ISA² solutions in public procurement

October 17th 2019

EUROPEAN COMMISSION

Directorate-General for Informatics (DIGIT)

1	**Introduction** Workshop overview and scenario introduction
2	Assess current status Assess the interoperability maturity of my services and their supporting ICT solutions
3	Define requirements Define my requirements, the specifications to use and formulate for public procurement
4	Validate proposals Apply quality control validation to the request and received proposals.
5	Manage eligibility Facilitate the definition of tenderer eligibility criteria and the collection of certificates
6	Wrap-up and discussion Wrap-up and discussion on the illustrated ISA^2 solutions and considered scenario

Workshop introduction

Goals

- ✓ Describe how ISA² solutions can support **public procurement**
- ✓ **Hands-on** introduction to ISA² solutions

Approach

- ✓ Demonstration structured to follow a high-level fictional **scenario**
- ✓ Scenario based on **procurement** and the **Single Digital Gateway**
- ✓ The scenario actor is an officer of a **National public administration**
- ✓ ISA² solutions are first **introduced**, followed by a discussion and demo on how they are used to support our **procurement scenario**

Scenario context

Legal background

Regulation (EU) 2018/1724 establishes a Single Digital Gateway to provide access to information, to procedures, and to assistance and problem-solving services.

National administrations need to foresee solutions to **publish** their National public services on the Single Digital Gateway and facilitate their **cross-border use**.

Goals

As an officer of my administration I need new or adapted **IT solutions** to ensure my digital public services are **usable** in a cross-border context and to **publish** their metadata on the Single Digital Gateway.

My goals are to:

- ✓ **Reuse existing work**.
- ✓ Launch **procurement** as needed.

Scenario steps

1 Assess current status

Which first services to target?

How to detect gaps to address?

2 Define requirements

Work to reuse?

Specifications to require?

How to define my requirements?

3 Validate proposals

How to help tenderers validate their proposals?

How to facilitate proposal evaluation?

4 Manage eligibility

How to manage request's eligibility criteria?

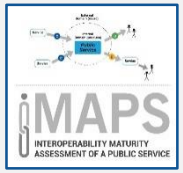
How to help tenderers provide eligibility proof?

Supporting ISA² solutions

iMAPS – Interoperability Maturity Assessment of a Public Service	Interoperability assessment of digital public services
CAMSS Solution – ELIS	EIRA-based library of proposed interoperability specifications
IQAT© Interoperability Quick Assessment Toolkit	Interoperability assessment for services' supporting IT solutions
CAMSS Solution – Assessment Tools	Tool to assess standards and specifications
EIRA – European Interoperability Reference Architecture	Interoperability reference architecture for public services
ITB – Interoperability Test Bed	Data validation services and conformance testing platform
CarTool [EIRA] Cartography Tool	Archi plug-in to model and consult EIRA resources
ESPD – European Single Procurement Document	Electronic document to manage procurement eligibility criteria

Supporting ISA² solutions

1 Assess current status



IQAT© Interoperability Quick Assessment Toolkit

2 Define requirements

CAMSS SOLUTION ELIS

CAMSS SOLUTION ASSESSMENT TOOLS

EIRA EUROPEAN INTEROPERABILITY REFERENCE ARCHITECTURE

CarTool [EIRA] CARTOGRAPHY TOOL

3 Validate proposals

ITB Interoperability Test Bed

4 Manage eligibility

ESPD European Single Procurement Document

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Scenario roadmap

1 **Assess current status**

2 Define requirements

3 Validate proposals

4 Manage eligibility

1

Assess current status

Business question

How to select the first digital public services to publish?

Objective

Assess and understand the interoperability aspects of my digital public services before selecting those to publish through the Single Digital Gateway.

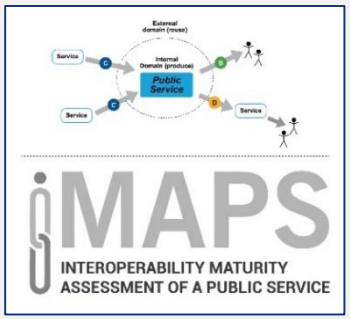
Practical approach

Use the IMAPS to measure the interoperability of my digital public services and the IQAT to measure that of their supporting ICT solution(s).

Output

A set of comparable interoperability assessments with identified gaps for improvement.

Interoperability assessment tools



The Interoperability Maturity Assessment of a Public Service (IMAPS) is an **online survey** to assess the potential interoperability of a **digital public service** in terms of EIF conformance

