Solution Architecture Template (SAT) Design Guidelines

Change control

Modification	Details
Version 2.0.0	
Alignment with EIRA v2.0.0	
Version 1.0.0	
Initial version	

Table of Contents

1 INTRODUCTION

1.1 Purpose of this document

This document explains the purpose of a Solution Architecture Template (SAT) and how to design one. It starts by explaining what the use-cases of the EIRA© are, how an SAT can be used in certain of those use-cases and what the benefits of an SAT are. The different steps on how to create and use an SAT are explained afterwards.

This document gives a small introduction to the EIRA©, the document does not try to explain the EIRA© in depth, nor how the EIRA© can be used, however. Detailed information on the EIRA© is available on the Joinup page[1].

1.2 Target audience

This document targets enterprise/solution architects involved in the design of SAT's based on the EIRA©.

1.3 Further information

This document is part of the EIRA© support series, more information on the EIRA© itself can be found on the Joinup page[2]. This page provides download links to the EIRA© modelled using ArchiMate®, the overview document that explains the EIRA© and tooling support is available via the CarTool©[3]. Finally, the following four SATs (beta versions at the time of the writing of this document) are available as well:

- Open Data SAT (v1.0.0 beta)
- eHI SAT (v1.0.0 beta) – Human Interfaces
- eID SAT (v1.0.0 beta)
- eDelivery SAT (v1.0.0 beta)

[1] https://joinup.ec.europa.eu/asset/eia/
[2] https://joinup.ec.europa.eu/asset/eia/description
[3] https://joinup.ec.europa.eu/asset/eia/asset_release/cartography-tool-v100

2 INTRODUCTION TO SOLUTION ARCHITECTURE TEMPLATES

2.1 The European Interoperability Reference Architecture

The Solution Architecture Templates that are described in this document are based on the "European Interoperability Reference Architecture (EIRA©)", 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:

- **Common terminology to achieve a minimum level of coordination**: It provides a set of well-defined ABBs that provide a minimal common understanding of the most important building blocks needed to build interoperable public services.
- **Reference architecture for delivering digital public services**: It offers a framework to categorise (re)usable solution building blocks (SBBs) of an e-Government solution. It allows portfolio managers to rationalise, manage and document their portfolio of solutions.
- **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®.
- **Alignment with EIF and TOGAF®**: The EIRA© is aligned with the New European Interoperability Framework (EIF)[4] and complies with the context given in the European Interoperability Framework – Implementation Strategy (EIF-IS)[5]. The views of the EIRA© correspond to the interoperability levels in the EIF: legal, organisational, semantic and technical interoperability. Within The Open Group Architecture Framework (TOGAF®)[6] 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.

The EIRA© uses views to model the different aspects of interoperability. Although interoperability almost always involves exchanging data between ICT systems, interoperability is a wider concept and encompasses the ability of organisations to work together towards mutually beneficial and commonly agreed goals. The different views that are used to express this interoperability are "Legal view", "Organisational view", "Semantic view" and "Technical view". An additional view called "EIF Underlying Principles view" contains goals and principles that describe the context in which European public services are designed and implemented.

[4] https://ec.europa.eu/isa2/eif_en
[5] http://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_1&format=PDF
[6] http://www.opengroup.org/subjectareas/enterprise/togaf

The EIRA© uses the following key elements in the development of specific solutions:

- **EIRA© view**: The EIRA© consists of several views, including one view for each of the EIF interoperability levels.
- **EIRA© viewpoints**: The EIRA© defines several viewpoints containing a selection of building blocks from the different views, to address the needs of specific stakeholders. SATs should include at least the High-level viewpoint, which provides an introductory view by highlighting the focal ABBs of the SAT.
- **Architecture Building Block**: Based on the TOGAF® definition, 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.
- **Solution Building Block**: Based on the TOGAF® definition, a solution building block is a concrete element that implements the required capabilities of one or more architecture building blocks. On the technical view, a solution building block is a specific product or software component.

More information on the EIRA© can be found on Joinup[7] where documentation is available, the model can be downloaded and other supporting material like the CarTool© and other SATs are available for consultation.

