange"⁶ is the core capability of eDelivery. In combination with the other Business Capabilities it allows to exchange documents and/ or data using standardised messaging protocols synchronously or asynchronously, no matter their size, no matter the messaging loads and having the guarantee that data and documents are delivered once and only once (retries, receipts, duplicate elimination). You are also certain that messages are delivered even if sent to temporarily unavailable channels (store and forward).

"Backend Integration"⁷ facilitates the integration between a public administration's IT systems and an eDelivery Node, via a Connector for example.

"Service Location"⁸ helps the sender to discover where the information about a receiver is stored and guides him towards this location. Service location also allows to change the data exchange network by easily changing or discovering the registered address of nodes (scalability, interoperability).

"Capability Lookup"⁹ makes discovery and access to the information about the participants (what messages they can process, the message protocol that they support ...) easily available to everyone in the data exchange network (scalability, interoperability).

⁵ <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Trust+Establishment>

⁶ <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Message+Exchange>

⁷ <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Backend+Integration>

⁸ <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Dynamic+Service+Location>

⁹ <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Capability+lookup>

3.5 Semantic View

The Semantic view of the eDelivery SAT consists of the following sub-set of EIRA Architecture Building Blocks (ABBs):

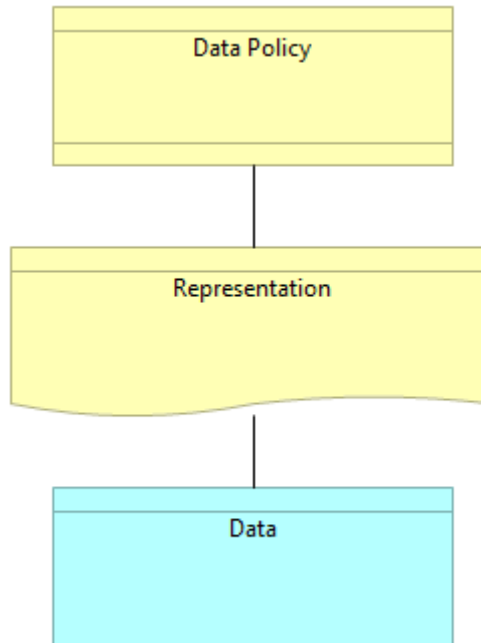


Figure 5 Semantic view

As eDelivery is payload agnostic, the semantic view contains only ABB's.

The implementer may choose to add SBBs having additional specifications, e.g. for the domain-specific XML formats to be used as payloads. In some communities, generic header or envelope formats (e.g. SBDH) or container formats (e.g. ASIC) are commonly used. Also, eSENS e-Documents¹⁰ is currently being assessed to become a new optional component of eDelivery.

¹⁰ <https://www.esens.eu/content/e-documents>

3.6 Technical View – Application

The Technical application view of the eDelivery SAT consists of the following sub-set of EIRA Architecture Building Blocks (ABBs) as well one non EIRA Architecture Building Block (see explanation below) and predefined Solution Building Blocks (SBBs):