Use survey online

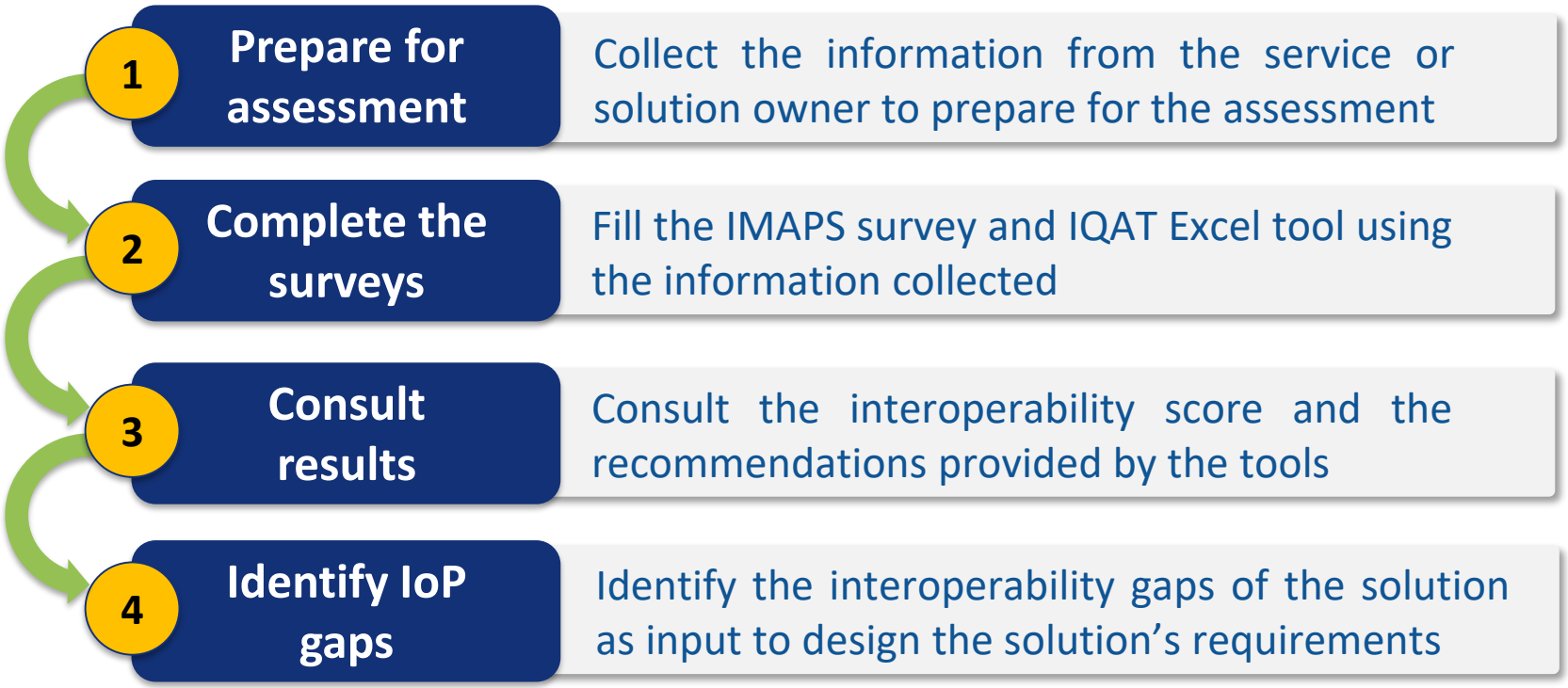
Download v1.1.1

IQAT© Interoperability Quick Assessment Toolkit

The Interoperability Quick Assessment Toolkit (IQAT) is an **Excel survey** to assess the potential interoperability of a **software solution** supporting digital public services in terms of EIF conformance

Download v1.2.0

IMAPS and IQAT steps



IMAPS assessment areas

What IoP areas does IMAPS assess?

- ✓ **Service Delivery (B)**

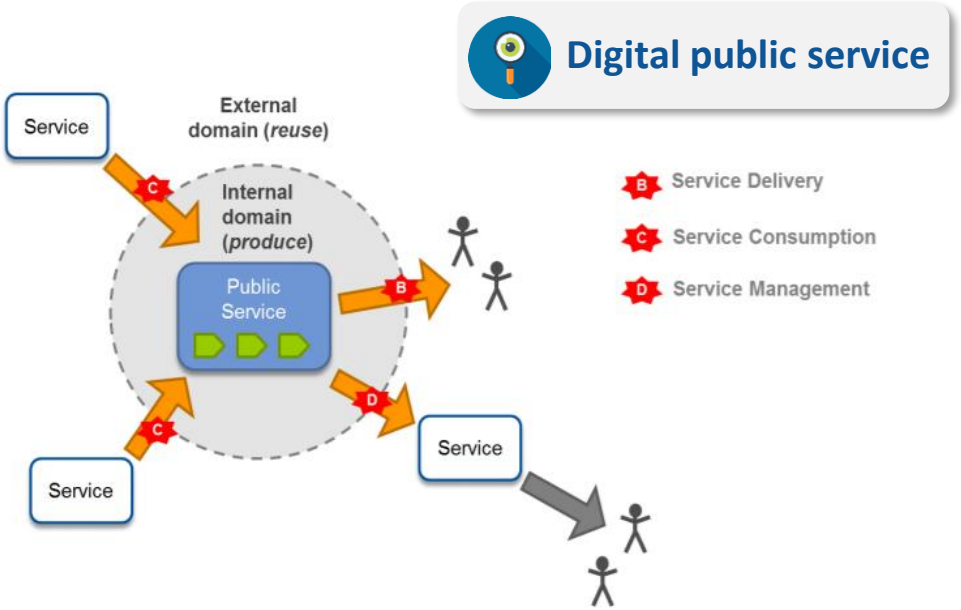
  Delivery of a digital public service

- ✓ **Service Consumption (C)**

  Consumption of services from other public administrations and businesses

- ✓ **Service Management (D)**

  Control and monitoring of the process flow related to service interactions with the external domain from trigger to outcome



Each area is assessed from a **Legal**, **Semantic**, **Organisational** and **Technical** point of view

IMAPS maturity levels

Ad Hoc	**Poor interoperability** - the digital public service cannot be considered interoperable
Opportunistic	**Fair interoperability** - the digital public service implements some elements of interoperability best practices
Essential	**Essential interoperability** - the digital public service implements the essential best practices for interoperability
Sustainable	**Good interoperability** - all relevant interoperability best practices are implemented by the digital public service
Seamless	**Interoperability leading practice** - the digital public service is a leading interoperability practice example for others

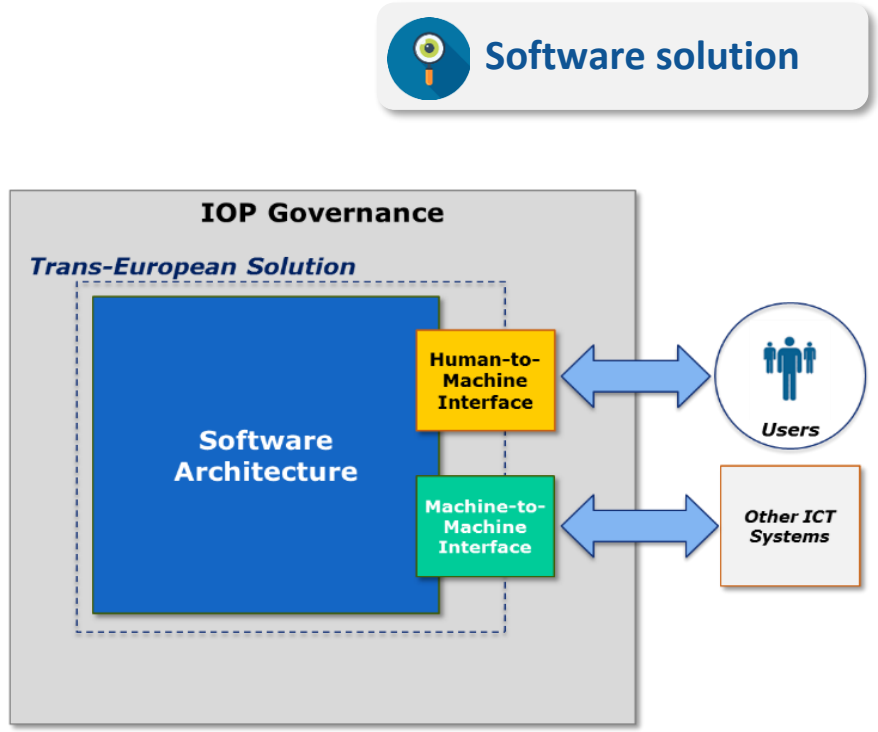
IQAT assessment areas

What IoP areas does IQAT assess?