2.2 What is a solution architecture template

A Solution Architecture Template (SAT) is a specification extending the EIRA© providing support to solution architects in a specific solution domain in the form of a template that can be used to design related solutions. An SAT contains the following elements:

- A motivation in the form of principles and requirements.
- A goal and a description of the supported functionalities.
- A sub-set of the EIRA© core Architecture Building Blocks (ABBs) covering the four EIF layers.
- A set of specific ABBs extending EIRA©'s views enabling specific functionalities to be provided by implementations derived from the SAT.
- The interoperability specifications of selected ABBs and a narrative for each EIRA© view.

[7] https://joinup.ec.europa.eu/asset/eia/

2.3 Benefits of an SAT

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 when building a solution in a specific problem area.
- 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 realising the ABBs identified in the SAT by specific SBBs.
- When an architect creates an SAT, he/she can define the interoperability specifications for the SAT's ABBs and moreover recommend specific SBBs so that the selection of specific solutions is facilitated and is ensured to have 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.

2.4 How can an SAT be used?

An SAT can be used in the following ways:

- **As a tool to help you design your solution**. An SAT serves as blueprint for architects to build solutions and guides them in indicating the elements, which should be implemented as well as the elements that are already available and should be taken into account. These elements can have a legal bases, can apply to organisational processes or can have a technical nature.
- **As guideline of explicit requirements that need to be met**: An SAT can also be used in procurement and call for tender procedures where the EIRA© is used as specification in such a way the EIRA© is used as controlled vocabulary and the interoperability specifications serve as a checklist for interoperability requirements.

3 WHAT ARE THE GUIDELINES OF DESIGNING A SOLUTION ARCHITECTURE TEMPLATE?

A Solution Architecture Template is provided in the form of a document containing the model based on ArchiMate® as well as a narrative describing the models. Furthermore, the document describes the context, has a glossary and references to other resources or resources that have been used in the model.

The model of the SAT itself is described in views using Architecture Building Blocks (ABBs), Solution Building Blocks (SBBs), Interoperability specifications, elements from the ArchiMate® motivation extension and a narrative. These aspects are described in the following sections.

3.1 EIRA© views - design guidelines

Design guideline #1: All of the EIRA© views should be covered in an SAT.

A Solution Architecture Template (SAT) is based on the EIRA© and therefore you can expect to find all of the EIRA© views in your SAT as well as the High-level viewpoint. The views and viewpoints you want to model are the following:

- High-level viewpoint
- Legal View
- Organisational View
- Semantic View
- Technical view – application
- Technical view – infrastructure

Design guideline #2: The focal building blocks in the high level viewpoint should be included.

On each of the views, you will typically want to model the focal building blocks in either the form of an Architecture Building Block (ABB) or a Solution Architecture Building (SBB), these are explained in the next sections. For most of the building blocks, you want to indicate a specification that defines its interoperability, additionally, you might want to add some requirements/constraints etc. for which the ArchiMate® motivation extension can be used. Finally, each view will have a narrative giving a textual explanation of that specific view.

3.2 Architecture Building Blocks - design guidelines

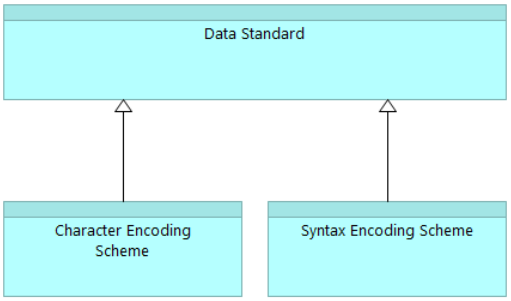
TOGAF® mentions the following[8]: Architecture Building Blocks (ABBs) capture architecture requirements; e.g., business, data, application, and technology requirements and direct and guide the development of SBBs.

[8] http://pubs.opengroup.org/architecture/togaf9-doc/arch/chap37.html

An SAT contains a selection of EIRA© ABBs in each of its views that are of specific importance in the context of the SAT and as such acts as requirements for the solution that will be developed based on the SAT.

Design guideline #3: A selection of the EIRA© ABBs will be added as IoP requirements.

