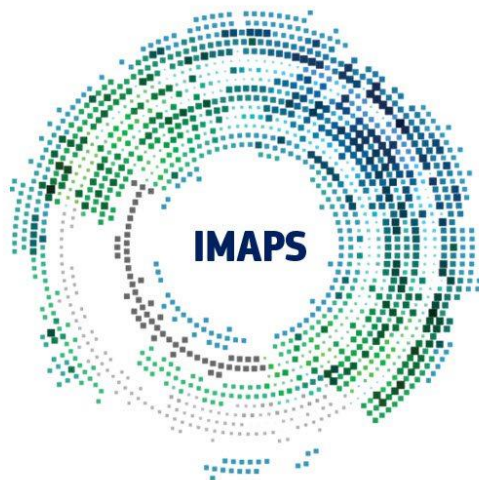


# TIMAPS v1.0.0

## Technical Interoperability Maturity Assessment of a Public Service

### User guide



Interoperability Maturity Assessment of Your Digital Public Service

**LIMAPS** Legal Interoperability

**OIMAPS** Organisational Interoperability

**SIMAPS** Semantic Interoperability

**TIMAPS** Technical Interoperability

## Disclaimer

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**Table of Abbreviations**

Acronym	Description
ABB	Architectural Building Block
CAMSS	Common Assessment Method for Standards and Specifications
CarTool	Cartography Tool
DIGIT	Directorate-General for Informatics
EC	European Commission
EIF	European Interoperability Framework
EIRA© (EIRA)	European Interoperability Reference Architecture
ELAP	EIRA Library of Architecture Principles (ELAP)
ELIS	EIRA Library of Interoperability Specifications
EU	European Union
HL SAT	High Level Solution Architecture Template
IQAT	Interoperability Quick Assessment Toolkit
ISA	Interoperability Services for Public Administrations
IMAPS	Interoperability Maturity Assessment of a Public Service
MS	Member State
PA	Public Administration
TIMAPS	Technical Interoperability Maturity Assessment of a Public Service
SIQAT	Structural Interoperability Quick Assessment Toolkit

**Glossary of terms**

Term	Description
Attribute	Structural part of each TIMAPS component. Each attribute includes questions (items) that assess a specific aspect of the digital public service. Each of the TIMAPS survey components has questions (items) that are organised under the following attributes: the technical interoperability specifications of data, information and knowledge delivered by the digital public service to its end users and/or other services, the technical interoperability enablers and the technical interoperability manifestations.
Component	Fundamental structural part of the TIMAPS model that reflects how the respective questions (items) in the questionnaire (survey) are organised. Each component refers to a different pillar of the digital public service lifecycle. TIMAPS has two components: Service Delivery and Service Consumption, which means that the respective questions refer to these two specific categories.
Item	Structural part of each TIMAPS attribute. Items are the questions of the TIMAPS questionnaire (survey)
Option	Options are the possible replies to one TIMAPS item
Principles	Rules applied on digital public service to enable and ensure technical interoperability
(Overall) Weight	Weight refers to the absolute numerical factor that each component/attribute/item contributes into the structural part it belongs. Overall weight refers to the overall numerical factor that each component/attribute/item contributes to the whole TIMAPS survey

## EXECUTIVE SUMMARY

This document provides the guidelines and definitions for using the **Technical Interoperability Maturity Assessment of a Public Service (TIMAPS)** tool in order to assess and improve the technical interoperability maturity of a digital public service. It also includes the questions and the options of the TIMAPS questionnaire as well as the respective recommendations. TIMAPS is the **technical specialisation** of IMAPS survey that assesses the behavioral aspects of a digital public service from the technical interoperability viewpoint.

In the following chapters, we provide an introduction to the most important chapters in the context of TIMAPS and we present the objectives of TIMAPS, the defined maturity levels and the approach and attributes of technical interoperability that are the subject of observation and assessment.