- ✓ **IoP Governance:** Assesses the overall governance of IoP (e.g. policies, processes)
- ✓ **Software Architecture:** Assesses software architecture maturity and external interactions
- ✓ **Human-to-Machine Interface**

  Assesses interactions with users
- ✓ **Machine-to-Machine Interface**

  Assesses interactions with other ICT systems



IQAT assessment criteria

IoP Governance

Assess the overall IoP Governance of solutions that support the delivery of interoperable digital public services

e.g. IoP by design, IoP strategies and plans, IoP processes, …

Software Architecture

Assess solution architecture and interactions with other solutions

e.g. architectural maturity, availability, solution documentation, conformance testing, …

Human-to-Machine Interface

Assess interaction between user and machine interfaces (web, mobile, etc.)

e.g. user-centricity (multi-channel delivery; device & platform independency), accessibility, open data, …

Machine-to-Machine Interface

Assess interaction between software solution and other external services (provider and consumer roles)

e.g. data exchange types data formats, transfer types, protocols, …

Use in our procurement scenario

1 ***Which are my best-in-class services to consider as first targets?***

Start with a first set of digital public services and use the **online IMAPS survey** to assess their IoP maturity. From the results determine the services that are **best-in-class** in terms of IoP.

Output: The best-in-class public services to target for publishing on the SDG.

2 ***How can I detect the gaps to improve for my public services?***

Completing the IMAPS survey also provides the **proposals** to reach the next IoP maturity level. Evaluate these to identify **quick wins** and determine where investigating the **ICT support layer** is needed.

Output: A set of proposals on where to further investigate to improve my services' IoP.

Use in our procurement scenario (2)

3

How can I detect the gaps to improve in my supporting ICT solutions?

For the public services identified for improvement use the **IQAT self-assessment tool** on their supporting ICT solutions and analyse the tool's **proposals** to improve their architecture, interfaces and governance.

Output: A set of actionable proposals on the services' supporting ICT solutions.

Demo

Demo 1: Using the IMAPS online survey to assess a public service

Demo 2: Using the IQAT to assess a supporting ICT solution

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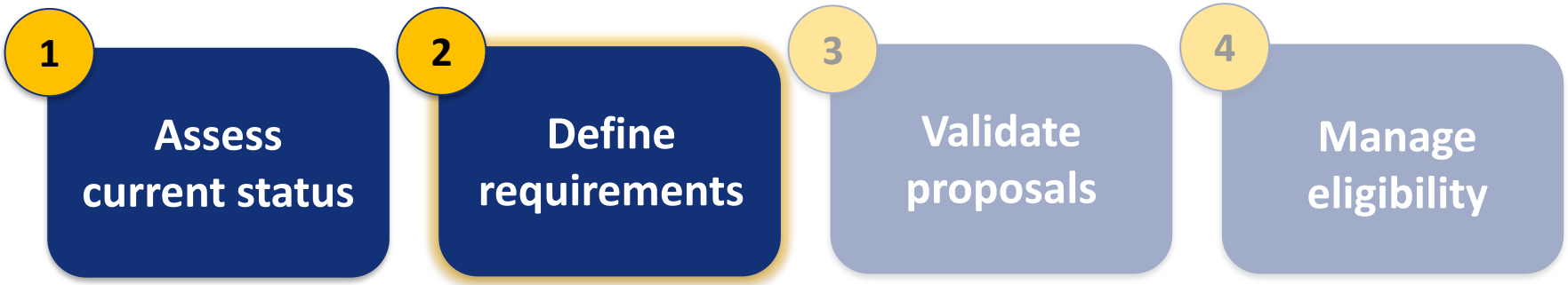


2

Define requirements

Business question

How to identify and express the requirements for my request?

Objective

Leverage existing work and methods in terms of solutions, specifications and assessments and formulate resulting requirements in an unambiguous and machine-processable manner.

Practical approach

Use the CAMSS to evaluate National specifications and the ELIS to find existing proposals per building block. Use the EIRA© as a controlled vocabulary and model requirements in the CarTool.

Output

One or more SATs representing the request's requirements in terms of required specifications.

Assessing specifications - CAMSS

CAMSS
COMMON ASSESSMENT METHOD FOR STANDARDS AND SPECIFICATIONS

CAMSS is the European guide to **assess** and select specifications, a **reference** when building an architecture and an **enabler to explain** choices in terms of interoperability needs and requirements

Use CAMSS

Use **yourself** the CAMSS resources to assess your specifications

Reuse CAMSS

Use a growing **collection** of online and ready to use assessments

Consume CAMSS

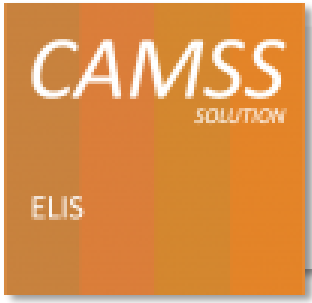
Request an assessment of a specification as a **service**

CAMSS solutions

Offline assessment tools (Excel, LibreOffice) for **do-it-yourself** scenario-based specification assessments

Public collection of **specification assessments** to be downloaded and reused (on Joinup)

Request as a service a **new assessment**, or for an existing one a **content** or **compliance review**



Library of proposed specifications per **EIRA© ABB** as best-in-class to support IoP (on Joinup)

The EIRA©

EIRA
EUROPEAN INTEROPERABILITY REFERENCE ARCHITECTURE

The **European Interoperability Reference Architecture** (EIRA©) is a reference architecture for delivering interoperable digital public services across borders and sectors

- ✓ Focus is on **interoperability**
- ✓ Aligned to the **EIF** and **TOGAF®**, uses **SOA** and **ArchiMate®**

Structure

- ✓ Defines concepts as **Architecture Building Blocks** (ABBs)
- ✓ ABBs organised in **four views** (Legal, Organisational, Semantic, Technical)

Products

- ✓ **Solution Architecture Templates** (SATs) to model requirements
  - HL*: IoP goals and principles
  - DL*: Specifications per ABB
- ✓ **Solution** models