Architecture Building Blocks can 'specialise' other Architecture Building Blocks, like is shown in the following example coming from the Semantic View of the EIRA©:



This example indicates a 'Data Standard', modelled as an Architecture Building Block (indicating that it serves as requirement, the actual implementation in the form of an SBB is not indicated in the example above), and it models two specialisations; a 'Character Encoding Scheme' and a 'Syntax Encoding Scheme'. This specialisation indicates that a 'Character Encoding Scheme' is a more specialised form of a 'Data Standard', the same applies for the 'Syntax Encoding Scheme'.

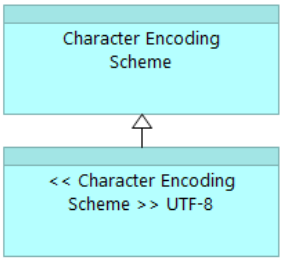
3.3 Solution Building Blocks - design guidelines

TOGAF® mentions the following[9]: Solution Building Blocks (SBBs) may be either procured or developed. They define what products and components will implement the functionality, define the implementation, fulfil business requirements and are product or vendor-aware.

Design guideline #4: Existing solutions or implementations will be added in the form of SBBs, realizing the EIRA© ABBs.

In an SAT, we specify both the ABB and the SBB for a specific implementation of a requirement. As example we use the 'Character Encoding Scheme' as part of a solution. The use of this ABB tells us that we must use a 'Character Encoding Scheme' in our solution. The actual implementation in the form of an SBB additionally tells us which implementation to use; 'UTF-8' in this specific example:

[9] http://pubs.opengroup.org/architecture/togaf9-doc/arch/chap37.html



When looking at the name of the SBB, you can see that it is annotated (using the following style: '`<< Implementation of ABB >>`') with the name of the ABB that it actually implements.

Creation of such annotations can be facilitated through appropriate tooling, such as the CarTool©, described in the chapter on tooling support, an EIRA©-focused extension to the popular Archi® tool.[10]

3.4 Interoperability Specifications - design guidelines

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. An interoperability specification can also refer to (use) other interoperability specifications.

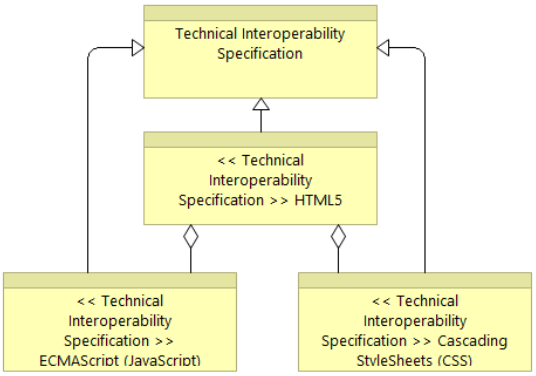
Interoperability specifications can be modelled in two ways;

- As a requirement for interoperability, the interoperability specification will be provided in the form of an ABB.
- As an implementation of an interoperability specification, the interoperability specification will be provided in the form of an SBB (the solution) specialising an ABB (the requirement).

Design guideline #5: Interoperability specifications are modelled as either requirement in the form of ABBs or as implementation of an interoperability specification in the form of an SBB. The SAT shall identify the ABBs that need interoperability specifications.

[10] http://archimatetool.com/

As example; we see three technical interoperability specifications; HTML5, ECMAScript and Cascading Stylesheets, all three are modelled as implementations of technical interoperability specifications in the form of annotated SBBs, they extend technical interoperability specification which is modelled as ABB. Additionally, we also include the notion that HTML5 refers to the two other specifications.



In most cases, only the top-level interoperability specification is used (HTML5 in the case of the example), but for clarification purposes, it can sometimes be more convenient to include a reference to other specifications as well.

To describe the interoperability requirement precisely, The "Interoperability Specification" building block is defined by the following attributes:

Attribute name	Description
ID	Internal key used to identify an architecture building block
dct:type	The type of the architecture building block
dct:publisher	The name of the individual or organisation that is documenting the current building block
dct:modified	The date that the information documented for this building block was last modified
eira:url	The URL at which the specification can be referenced online
eira:identifier	The identifier is unique. It identifies univocally the specification in the Cartography
eira:body	The body contains statements on one or several Building Blocks. It informs either (i.e. proposed mode) on the proposed specification at the ABB level to achieve interoperability for its SBBs or (i.e. in solution descriptive mode) on a specification to which an SBB is actually compliant to achieve interoperability

Design guideline #6: The interoperability specifications should document the following attributes: ID, dct:type, dct:publisher, dct:modified, eira:url, eira:identifier and eira:body.