In addition, we present an explanation of the structure of the TIMAPS questionnaire, the methodology used to determine the maturity levels of technical behavioral interoperability of a public service and the questions and options of the questionnaire.

Finally, we conclude with the recommendations that the end-user receives for each question. After filling in the online questionnaire, the respondent receives a PDF with advice on how to improve the technical behavioral interoperability of his digital public service.

## 1 INTRODUCTION

### 1.1 Document Objectives

The main objective of the **Technical Interoperability Maturity Assessment of a Public Services (TIMAPS)** is to provide insight into how digital public services can improve their technical behavioral interoperability maturity. TIMAPS is the **technical specialisation** of IMAPS survey that assesses the behavioral aspects of a digital public service from the technical interoperability viewpoint. This document is based on the updates of TIMAPS beta v1.0.0 to version 1.0.0 by implementing the feedback collected during TIMAPS beta v1.0.0 deployment and review, as this has been recorded in the respective JIRA tickets as well as during the sessions with the experts. These updates include the description of TIMAPS version 1.0.0, its purpose and scope in relation to IMAPS, as well as its design and deployment on the EU Survey portal. The objectives of the present deliverable are the following:

- the description of the **key concepts** to understand the TIMAPS;
- the presentation of **model objectives**;
- the description of the TIMAPS **maturity levels**, as well as the **behavioral interoperability aspects** that it covers;
- the description of the TIMAPS **structure** including its **attributes and components**;
- the description of how the TIMAPS **questionnaire** is structured, its questions and their options;
- the description of how the TIMAPS **recommendations** are generated including the recommendations per question.

### 1.2 Document Structure

The document is organised in the following chapters:

- **Executive summary**, which provides an overview of the deliverable objectives, activities and conclusions;
- **Chapter 1:** Serves as introduction to the document;
- **Chapter 2:** Includes the description of the key concepts used in TIMAPS and their link to IMAPS;
- **Chapter 3:** Includes the maturity levels of TIMAPS;
- **Chapter 4:** Presents TIMAPS structure, in components, attributes and items, demonstrating how their design ensures alignment with IMAPS, EIF and EIRA;
- **Chapter 5:** Presents the TIMAPS questionnaire and how it is structured;
- **Chapter 6:** Presents the TIMAPS recommendations and how they are generated

## 2 TIMAPS KEY CONCEPTS

The following concepts are key to understand the TIMAPS:

- *Digital public service* – the digital delivery of a public service via channels such as interactive digital collaborations (chat, messaging functionality), mobile application, web portal / website, email and machine-to-machine interface.
- *Interoperability* – 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 IT systems.
- *Technical Interoperability* - Technical interoperability refers to systems and services that link applications and infrastructures (via interfaces, data integration services and secure communication protocols). In the context of EIF, this covers the applications and infrastructures linking systems and services. Aspects of technical interoperability include interface specifications, interconnection services, data integration services, data presentation and exchange, and secure communication protocols.

### 2.1 Digital public service

The Technical Interoperability Maturity Assessment of Public Services (TIMAPS) assesses the technical behavioral interoperability of a digital public service. The following four design rules apply when defining a digital public service:

1. The digital public service has a **single outcome / public decision**. When multiple service outcomes are recognised, then multiple digital public services will need to be defined and assessed, each one through a separate TIMAPS assessment;
2. The digital public service has a **single service owner** i.e. the public administration responsible for the service. When the ownership of a service is distributed amongst multiple public administrations (e.g. multiple local administrations providing birth certificates), then each service owner needs to conduct a separate assessment for his respective service;
3. The digital public service has a **single primary end user group**. Public services can be delivered towards three of end users: citizens, businesses and other public administrations. In case the same digital public service is delivered to different types of end users, then these services should be assessed separately from one another through the TIMAPS;
4. The digital public service has a **virtual end user interface**. TIMAPS at the outset has been designed to evaluate services, which are delivered to end users. This is a corollary to the previous design rule.