* *High-Level (HL), Detail-Level (DL)*

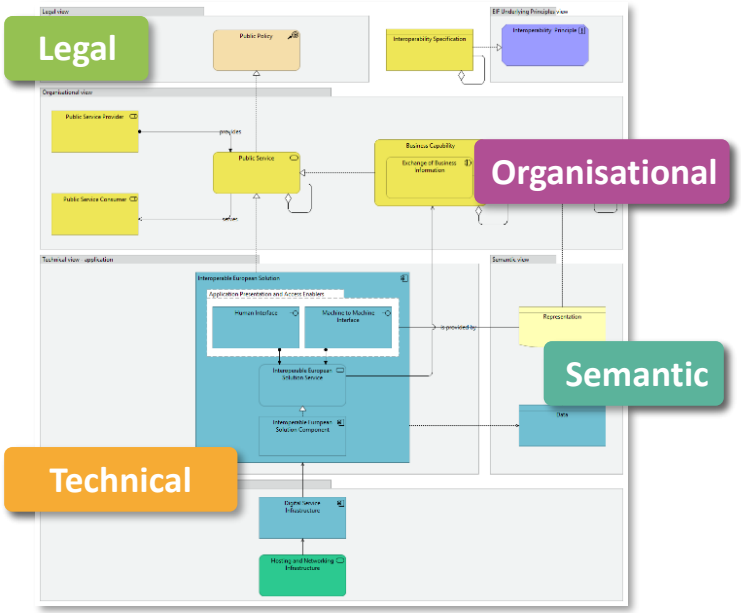
The EIRA© and the EIF

EIF

Framework and principles

EIRA© v3.0.0

Implementation guidelines and specifications



EIRA© use cases

Design

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

Assess

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

Communicate and share

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

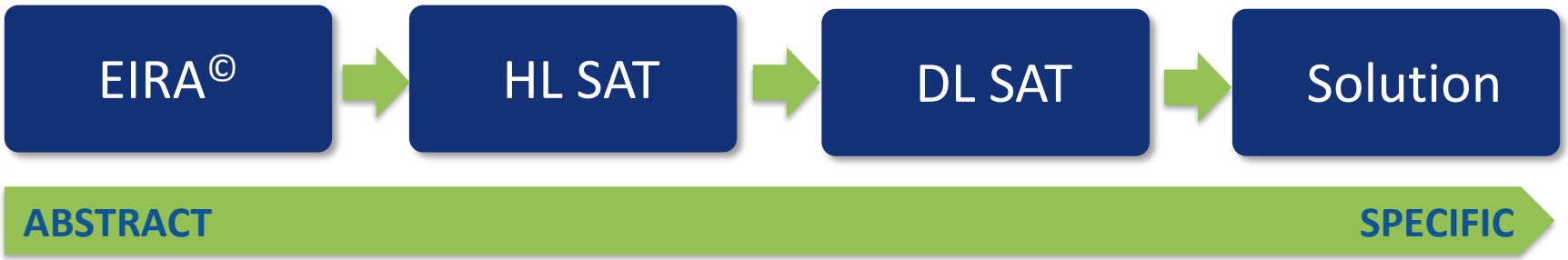
Discover and reuse

Ease the discovery and reuse of interoperability solutions through EIRA©-based Cartographies using the CarTool

Solution Architecture Templates (SATs)

SATs are the EIRA© mechanism to represent **requirements** at two levels:

- ✓ **High-level (HL) SATs** provide an abstract view in terms of ABBs and their **interoperability aspects** and **requirements**
- ✓ **Detail-level (DL) SATs** are specific and can define existing solution building blocks (SBBs) as required components (e.g. a National eID service) or ABBs (i.e. at abstract level) with **linked IoP specifications**

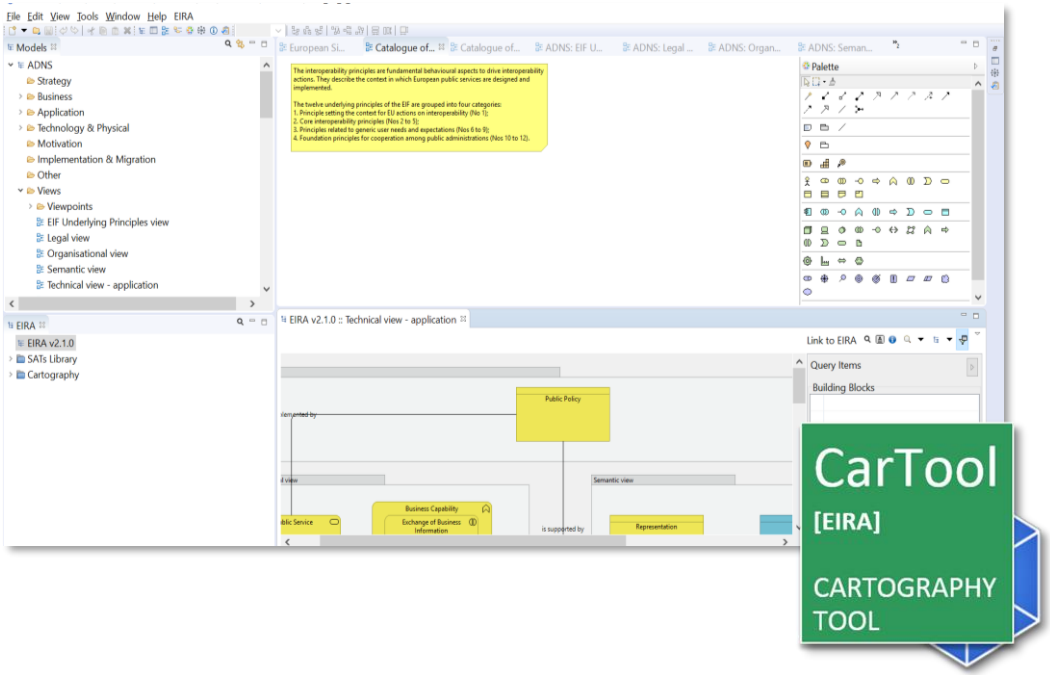


The Cartography Tool (CarTool)

The **Cartography Tool** (CarTool) provides high level support for the EIRA© as a **plug-in** for the popular **ArchiMate modelling tool Archi®**.