3.5 ArchiMate® Motivation Extension

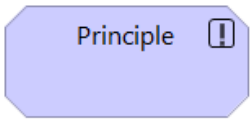
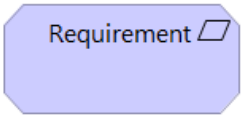
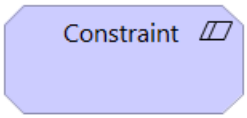
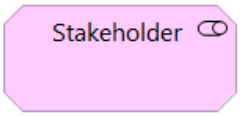
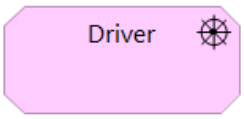
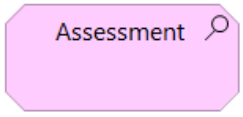
The motivation extension is used to model specific goals, principles, requirements and/or constraints and optionally also the sources of those intentions; stakeholders, drivers and assessments. Motivational concepts are used to model the motivations, or reasons, that underlie the design or change of a given enterprise architecture. These motivations influence, guide, and constrain the design.

Design guideline #7: The ArchiMate® motivation extension is used to model motivational concepts and their sources.

It is essential to understand the factors, often referred to as drivers, which influence the motivational elements. They can originate from either inside or outside the enterprise. Internal drivers, also called concerns, are associated with stakeholders, which can be some individual human being or some group of human beings, such as a project team, enterprise, or society.

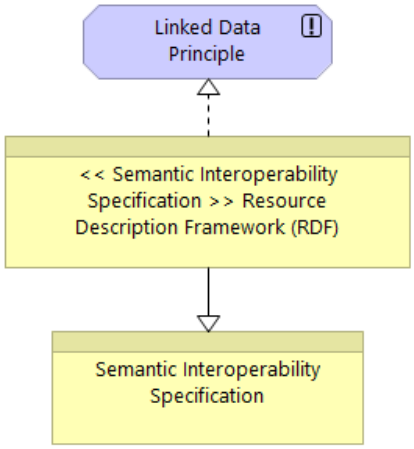
The actual motivations are represented by goals, principles, requirements, and constraints. Goals represent some desired result – or end – that a stakeholder wants to achieve; e.g., increasing customer satisfaction by 10%. Principles and requirements represent desired properties of solutions – or means – to realize the goals. Principles are normative guidelines that guide the design of all possible solutions in a given context.[11]

The following concepts are available in the ArchiMate® motivation extension:

Non-EIRA© concept	Description
	A principle is defined as a normative property of all systems in a given context.
	A requirement is defined as a statement of need that must be realized by a system.
	A goal is defined as an end state that a stakeholder intends to achieve.
	A constraint is defined as a restriction on the way in which a system is realized.
	A stakeholder is defined as the role of an individual, team, or organization (or classes thereof) that represents their interests in, or concerns relative to, the outcome of the architecture.
	A driver is defined as something that creates, motivates, and fuels the change in an organization
	An assessment is defined as the outcome of some analysis of some driver.

[11] http://pubs.opengroup.org/architecture/archimate2-doc/chap10.html

Example of the 'Resource Description Framework (RDF)' as implementation of a 'Semantic Interoperability Specification which has a principle attached (the 'Linked Data Principle')



3.6 Narratives

Design guideline #8: The models are completed using narratives, a textual description that explains the context, the building blocks and their relationships.

Narratives are descriptions that provide more insight into the model by giving a textual and human readable description of the context of the view, each building block in the view, its purpose and its relationship to the other building blocks. The link to interoperability specifications that are linked to the building blocks should also be described. The narratives are provided as description in the ArchiMate® model itself and also as text accompanying the model in the final document.

Design guideline #9: Narratives are provided as description in the model itself as well as accompanying text in the final document.

4 TOOLING SUPPORT

The CarTool©[12] is a tool built by the European Commission's ISA unit designed to provide support in using the European Interoperability Reference Architecture (EIRA©) and accessing a portfolio (Cartography) of solutions that are documented using the EIRA©. It is built as a plug-in for the popular open source ArchiMate® modelling tool Archi®, building upon its modelling capabilities and providing higher level EIRA© support. The CarTool© itself is open-source[13] and distributed under the ISA non-commercial licence which is available on the Joinup page[14].