Examples of digital public services that conform to the aforementioned design rules are the following:

- Citizens (3) are offered the service to issue an e-administrative fee (1) via the GSIS portal (4) provided by the Ministry of Digital Government (2);

- New parents (3) could get a birth certificate, register for parental leave, and access other relevant services (1) through one single eGovernment portal (4) instead of interacting with multiple agencies. The eGovernment portal uses open standards such as XML, SQL and HTML;
- Citizens (3) are offered the national electronic service of citizens' identities (eID) (1) via the eID portal (4) provided by the Ministry of Interior (2).

## 2.2 Interoperability and IMAPS

Interoperability in a digital public service is an attribution defined as "the extent it enables peer-to-peer collaboration with public services towards mutually beneficial goals, involving the sharing of data, information and knowledge between them regardless their legal, organisational, semantic and technical environment". Figure 2 illustrates the digital public service in the context of interoperability.

Interoperability is of multidimensional nature involving structural interoperability, behavioral interoperability and governance interoperability:

1. The **structural interoperability** is "the extent its structure has been developed reusing and/or sharing components in support of a peer-to-peer collaboration"
2. The **behavioral interoperability** is "the extent its manifested behaviour exchanges data, information or knowledge with its environment in support of a peer-to-peer collaboration"
3. The **governance interoperability** is "the extent its agreed choreography rules support a peer-to-peer collaboration"

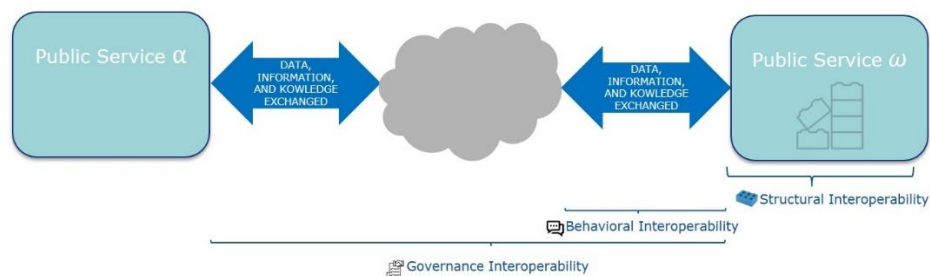


Figure 1: Interoperability dimensions

In addition, all relationships that interconnect the digital public service with the outside environment are considered relevant for assessing interoperability and thus, they are taken into account in the IMAPS. Interoperability and IMAPS are concerned with how the relationship between internal and external domains is defined and implemented.

In particular, IMAPS measures how well a public administration interacts with **external** entities to organise the efficient provisioning of its public services to other public administrations, businesses and citizens. IMAPS uses the term "behavioral" to refer to the fact that it assesses aspects that have to do with how the public services "behave" while interacting with each other or with their end users (citizens, business or other Public Administrations).



## 2.3 Technical Interoperability and TIMAPS

TIMAPS assesses the behavioral aspects of a digital public service, via an approach similar to this of IMAPS, but from the **technical behavioral interoperability viewpoint**.

**Technical interoperability** refers to systems and services that link applications and infrastructures (via interfaces, data integration services and secure communication protocols). **In the context of the European Interoperability Framework (EIF)**, this covers the applications and infrastructures linking systems and services. Aspects of technical interoperability include interface specifications, interconnection services, data integration services, data presentation and exchange, and secure communication protocols. **Technical Interoperability** is usually associated with hardware/software components, systems and platforms that enable machine-to-machine communication to take place. The interoperability of information systems is essential in providing integrated government services.

In particular, TIMAPS assesses the behavioral aspects of a digital public service by limiting its focus on:

- the technical behavioral interoperability **specifications** of data, information and knowledge delivered and consumed by the public service and its end-users or other client services;
- the technical behavioral interoperability **capabilities** that **enable** either the delivery and consumption of data, information and knowledge by the digital public service and its end users or other client services or ii) the discoverability of the public service or other client services;
- the technical behavioral interoperability **manifestations** of the public service delivering and consuming data, information and knowledge (manifestations can be performance, results, user experience).