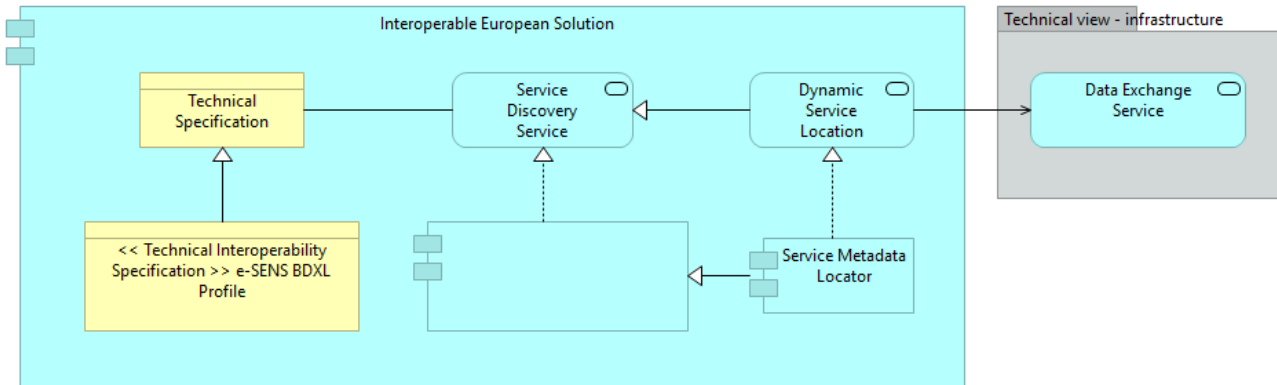


Figure 6 Technical view - Application

eDelivery's Dynamic Service Location enables the Sending Data Exchange Components (see Technical view – Infrastructure) to dynamically discover the IP address of the Receiving Data Exchange Component. Instead of looking at a static list of IP addresses, the Sending Data Exchange Components consults a Service Metadata Publisher (SMP) (see Technical view – Infrastructure) where information about every participant in the document and data exchange network is kept up to date, including IP addresses of their Data Exchange Component. As at any point in time there can be several SMPs, every participant must be given a unique ID in the form of a website's URL and this must be published by the Service Metadata Locator (SML) on the internet's Domain Name System (DNS). By knowing this URL, the Data Exchange Component is able to dynamically locate the right SMP and therefore the right Data Exchange Component. The SML component is conformant with the eSens BDXL Profile specifications.



In the EIRA v2.0.0, a Service Discovery Service is realised by a Business Process Management Component. Using this ABB would result in the confusion in the case of eDelivery as the Service Metadata Locator cannot be considered as a specialisation of the Business Process Management Component ABB but yet realises the Service Discovery Service, therefore an “empty” non EIRA AAB component has been added to the model.



CEF eDelivery provides a list of sample implementations of the CEF eDelivery components. The source code of those implementations can be found here: <https://ec.europa.eu/cefdigital/code/projects/EDELIVERY>

3.7 Technical View – Infrastructure

The Technical infrastructure view of the eDelivery SAT consists of the following sub-set of EIRA Architecture Building Blocks (ABBs) as well as some predefined Solution Building Blocks (SBBs):