From a high-level perspective the CarTool© enables you with the following features when working with SATs:

- **Inspect the EIRA©'s views, ABBs and attributes**, including their documentation. This can be done both in graphical mode, by viewing the EIRA©'s views, or in tabular form allowing searching and sorting.
- **Inspect the content of all Cartography solutions and SATs**. Similar to the EIRA© this can be done both in graphical and tabular mode.
- **Create or modify solutions and SATs** by adding to them SBBs (and also ABBs in the case of SATs), from the EIRA©, SATs or other solutions.
- **Consult proposed and used interoperability specifications** to find conformant SBBs from the Cartography and include them, and related specifications, to solutions and SATs.

[12] https://joinup.ec.europa.eu/asset/eia/asset_release/cartography-tool-v100
[13] https://webgate.ec.europa.eu/CITnet/stash/projects/CARTOOL/repos/cartoolplugin/browse
[14] https://joinup.ec.europa.eu/asset/eia/description

5 SAT DEVELOPMENT LIFECYCLE

The lifecycle of an SAT follows the classical stages a lifecycle model: Plan, Build, Deliver and Run. We can map these stages to the SAT lifecycle as follows:

- **Plan**; initiation phase; perform an assessment and get approval to develop the SAT.
- **Build**: design the SAT.
- **Deliver**: publish the SAT.
- **Run**: use the SAT, collect feedback and apply a change management process.

These different stages are explained in the following sections.

5.1 Initiation of an SAT

The initiation of an SAT implies performing an assessment and getting approval to develop the SAT.

5.1.1 Perform a preliminary assessment

The very first step in the lifecycle of an SAT is to produce a basic business case identifying the target users and value provided. Based on it, an assessment is performed - does it make sense to create an SAT for the solution area which you want to describe? The value shall be assessed in terms of the following aspects:

- The level of granularity (more generic versus more specific)
- The number of interoperability specifications that play a role at the predefined level of granularity.

An SAT is only useful when there is a significant amount of interoperability specifications to promote the level of desired interoperability which is needed to promote cross-border reusability. When an SAT becomes too specific, it loses its value as a template. Keep in mind that if you attempt to make an SAT too specific it loses its value of a template.

5.2 Get approval to develop the SAT

Once the level of granularity and the expected number of interoperability specifications are estimated to provide enough detail to bring added value, an approval to develop the SAT should be obtained. As example for the European Commission; the Directorate General (DG) that owns the public policy should accept the development of an SAT for the specific solution domain.

5.3 Designing the SAT

Designing an SAT is an iterative process. During this process, feedback should be obtained from the different stakeholders such as policy makers and subject matter experts in order to ensure that the SAT represents state of the art, including all aspects from legal, organisational, semantic and technical level.