It provides both modelling and querying features:

- ✓ **Model:** Model new solutions based on the EIRA©, SATs or existing solutions; or model new SATs based on the EIRA©.
- ✓ **Search:** Query Cartographies based on the EIRA© and consult SAT and specification libraries

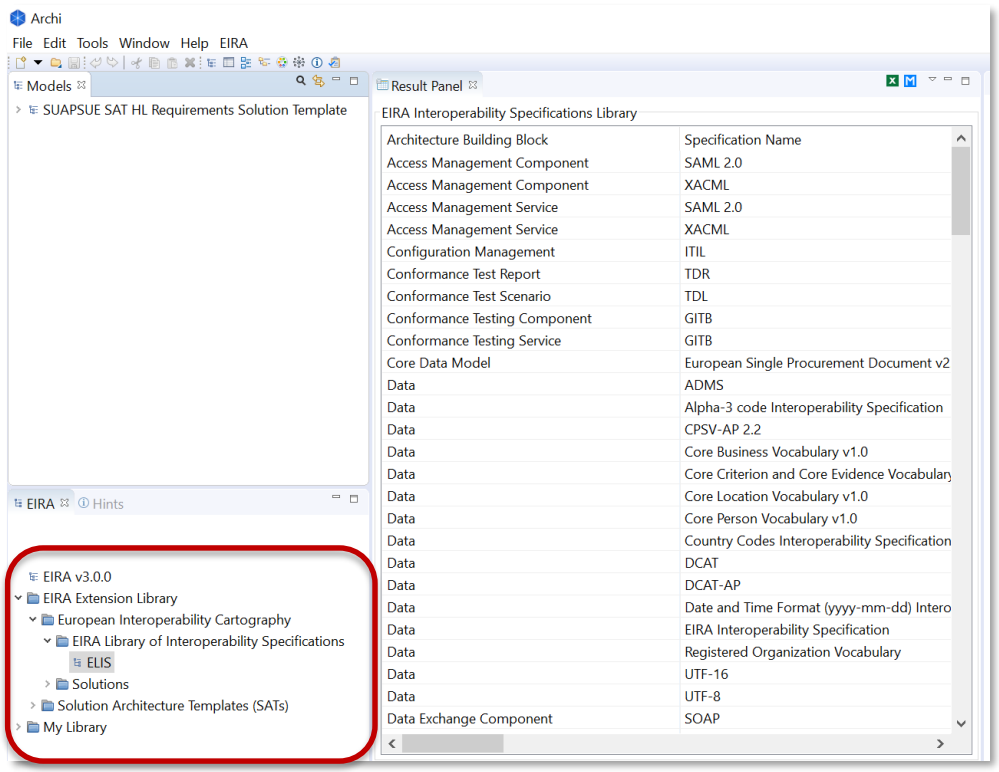


ELIS and CarTool integration

The **EIRA© Library of Interoperability Specifications (ELIS)** lists standards and specifications proposed by the European Commission for each EIRA© ABB (see v1.0.0 beta).

It is populated using various **sources** including National standard lists, EU and International standards, SATs, CAMSS assessments and expert input

The EIRA©'s **CarTool** offers top-level support for the ELIS integrating it in the modelling process of solutions and SATs.



ELIS ABB coverage

The goal of the ELIS is to have complete coverage of all **Legal**, **Organisational**, **Semantic** and **Technical** ABBs. Current coverage of the ABBs in EIRA© v3.0.0 is as follows:

Metrics/View	Legal	Organisational	Semantic	Technical
Total number of ABBs	12	27	14	65
ABBs covered	3	10	6	55
% of coverage	25.00%	37.04%	42.86%	84.62%
Specs used in the view	3	4	31	127
ABBs covered with more than 1 spec	0	0	5	24
Specs assessed in the view	0	0	4	4
% of assessed coverage	0.00%	0.00%	28.57%	6.15%

EIRA© conformance - vision

Completeness

Test a model to ensure the EIRA© **guidelines**, **structure** and **modelling rules** are respected

Test **solution** or **DL/HL SAT** vs the EIRA©

IoP requirements

Test that a model respects prescribed **IoP requirements**

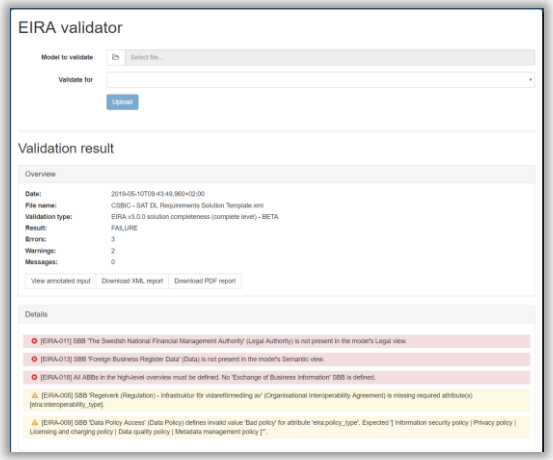
Test **DL SAT vs a HL SAT**, **solution vs a SAT**, **DL SAT specifications vs the ELIS**

- ✓ Conformance testing organised in **conformance profiles** per **EIRA© version**
- ✓ Each profile defines **conformance levels** (“basic”, “complete”)
- ✓ Target solution/SAT model used for **deterministic results**

EIRA© conformance - implementation

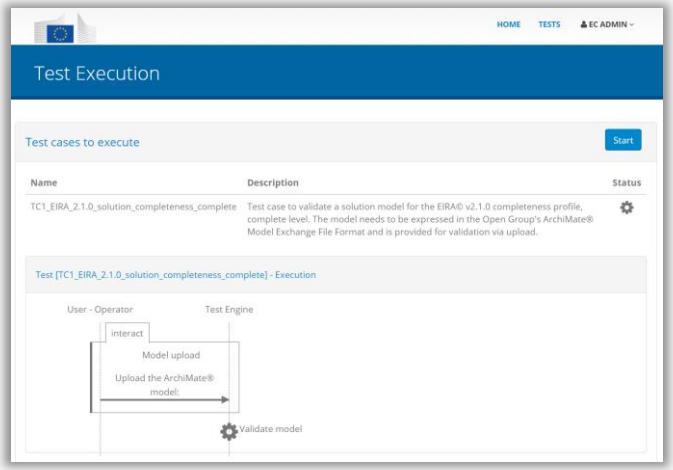
EIRA© conformance testing implemented on the **ISA² Interoperability Test Bed**

EIRA© validator



Public and anonymous validation via [web UI] and [SOAP API]

EIRA© on ITB



Account-based access on [ISA² ITB] with full reporting and monitoring

Use in our procurement scenario

1 ***How to define the requirements to improve my service's IoP?***

Consider the IMAPS and IQAT proposals and model the identified gap using the **EIRA©**. Define these either as a **HL SAT** (to model aspects and principles) or a **DL SAT** (to model specific requirements).