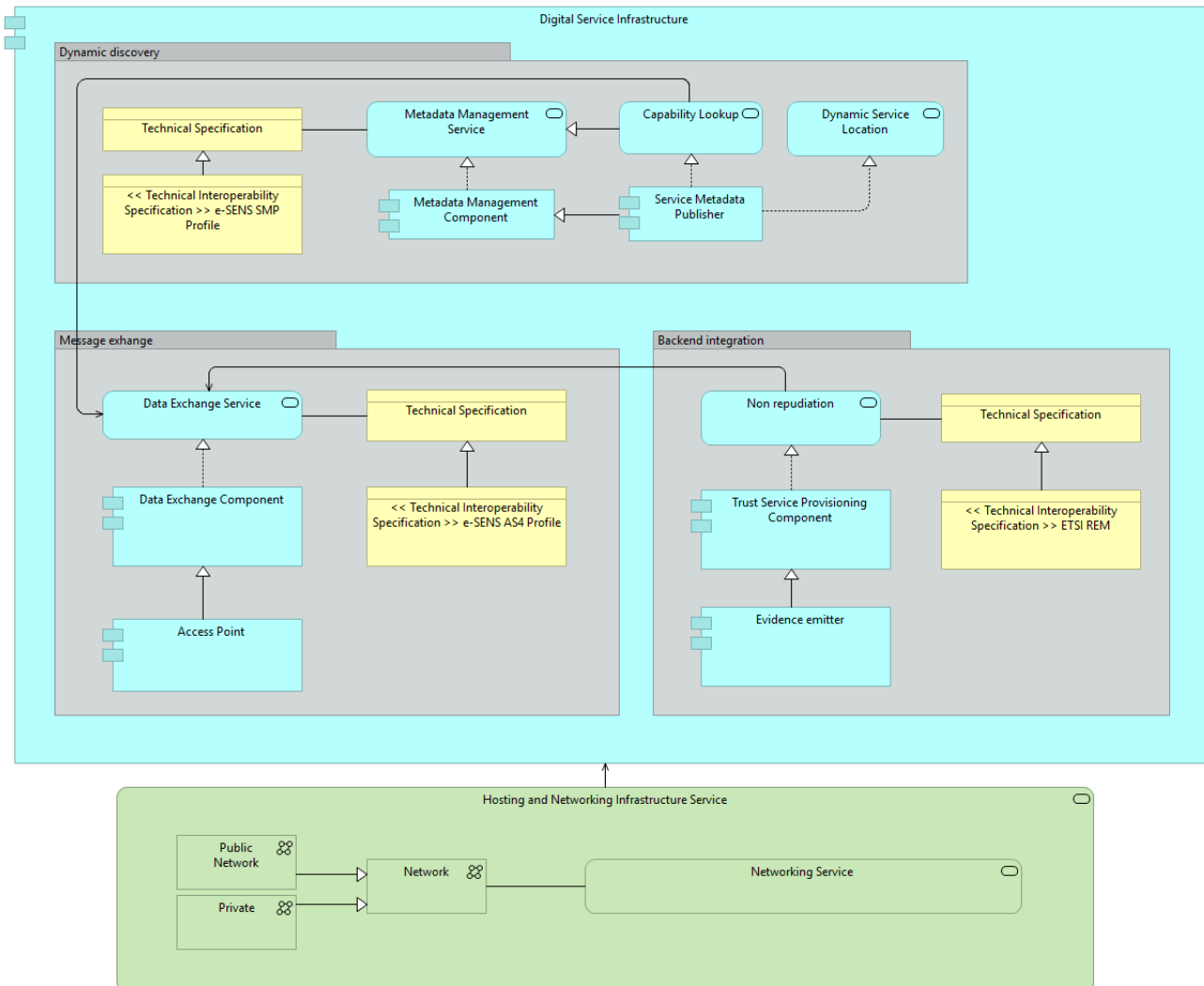


Figure 7 Technical view - Infrastructure

Capability lookup is about the delivery of metadata about the capabilities of each participant in a document and data exchange network. The metadata can be used to dynamically set interoperability parameters between the sender and the receiver. The Service Metadata Publisher (SMP) is a register of the message exchange capabilities and location of participants. The SMP is usually distributed. The SMP component is conformant with the e-SENS SMP Profile specifications.

The Data Exchange Components of eDelivery are not operated centrally, instead they are deployed locally under the responsibility of a public or private sector service provider. The users of the Data Exchange Components are the Backend systems that need to exchange information with other administrations or businesses. During the exchange, the data and documents are secured by eDelivery's trust establishment mechanisms. This implies a choice of trust establishment model. The Data Exchange Components of eDelivery implement the e-SENS AS4 Profile which is a profile of the ebMS3 and AS4 OASIS Standards which ensures secure and reliable data exchange.

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The trust models of eDelivery are all based on digital certificates. Two trust models are available to create, manage, distribute, store, and revoke the digital certificates of the Data Exchange Components: either a PKI model or a mutual exchange model of digital certificates.

Non-repudiation of receipt is guaranteed by following the ETSI REM specifications.



CEF eDelivery provides a list of sample implementations of the CEF eDelivery components. The source code of those implementations can be found here : <https://ec.europa.eu/cefdigital/code/projects/EDELIVERY>

4 REFERENCES

- CEF digital eDelivery
<https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eDelivery>
- eSens eDelivery SAT
<http://wiki.ds.unipi.gr/display/ESENS/WP6+-+Building+Blocks>
- European Interoperability Reference Architecture (EIRA)
<https://joinup.ec.europa.eu/asset/eia/>
- European Interoperability Framework (EIF)
http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf
- ArchiMate®
<http://www.opengroup.org/subjectareas/enterprise/archimate>
- Archi®
<http://www.archimatetool.com/>

4.1 Legislative references

- Regulation (EU) N°910/2014 (eIDAS)
http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.257.01.0073.01.ENG