5.3.1 Define motivation and use-cases

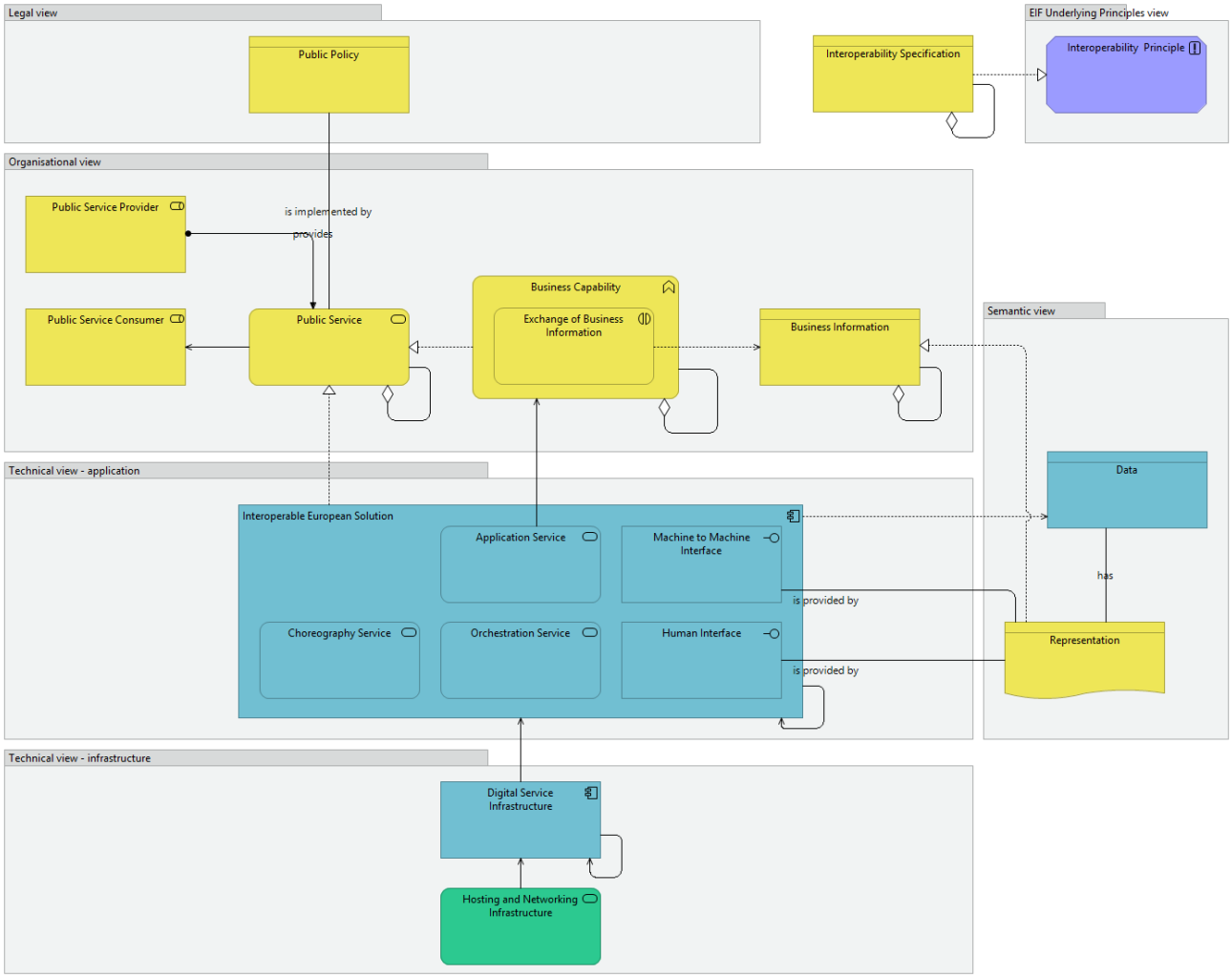
Start with your use-case and define and document your intentions (goals, principles, drivers and constraints) and the sources of these intentions (stakeholders, drivers and assessments)[15]. These will typically appear in the SAT using ArchiMate®'s motivation extension.

5.3.2 Identify and document your target audience

Define and document your target audience, these typically include architects, policy makes and/or public administrations or member states, but can include other roles. The definition of these roles will impact your choice on the level of granularity.

5.3.3 Identify the required EIRA©'s building blocks

The architect starts by consulting the different views (including the High-level viewpoint) of the EIRA©. Special attention should be placed on the focal building blocks that can be distinguished by their colour and are also available in the "High Level viewpoint".



[15] http://pubs.opengroup.org/architecture/archimate2-doc/chap10.html

Important building blocks are the "Interoperable European Solution (IES)" and the "Digital Service Infrastructure"

- 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.
- 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[16].

Besides the focal "Architecture Building Blocks" (ABBs), the architect should identify the ABBs that are needed to address the specific interoperability needs for which the SAT that will be developed.

A solution architecture template should have the appropriate level of granularity in terms of ABBs, which may differ depending on the target audience. It is important to note that an SAT should probably not cover the entire definition of the system, the template should be used for coordination on interoperability, not for system analysis.

5.3.4 Create a blueprint

Once the ABBs have been identified, the architect can create a blueprint by linking the focal ABBs with the selected ABBs. This will give an initial population of the views of the EIRA© and will provide the core structure upon which elements such as interoperability specifications can be added. Since the EIRA© focusses on interoperability and does not try to be a reference architecture for every solution, it is possible that certain ABBs that are required for a certain solution are missing. These should be added if doing so provides better context and results in a more cohesive outcome, even if they are not directly linked to interoperability.