### TIMAPS Objectives

TIMAPS delivers insights into two important aspects of technical interoperability maturity:

- Provide insight into the **current technical interoperability maturity** of a digital public service based on a set of defined interoperability attributes and maturity stages;
- Provide guidelines for how the digital public service can **improve its technical interoperability maturity**.

Improving interoperability and in particular, technical interoperability is a continuous activity. Organisations are therefore encouraged to use the model and its improvement recommendations regularly.

## 2.4 IMAPS and TIMAPS User Journey

The figure below illustrates a typical user journey for the IMAPS end user and shows how IMAPS recommendations can trigger the need for an assessment with TIMAPS survey.

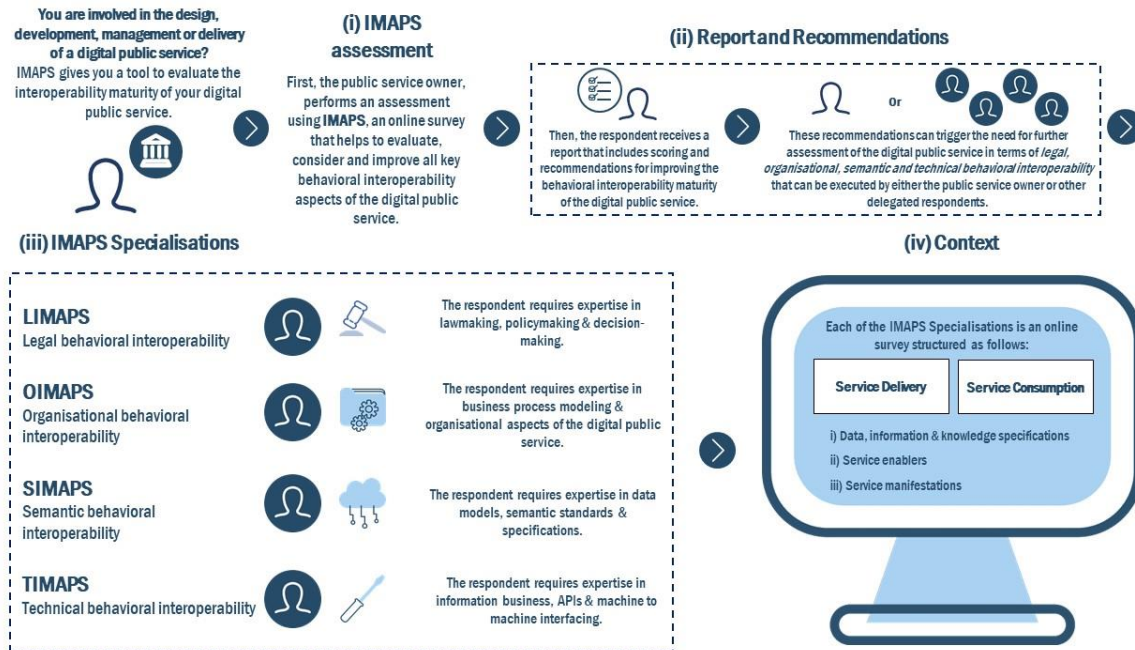


Figure 2: IMAPS to TIMAPS user journey

## 2.5 TIMAPS Target users

TIMAPS can be used by the following end-users:

- IT Requirements Managers: to analyse and assess the functionalities of a To-Be digital public service;
- IT Architects: to design, develop and assess an interoperable software solution for a digital public service;
- IT experts: to get insights on the future technical necessities and possibilities for a digital public service.

### 3 TIMAPS MATURITY LEVELS

TIMAPS uses a **five-stage model** to indicate the technical interoperability maturity of the digital public service. Using maturity levels allows to:

- Measure the technical interoperability maturity of the digital public service as a whole as well as underlying aspects;
- Indicate which capabilities and next steps are required to reach higher levels, and thus improve technical interoperability maturity.