4.2 Technical references

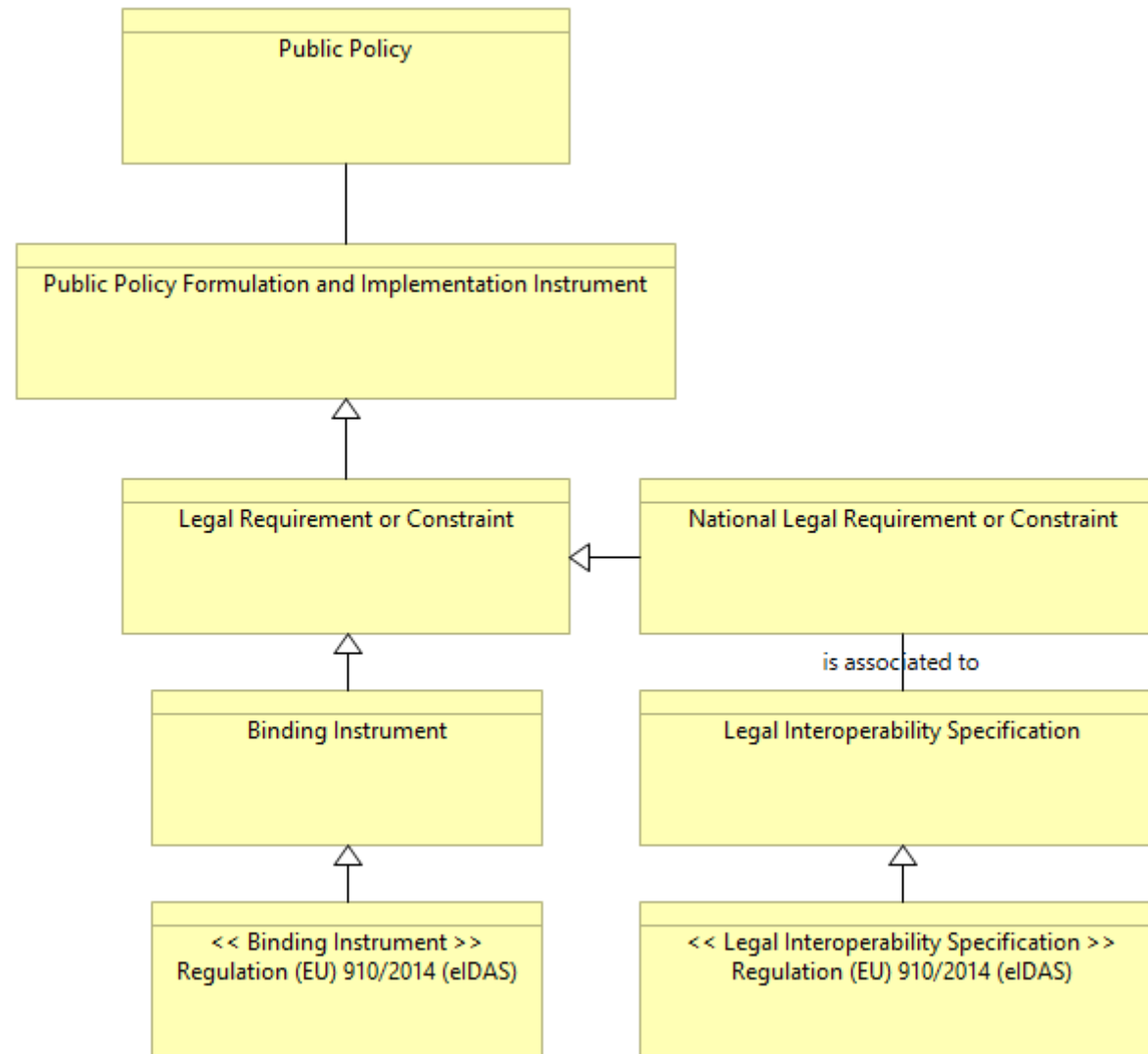
- eSens BDXL Profile
<http://wiki.ds.unipi.gr/display/ESENS/PR+-+BDXL>
- eSens SMP Profile
<http://wiki.ds.unipi.gr/display/ESENS/PR+-+SMP>
- eSens AS4 Profile
<http://wiki.ds.unipi.gr/display/ESENS/PR+-+AS4>
- ETSI REM specification
http://www.etsi.org/deliver/etsi_ts/102600_102699/10264002/02.01.01_60/ts_10264002v020101p.pdf
- TLS specification
<https://tools.ietf.org/html/rfc5246>