Output: An SAT modelling the requirements to implement identified gaps.

2 ***How can I reuse existing work when defining my requirements?***

Use the **CarTool** to inspect **existing SATs** that model requirements in given policy domains and deployment scenarios. SATs can be used for **inspiration** or be considered **as-is** as part of my overall requirements.

Output: Potentially one or more existing SAT(s) that complement my requirements.

Use in our procurement scenario (2)

3

Where new development is needed how do I determine the specifications to use?

Start in the **CarTool** by inspecting **existing SATs** and, using its **ELIS** integration, view proposals per identified ABBs. Consider also existing specification assessments from the **CAMSS library of assessments**.

Output: The best-in-class IoP specifications to use per ABB.

4

How can I evaluate and reuse my own National specifications?

Use the **CAMSS assessment tool** to evaluate National specifications. Apart from identifying specifications that are **IoP enablers** this exercise also identifies points to improve towards **standardisation**.

Output: Assessed National specifications to potentially use in the request.

Use in our procurement scenario (3)

5

How do I model my procurement requirements in a non-ambiguous manner?

The request's combined requirements are modelled using the **EIRA©** as a **controlled vocabulary for procurement** by means of a **DL SAT**, including identified specifications and predetermined National solution building blocks. If applicable this can also be accompanied by other **SATs reused** from the CarTool.

Tenderers are expected to propose their solutions as models that conform to the latest **EIRA© version** and the **request's SAT(s)**.

Output: My request's requirements modelled as one or more DL SAT(s).

Demo

Demo 1: Using the CAMSS toolkit to assess a National specification

Demo 2: Using the CarTool to model a DL SAT and leverage the ELIS

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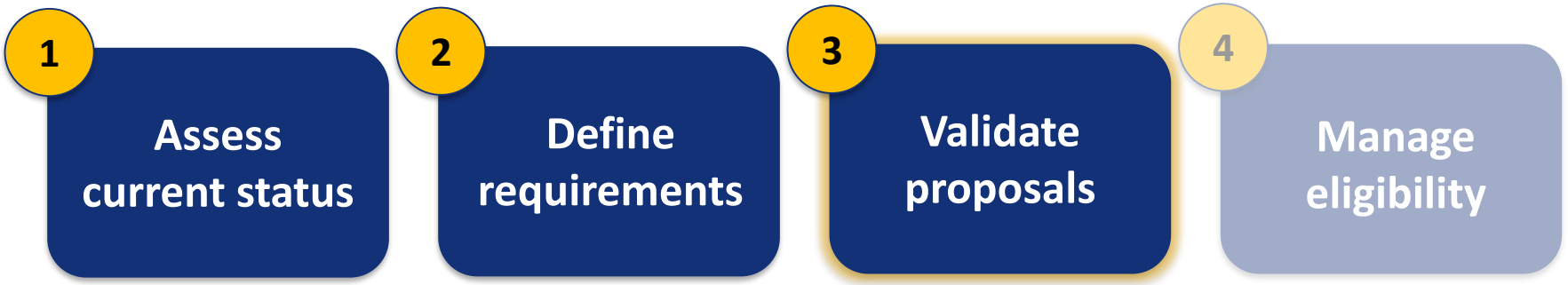


3

Validate proposals

Business question

How to validate the received proposals for my request?

Objective

Provide support to tenderers to validate their models before they submit and to the public administration to facilitate an initial quality control on received proposals.

Practical approach

Use the ITB and its public EIRA© conformance testing services to validate proposed models against the EIRA©'s guidelines and the request's SAT(s).

Output

The set of proposals that conform to my request and can be further evaluated.

What is the Interoperability Test Bed?

ITB
Interoperability Test Bed

The ISA² Interoperability Test Bed is an online, intuitive and self-service platform for conformance testing of IT systems against semantic and technical specifications

Test Bed value proposition (https://www.itb.ec.europa.eu/docs/guides/latest/valueProposition/)

Powered by DIGIT ISA² Action 2016.25

Based on the GITB CEN Workshop Agreement

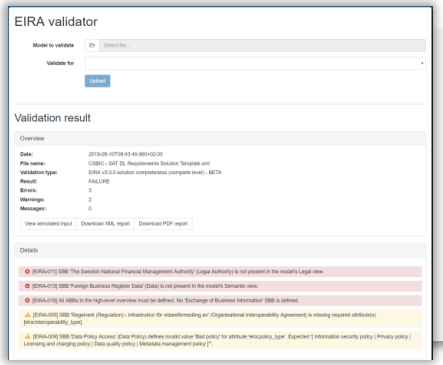
What can it be used for?

Conformance testing

- ✓ API simulation
- ✓ Content validation
- ✓ Protocol verification
- ✓ Conversation validation
- ✓ Self-service tests
- ✓ Report exports
- ✓ Progress monitoring
- ✓ Conformance certificates