A five-stage approach is often seen in proven maturity models and is considered best practice for assessing and improving maturity. The five maturity levels for TIMAPS are summarised in the table below.

**Table 1: Five maturity levels of TIMAPS**

Maturity Level	Maturity Stage	Interpretation
1	Ad Hoc	Poor interoperability – the digital public service cannot be considered interoperable
2	Opportunistic	Fair interoperability – the digital public service implements some elements of interoperability best practices
3	Essential	Essential interoperability – the digital public service implements the essential best practices for interoperability
4	Sustainable	Good interoperability – all relevant interoperability best practices are implemented by the digital public service
5	Seamless	Interoperability leading practice – the digital public service is a leading interoperability practice example for others

The desired interoperability level for a digital public service is at least level 4: “Sustainable”. At this level, the digital public service is considered to have implemented all relevant best practices.

## 4 TIMAPS STRUCTURE

### 4.1 Approach

IMAPS uses the term “behavioral” to refer to the fact that it assesses aspects that have to do with how the public services “behave” while interacting with each other or with their end users (citizens, business or other Public Administrations). **TIMAPS** assesses the behavioral aspects of a digital public service, via an approach similar to this of IMAPS, but from the **technical behavioral interoperability viewpoint**.

TIMAPS conceptual model describes all possible instances where **interoperability with the outside world may occur from the digital public service viewpoint**. It distinguishes between the **internal domain** (the internal service management) and the **external domain** (the digital public service uses/consumes existing services and exposes the produced service to thirds).

### 4.2 TIMAPS Components

Component	Fundamental structural part of the TIMAPS model that reflects how the respective questions (items) in the questionnaire (survey) are organised. Each component refers to a different pillar of the digital public service lifecycle. TIMAPS has two components: Service Delivery and Service Consumption, which means that the respective questions refer to these two specific categories.
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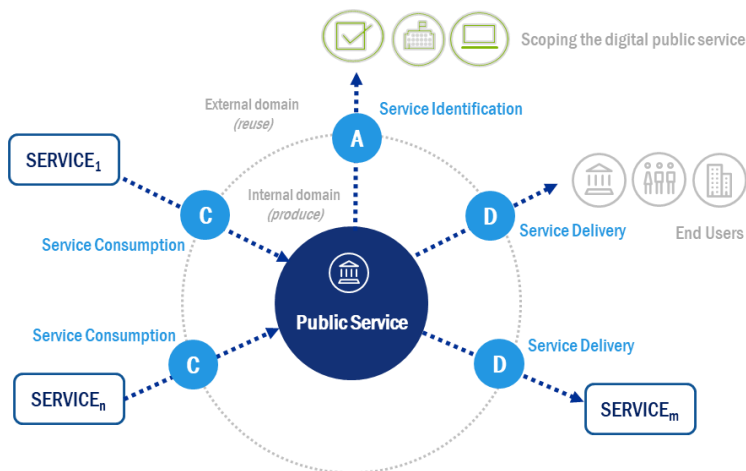


Figure 3: TIMAPS behavioral interoperability viewpoint

The behavioral interoperability aspects are described below:

- **Service Consumption (C)** – Consumption of reusable machine-to-machine services from other public administrations and businesses. This can include the consumption of functionalities, base registry information and security services;
- **Service Delivery (D)** – Delivery of the digital public service to its end users and/or other public administrations

The aspects (hereafter referred to as Behavioral Interoperability Aspects) indicated in the figure above are the object of measurement in TIMAPS, specifying where technical behavioral interoperability plays a role from a service delivery and a service consumption viewpoint.