5 ACKNOWLEDGEMENTS

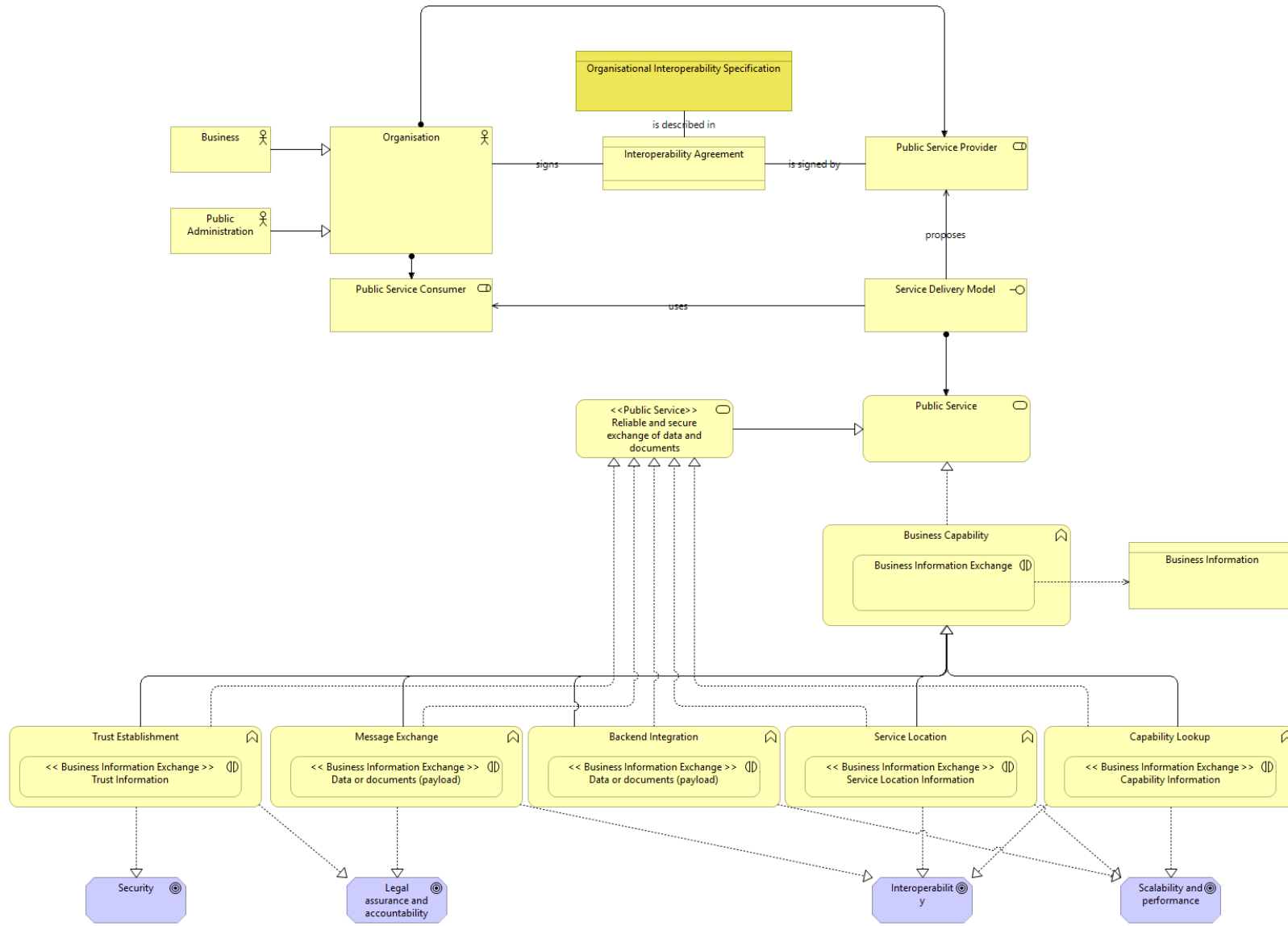
The creation of this SAT was made possible with the help of the EC DIGIT B4 and EC DIGIT B6. We would like to thank the following people for their input (alphabetical order):