Creation of a blueprint can be done 'top-down' where the legal aspects are used as a base to start modelling the organisational part before looking at the semantic and technical views.

Candidate ABBs to start your modelling are: the "Public Policy" in the "Legal View" or the "Business Capability" the "Public service" with its providers and consumers in the "Organisational View".

Another approach might be to model an SAT in a 'bottom-up' fashion where the technical and semantic aspects are used as base to look at the organisational aspects and completed with the legal references afterwards.

Candidate ABBs to start modelling are typically the Interoperable European Solution (IES) with its different domain specific application services and components as well as the Digital Service Infrastructure (DSI) which has domain agnostic application services and components.

[16] http://ec.europa.eu/digital-agenda/en/connecting-europe-facility

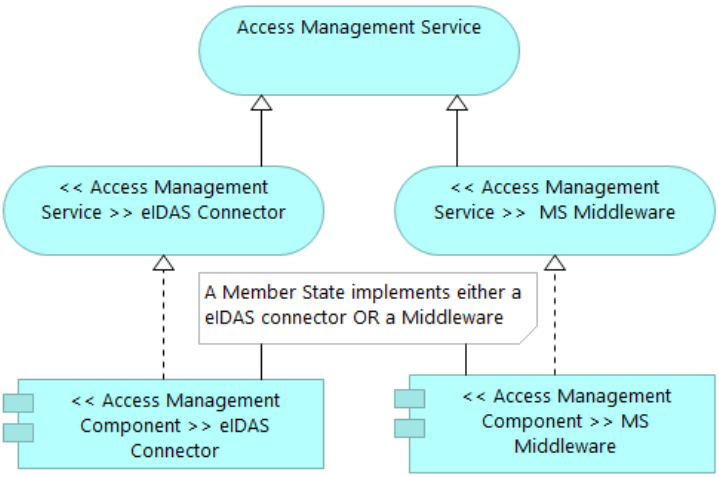
5.3.5 Identify existing entities that should be reused

For certain ABBs, an implementation might already exist. If it is mandatory or highly desirable that this solution should be reused in the solution that will be built based upon the SAT. The implementation of this reusable entity should be provided in the form of a SBB.

The CarTool© plugin will help you to identify reusable solutions by allowing you to search the cartography that is used within the tool.

The SBBs that will be added to an SAT will always link to their requirement in the form of an ABB via the ArchiMate® specialisation relationship. Other relations between SBBs and ABBs are discouraged.

An example on the prescription of a specific implementation comes from the eDelivery SAT where we model two possibilities related to access management. The implementation that uses the SAT should not provide an own implementation of the Access Management Service, but pick either the eIDAS connector or use the Member State middleware which are existing components.



5.3.6 Add interoperability specifications

The architect should add Interoperability Specifications (IoP Specs) to the different ABBs (in prescribing mode) or SBBs (in describing mode).

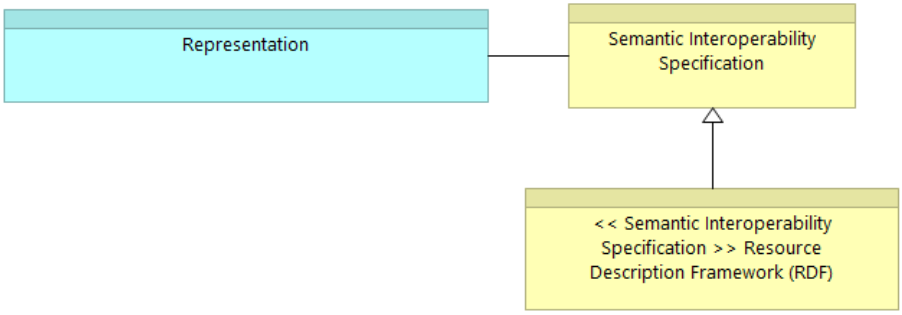
Interoperability, within the context of European public service delivery, is the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems.[17]

Interoperability is multilateral by nature and is best understood as a shared value of a community. To help prescribe and document interoperability, EIRA© defines interoperability specifications building blocks. 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, additionally, interoperability specifications can also imply other interoperability specifications.

[17] EIF - http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf

The IoP Specs are added in the form of a Solution Building Block (SBB), since they describe how the solution leverages interoperability. As indicated earlier, we never link an SBB to an ABB, except when using a specialisation relationship.