#### 4.2.1 Service Delivery (D)

The public administration delivers the digital public service towards end users i.e. citizens, businesses or other administrations. We call this **Service Delivery**. The service that is being delivered represents the focal point of the TIMAPS in terms of correctly scoping and delimiting the digital public service under evaluation. If service delivery is scoped correctly, the scoping of the other areas becomes more straightforward. The Service Delivery area focuses on the delivery of the digital public service to its end users or other services.

#### 4.2.2 Service Consumption (C)

For delivering the digital public service towards the end user, the digital public service may be required to consume services of other public administrations or businesses. This area is called **Service Consumption** and it focuses on the consumption of reusable machine-to-machine (client) services from other public administrations and businesses. This can, indicatively, include the consumption of functionalities, base registry information and security services.

Digital public services that consume (reuse) existing services where possible are considered more interoperable than organisations that produce (develop) their own proprietary services without reusing existing functionalities.

### 4.3 TIMAPS Attributes

Attribute	Structural part of each TIMAPS component. Each attribute includes questions (items) that assess a specific aspect of the digital public service. Each of the TIMAPS survey components has questions (items) that are organised under the following attributes: the technical interoperability specifications of data, information and knowledge delivered by the digital public service to its end users and/or other services, the technical interoperability enablers and the technical interoperability manifestations.
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It is reminded, as per the glossary in the introduction of this document, that TIMAPS questionnaire is structured into two components: Service Delivery and Service consumption. The attributes that compose these TIMAPS components, are presented in the table below.

Table 2: Service delivery and service consumption attributes

Service Delivery	
Attribute	Rationale
<b>Data, Information, Knowledge Delivered</b>	Assesses the technical behavioral interoperability <b>specifications</b> of data, information and knowledge delivered by the public service to its end users and/or other client services.
<b>Service Delivery Enablers</b>	Assesses the technical behavioral interoperability <b>capabilities</b> that enable either i) the delivery of data, information and knowledge by the digital public service to its end users <b>and/or other client services</b> or ii) the discoverability of the public service.
<b>Service Delivery Manifestations</b>	Assesses the technical behavioral interoperability <b>manifestations</b> of the public service delivering data, information and knowledge (manifestations can be performance, results, user experience).
Service Consumption	
Attribute	Rationale
<b>Data, Information, Knowledge Consumed</b>	Assesses the technical behavioral interoperability <b>specifications</b> of data, information and knowledge <b>consumed</b> by the public service <b>from</b> other server services
<b>Service Consumption Enablers</b>	Assesses the technical behavioral interoperability <b>capabilities that enable the public service to either i) discover other server services and/or ii) consume their</b> data, information and knowledge
<b>Service Consumption Manifestations</b>	Assesses the technical behavioral interoperability <b>manifestations</b> of the public service <b>consuming</b> data, information and knowledge (manifestations can be performance, results, user experience).

It is briefly noted that there is a symmetry in the way the Service Delivery and Service Consumption attributes have been defined, from the delivery viewpoint to the consumption viewpoint. This means that there is no attribute in Service Delivery that is not also examined in the Service Consumption component from the service consumption viewpoint and vice versa.

#### 4.4 Sources of Input

Various related programmes and initiatives inside and outside ISA<sup>2</sup> have been leveraged to build the current set of TIMAPS Attributes. The most important ones are:

- **European Interoperability Framework (EIF)**<sup>1</sup> – The European Interoperability Framework (EIF) serves as an important framework for organisations to promote and improve interoperability and therefore is considered as a paramount starting point for defining TIMAPS attributes. The respective items per attribute have been specifically formed to assess the level of conformance

<sup>1</sup> [https://ec.europa.eu/isa2/eif\\_en](https://ec.europa.eu/isa2/eif_en)

with the elements of EIF structure (principles/layers/conceptual model). The basis to define TIMAPS items have been the EIF recommendations;