- FERIAL, Adrien
- RODRIGUES, Joao
- WIGARD, Suzanne

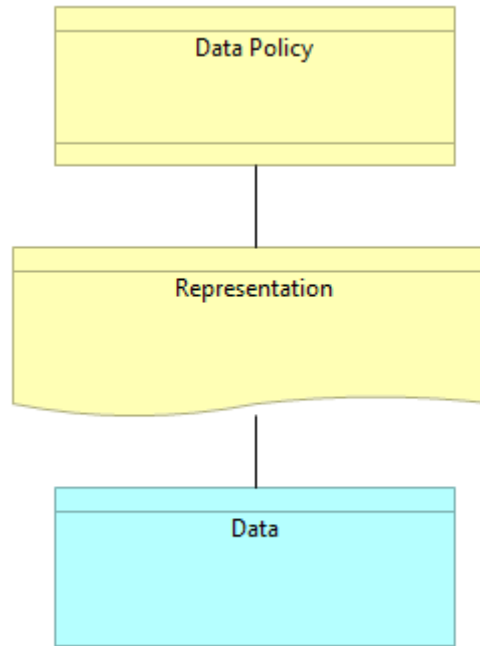
6 APPENDIX: LEGAL VIEW



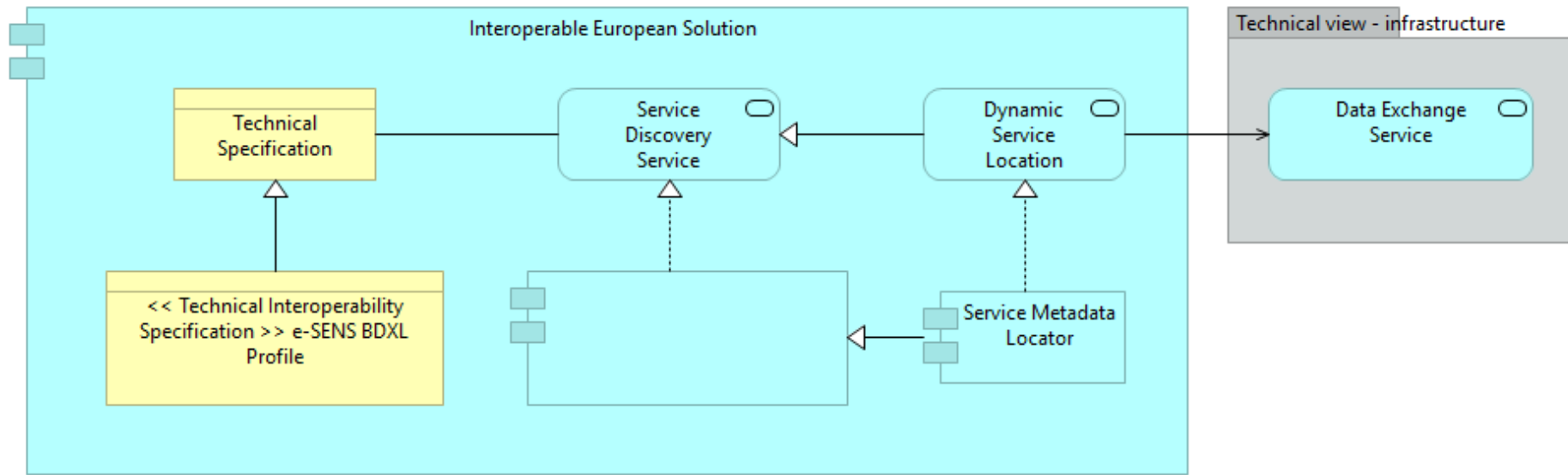
7 APPENDIX: ORGANISATIONAL VIEW



8 APPENDIX: SEMANTIC VIEW



9 APPENDIX: TECHNICAL VIEW – APPLICATION



10 APPENDIX: TECHNICAL VIEW – INFRASTRUCTURE