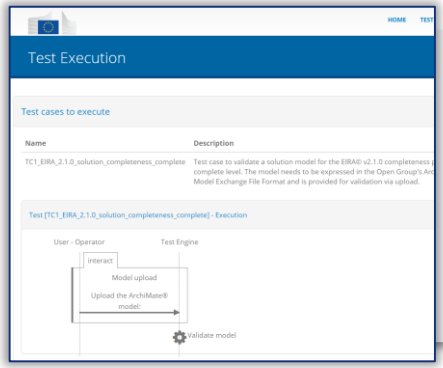
Interoperability testing

Testing channels



- ✓ Public
- ✓ Simple reporting
- ✓ Anonymous and stateless

Data validators



- ✓ Account-based
- ✓ Test scenarios
- ✓ History, monitoring and reporting

Complete Test Bed

Technical capabilities

✓ Built-in support

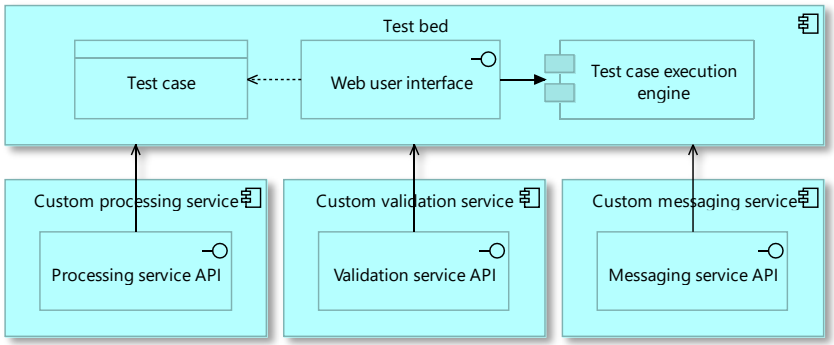
Messaging

AS2, AS4
SOAP, REST
eDelivery, FLUX, HTTP, HTTPS

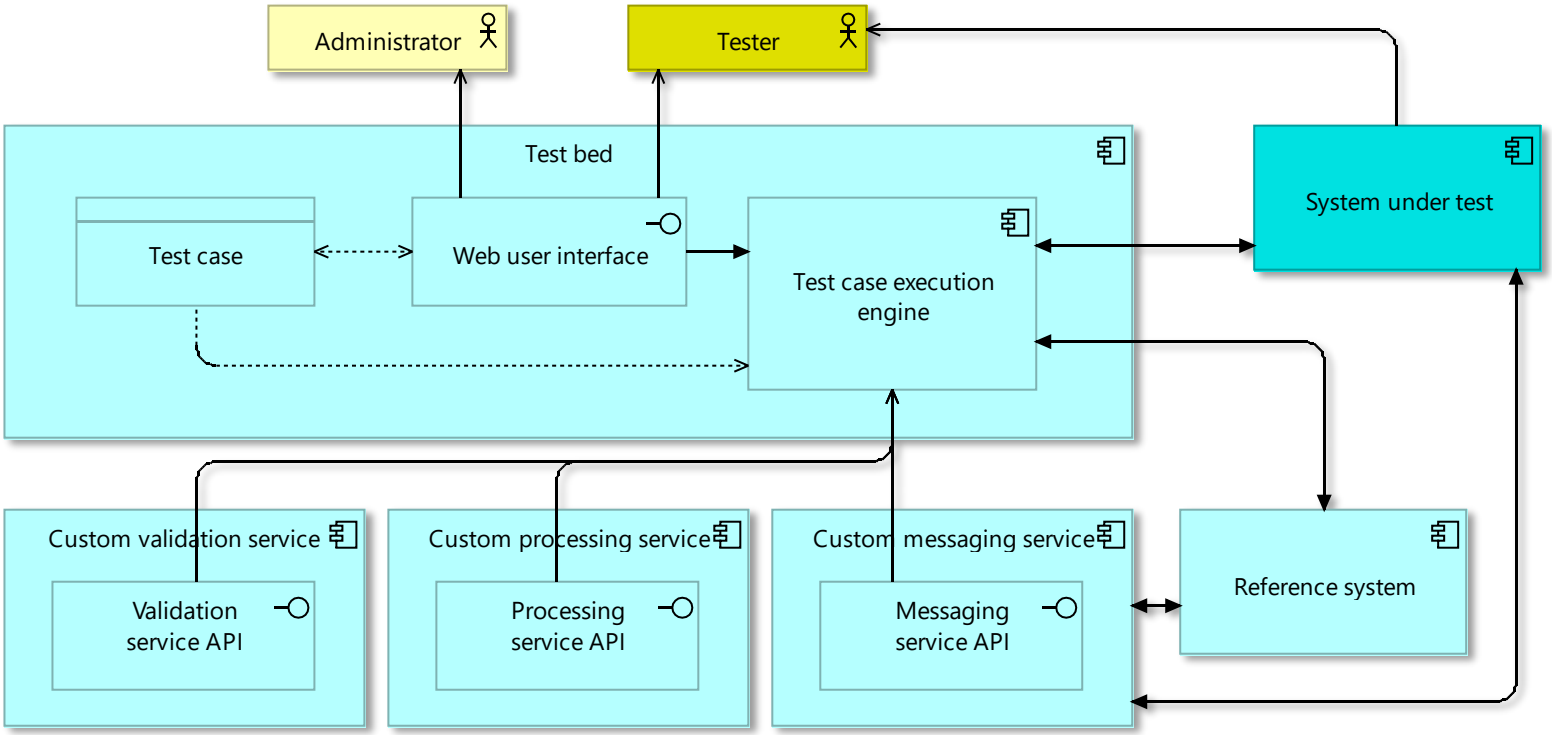
Validation

XML, RDF
SHACL, XSD
Schematron, XPath, RegExp

✓ Custom extensions



How does it work?



Deployment models

Cloud-based

- ✓ Shared ISA^2 instance
- ✓ Private communities
- ✓ Publicly accessible
- ✓ Managed by ITB team

On-premise

- ✓ Private instance
- ✓ Dockerised service
- ✓ Automated updates
- ✓ Managed by users

EIRA© - ITB synergy in procurement

EIRA
EUROPEAN INTEROPERABILITY REFERENCE ARCHITECTURE

- ✓ **Quality assurance** instrument
- ✓ Ensures compliance to **EIF** and **EU regulations**

ITB
Interoperability Test Bed

- ✓ **Quality control** instrument
- ✓ Tests conformance to **EIRA©** and **IoP specs**

Use in our procurement scenario

1

How do I do a quality check on my requirements before publishing my request?

Use the **ITB's EIRA© validation service** to validate the produced DL SAT in terms of **completeness** (i.e. that it is correctly modelled) and **IoP requirements** (that best-in-class specifications are indeed used).

Output: A validation report for my request's SAT ensuring it is correctly defined.

2

How can tenderers be supported in preparing their response?

Tenderers can use the **CarTool** to inspect the request's **SAT(s)** and model their proposed **solution**. Before submission they can use the **ITB's EIRA© validation service** to validate their solution model.

Output: A proposal as a conformant solution model, validated as such by the ITB.

Use in our procurement scenario (2)

3

How can I do a first quality control check on received submissions?

Use the **ITB's EIRA© validation service** to detect submissions where solutions are incorrectly modelled or where the request's SAT(s) are not respected. This acts as a first deterministic **quality control** check before proceeding with further evaluation.

Output: The set of received proposals that conform to my request's requirements.