- **European Interoperability Reference Architecture (EIRA)**<sup>2</sup> – EIRA compliance is ensured at the level of TIMAPS attributes. In this context, the respective items per attribute have been specifically formed to assess the level of conformance with the EIRA Architecture Building Blocks (ABBs). The basis to define TIMAPS items has been the context of each one of the EIRA ABBs.
- **Digital Single Market** - the Digital Single Market strategy aims to open up digital opportunities for people and business and enhance Europe's position as a world leader in the digital economy. Select attributes were defined to align with this ambition; the terminology of TIMAPS overall embraces the key concepts of “digitalisation” in its various aspects;
- **Structural Interoperability Quick Assessment Toolkit (SIQAT©)**<sup>3</sup> – SIQAT© has been developed in the context of Action 2016.36 Assessment of trans-European systems supporting EU policies of the Interoperability solutions and common frameworks for European public administrations, businesses and citizens. The objective of the SIQAT© is to allow public service owners to evaluate the structural interoperability maturity level of their digital public service.
- **Technical interoperability experts** – The IMAPS project team conducted some rounds of interviews with the identified experts to improve the TIMAPS questionnaire.
- **A multi-dimensional framework to evaluate the innovation potential of digital public services**<sup>4</sup> – This report presents the main findings of a study conducted as part of the “Innovative Public Services” (IPS) Action of the ISA<sup>2</sup> Programme. The main outcome of the research is an original multi-dimensional framework for evaluating the interoperability readiness of digital public services. The framework was conceptualised and tested in the context of desk and field research on available evidence to support European Public Administrations willing to embrace new digital technologies and deliver innovative public services according to the four layers of the European Interoperability Framework (EIF) and in alignment with the user centricity principles defined in the Tallinn Declaration (2017).
- **Common Assessment Method for Standards and Specifications (CAMSS)**<sup>5</sup> - CAMSS is the European guide for assessing and selecting standards and specifications for an eGovernment project, a reference when building an architecture and an enabler for justifying the choice of standards and specifications in terms of interoperability needs and requirements. It is fully aligned with the European Standardisation Regulation 1025/2012.
- **EIRA Library of Interoperability Specifications (ELIS)**<sup>6</sup> - The EIRA Library of Interoperability Specifications is a library containing the standards and specifications defining the interoperability requirements of the architectural building blocks (ABBs) contained in the European Interoperability Reference Architecture (EIRA). The aim of this library is supporting solutions architects when modelling using EIRA.

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<sup>2</sup> <https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira/solution/eira>

<sup>3</sup> <https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira/solution/siqat/release/v100>

<sup>4</sup> <https://ec.europa.eu/jrc/en/publication/multi-dimensional-framework-evaluate-innovation-potential-digital-public-services>

<sup>5</sup> <https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/about>

<sup>6</sup> <https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/elis/release/v110>

- ***EIRA Library of Architecture Principles (ELAP)***<sup>7</sup> - The EIRA library of architecture principles (ELAP) is intended to direct government organizations in initiating changes and implementing IT projects. Particularly when designing new or modified services, it is necessary to make visible how the principles are implemented and which considerations are made in this regard. The apply-or-explain principle applies here, whereby deviations are permitted provided that they are substantiated and recorded with good arguments so that they can be revisited at a later stage. This prevents important matters from being overlooked. The principles are described in relation to relevant policy frameworks, established standards, building blocks and examples that are already available, so that they are as recognisable as possible in practice. In the context of TIMAPS, the CAMSS terminology, ELIS requirements and ELAP principles have been used as basis and guidance to design the items and options of the questionnaire, as well as the respective interoperability aspects, linked to each item. These interoperability aspects will serve as the basis to design the High Level Solution Architecture Template (HL SAT) of TIMAPS, a specification that extends EIRA and provides high level requirements on how to design a technically interoperable digital public service.

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<sup>7</sup> <https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/elap/release/v100>



## 5 TIMAPS QUESTIONNAIRE

TIMAPS uses a questionnaire structure for assessing the technical behavioral interoperability maturity of a digital public service. This section details the questionnaire type, question types and assessment structure in more detail.