As example; RDF as Semantic Interoperability Specification for Representation (coming from the Open Data SAT). Note that the RDF SBB is linked to the Semantic Interoperability Specification ABB and not directly to the Representation ABB:



5.3.7 Add a narrative to each view

At this point, the different views have been populated. We have:

- ABBs added as important elements for solutions for which a specific solution needs to be provided.
- SBBs as prescribed mandatory or highly recommended solutions that should be present in the target solution
- IoP specs as the requirements based on which the SAT's ABBs will be realised by SBBs in the target solution.

A model alone is not enough, often an additional explanation is needed explaining some of the relations in the model, explaining the need of some of the building blocks when this might not be directly clear. The different views should be completed by providing a narrative, a textual description documenting the different building blocks and the relationships between them. This narrative should be provided in the model itself (as description of the view) as well as in the document that supports the SAT.

5.4 Publishing the SAT

After having developed the SAT, it should be published for use, either internally or publicly. The publication can be done in company specific repositories, national repositories, or on Joinup for EC specific SATs. For EU specific SATs, it is advisable to send the SAT to the EIRA© team for feedback and technical validation. This can be done by using the following email address: DIGIT-EIRA@ec.europa.eu

5.5 SAT Change management

After publication of the SAT, you will need a change management practise to handle new feature requests, modifications and bugs that may lead to a new version of the EIRA© since a new version of the EIRA© could result in an update of the SAT. Examples of changes in the EIRA© that may lead to a change in an SAT are for example the obsoleting of a specific EIRA© ABB, refinement of interoperability specifications or a change in a relation between two ABBs.

This document does not specify the implementation of the change management process, but advises you to implement one.

6 CONCLUSION

This document described the steps needed when designing a Solution Architecture Template (SAT). This is done by first giving an introduction on the EIRA© and the link between SATs and the EIRA© and the benefits of an SAT.

The following elements of an SAT are described in a dedicated chapter:

- EIRA© views
- Architecture Building Blocks
- Solution Building Blocks
- Interoperability Specifications
- ArchiMate® Motivation Extension
- Narratives.

Tooling support for SATs in the form of the CarTool© as Archi® plugin is described after which the lifecycle is detailed. The lifecycle of an SAT contains the following steps:

1. Initiation of an SAT
    a. Perform an assessment
2. Get approval to develop the SAT
3. Designing the SAT
    a. Define the motivation and use-cases
    b. Identify and document the target audience
    c. Identify the required EIRA©'s building blocks
    d. Create a blueprint
    e. Identify existing entities that should be reused
    f. Add interoperability specifications
    g. Add a narrative to each view
4. Publish the SAT
5. Establish change management.

APPENDIX: DESIGN GUIDELINES

This chapter provides a listing of the design guidelines that have been presented in this document:

- Design guideline #1: All of the EIRA© views should be covered in an SAT.
- Design guideline #2: The focal building blocks in the high level overview should be included.
- Design guideline #3: A selection of the EIRA© ABBs will be added as interoperability requirements.
- Design guideline #4: Existing solutions or implementations will be added in the form of SBBs, realizing the EIRA© ABBs.
- Design guideline #5: Interoperability specifications are modelled as either requirement in the form of ABBs or as implementation of an interoperability specification in the form of an SBB. The SAT shall identify the ABBs that need interoperability specifications.
- Design guideline #6: The interoperability specifications should document the following attributes: ID, dct:type, dct:publisher, dct:modified, eira:url, eira:identifier and eira:body.
- Design guideline #7: The ArchiMate® motivation extension is used to model motivational concepts and their sources.
- Design guideline #8: The models are completed using narratives, a textual description that explains the context, the building blocks and their relationships.
- Design guideline #9: Narratives are provided as description in the model itself as well as accompanying text in the final document.

APPENDIX: GLOSSARY

ABB	Architecture Building Block
DG	Directorate General
DSI	Digital Service Infrastructure
EC	European Commission
EIF	European Interoperability Framework
EIRA©	European Interoperability Reference Architecture
EIS	European Interoperability Strategy
IES	Interoperable European Solution
SAT	Solution Architecture Template
SBB	Solution Building Block
TOGAF®	The Open Group Architecture Framework

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