Demo

Demo 1: Using the EIRA© validation service to validate an SAT or solution

Demo 2: Using the ITB to validate a full message exchange linked to the SDG

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5	**Manage eligibility** Facilitate the definition of tenderer eligibility criteria and the collection of certificates
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Scenario roadmap

1. Assess current status
2. Define requirements
3. Validate proposals
4. Manage eligibility

4

Manage eligibility

Business question

How facilitate the collection of tenderer eligibility proof for my request?

Objective

Simplify the definition of selection and exclusion criteria, allowing the reuse of existing information and facilitating the certification process for tenderers across the EU.

Practical approach

Use the ESPD to define the requested criteria and responses for tenderer eligibility certifications. Automatically use eCertis to lookup National certification mappings and templates.

Output

An ESPD request to define the eligibility criteria for tenderers.

Introducing the ESPD

ESPD

European Single Procurement Document

The European Single Procurement Document (ESPD) is a **self-declaration form** used in public procurement procedures to facilitate the definition of tenderer **eligibility criteria** and the provision of **certifications**

- ✓ ESPD templates, certificate templates and data can be **reused**
- ✓ Can be streamlined by **integration** with National and EC services
- ✓ Only the tender **winner** needs to provide the actual documentation
- ✓ **ESPD service** software provided by EC and operated by Member States

ESPD integrations and synergies

European level

eCertis

eCertis is an online service operated by the EC allowing buyers and bidders to identify and compare the **certificates** required as evidence of eligibility for public procurement procedures across the EU.

TED

Tenders Electronic Daily (TED) is an online service operated by the EU Publications Office for the publication and consultation of procurement notices (also cross-border).

National level

Prequalification systems are services that store information and documents about businesses. They can be linked to **National registers** to reduce the need to submit evidence multiple times.

How does the ESPD work?

1. The buyer creates or reuses an **ESPD template**, defining bidder exclusion and selection criteria. The **ESPD** is included in the request.
2. The **procurement documents** are published in the National procurement journal and automatically submitted to **TED**.
3. The bidder finds the request in her **National portal** (updated through **TED**) and downloads its documents including the **ESPD**.
4. The bidder fills in the **ESPD** manually or **automatically** through a **prequalification system**. When ready the bid (with the **ESPD**) is submitted.
5. The buyer evaluates all received **ESPDs** and uses **eCertis** to compare certification requirements from other Member States.
6. The buyer evaluates the bids and awards the contract to the bidder with **the best offer**. The **winner** provides the actual documents from the ESPD.

Use in our procurement scenario

1

How do I define the eligibility criteria for my request?

Create or reuse an **ESPD** as part of the request's documentation and included SAT(s). Define the use of the **EIRA©** and validation through the **ITB** as **National sub-selection criteria**.

Output: An ESPD capturing the request's eligibility criteria.

2

How can tenderers be supported in providing eligibility proof?

Tenderers fill in the ESPD manually or automatically and provide the actual documentation only if awarded the contract.

Output: A completed ESPD per tenderer.

Use in our procurement scenario (2)

3

How do I check the eligibility of the tenderers submitting proposals?

Generate an overview for the request over **all received ESPDs** and check **cross-border certification requirements** in **eCertis**. This complements the quality control step by facilitating eligibility checks.

Output: A set of submissions that meet eligibility criteria that can be further evaluated.

Demo

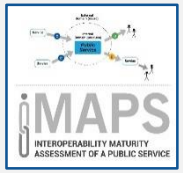
Demo 1: Using a National ESPD service to create a new ESPD

Demo 2: Using eCertis to lookup cross-border certification needs

1	**Introduction** Workshop overview and scenario introduction
2	**Assess current status** Assess the interoperability maturity of my services and their supporting ICT solutions
3	**Define requirements** Define my requirements, the specifications to use and formulate for public procurement
4	**Validate proposals** Apply quality control validation to the request and received proposals.
5	**Manage eligibility** Facilitate the definition of tenderer eligibility criteria and the collection of certificates
6	**Wrap-up and discussion** Wrap-up and discussion on the illustrated ISA^2 solutions and considered scenario

Steps and supporting ISA² solutions

1 Assess current status



IQAT© Interoperability Quick Assessment Toolkit

2 Define requirements

CAMSS SOLUTION ELIS

CAMSS SOLUTION ASSESSMENT TOOLS

EIRA EUROPEAN INTEROPERABILITY REFERENCE ARCHITECTURE

CarTool [EIRA] CARTOGRAPHY TOOL

3 Validate proposals

ITB Interoperability Test Bed

4 Manage eligibility

ESPD European Single Procurement Document

How did the ISA² solutions help?

Using **IMAPS** and **IQAT** as consistent tools to measure our services' IoP we identified best-in-class cases and the gaps to fill

Using the **CAMSS** tools we assessed our National specifications and using the **ELIS** we identified the proposed specifications to use

Using the **EIRA©** and the **CarTool** we modelled our request's requirements in an unambiguous manner supporting streamlined processing

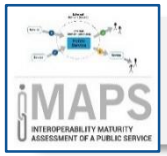
Using the **ITB** we made a first filtering on the received proposals' content allowing more time to be focused on those of high quality

Using the **ESPD** we allowed tenderers to spend more time on proposals' content and simplified our approach to verify eligibility

ISA² solution overview

- **iMAPS** — Interoperability assessment of digital public services
- **CAMSS ELIS** — EIRA-based library of proposed interoperability specifications
- **IQAT© Interoperability Quick Assessment Toolkit** — Interoperability assessment for services' supporting IT solutions
- **CAMSS Assessment Tools** — Tool to assess standards and specifications
- **EIRA** European Interoperability Reference Architecture — Interoperability reference architecture for public services
- **ITB** Interoperability Test Bed — Data validation services and conformance testing platform
- **CarTool [EIRA] Cartography Tool** — Archi plug-in to model and consult EIRA resources
- **ESPD** European Single Procurement Document — Electronic document to manage procurement eligibility criteria

ISA² solution references



Info, Online survey, IMAPS v1.1.1

Info, ELIS v1.0.0 beta

Info, IQAT v1.2.0

Info, CAMSS Tools v3.0.0, CAMSS assessment library

Info, EIRA v3.0.0

Info, ITB v1.7.0, ITB guides, ISA² instance

Info, CarTool v3.0.0

Info, eCertis, ESPD regulation

Questions?

ISA² programme

You click, we link.

Stay in touch

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Run by the Interoperability Unit at DIGIT (European Commission) with 131€M budget, the ISA² programme provides public administrations, businesses and citizens with specifications and standards, software and services to reduce administrative burdens.