TIMAPS questionnaire is a compact and highly user-friendly tool available online. Designed as a self-assessment tool, TIMAPS assessment criteria have been condensed into targeted question sets in order to evaluate key technical behavioral interoperability aspects of a digital public service. Such insight results in personalised, confidential feedback and recommendations on how a service can improve.

TIMAPS Questionnaire is designed to take approximately 20 minutes to complete. Once the questionnaire is completed, a report is generated with the technical behavioral interoperability scores plus recommendations on how to further improve the digital public service's technical behavioral interoperability.

### 5.1 Questionnaire Structure

This section outlines the structure of the questionnaire. The four main sections of the questionnaire are in line with the earlier presented overview of behavioral interoperability aspects ([section 5](#)):

- Service Identifications (A): This section assesses the scope of the digital public service (the object of measurement, i.e. the digital public service to examine), service landscaping, the digital public service's outcome, the service owner, the administrative level, etc.;
- Service Delivery (D): The section assesses how the digital public service delivers its service;
- Service Consumption (C): This section assesses if and how services are consumed from other administrations and businesses.

The following figures illustrate the sections A, D and C of TIMAPS questionnaire as described above.

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### Service Identification (A)

\* A1A. Please provide your name:

\* A1B. Please provide your email address:  
We will send your report to this email address

A1C. Please provide your phone number:

\* A1D. Please indicate the country of the organisation providing the digital public service

- Austria
- Belgium
- Bulgaria
- Croatia
- Cyprus
- Czechia
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Ireland
- Italy
- Latvia

Figure 4: TIMAPS questionnaire Section A

\* A2A. A digital public service is a digital service rendered in the public interest.  
What is the name of the digital public service that you provide to the end users (citizens, businesses or other public administrations)?

\* A2B. Use the following criteria to define a digital public service: i) Process and underlying activities, ii) Appearance, iii) Owner (see A3).

Please describe the process and underlying activities of the digital public service. The digital public service always has three phases (1. initiation, 2. processing and 3. delivery of an outcome).  
Focus on the public decision that is the outcome of the service. If there is no public decision and/or outcome, focus on the benefits the service provides to the target audience.

\* A2C. Appearance: How does the digital public service deliver the outcome towards the end user group?

- The public service does not deliver the outcome directly towards a person but towards other IT systems (machine-to-machine interface)
- The public service delivers the outcome towards the end users via traditional channels e.g. phone, postal service
- The public service delivers the outcome towards the end users via digital channels, e.g. through a web portal/website or an application

Figure 5: TIMAPS questionnaire Section A

**Service Delivery (D)**



The public administration delivers the digital public service data towards other end users like administrations, businesses and citizens. We call this the **Public Service Delivery**.

The service being delivered represents the focal point of the TIMAPS in terms of correctly scoping and delimiting the digital public service data under evaluation.

**Figure 6: TIMAPS questionnaire Section D**

**Data, information and knowledge delivered**

*\*Assesses the technical behavioural interoperability specifications of data, information and knowledge delivered by the digital public service to its end users and/or other client services.*

**\* D1. To what extent does the digital public service deliver data, information and knowledge using synchronous digital communication?**

*More Info*

**Enabler / Manifestation**

- The digital public service delivers data, information and knowledge using asynchronous digital communication without any event processing (e.g. the end user should retrieve and download the digital outcome from a website, platform, etc.)
- The digital public service delivers data, information and knowledge using asynchronous digital communication with event processing (e.g. asynchronous messaging, where the end user receives an e-mail with the digital outcome of the digital public service)
- The digital public service delivers data, information and knowledge using asynchronous digital communication with batch processing (e.g. ETL scheduled jobs)
- The digital public service delivers most data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.)
- The digital public service delivers any data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.)

**\* D2. To what extent does the digital public service deliver data, information and knowledge via multiple open Machine to Machine (M2M) interfaces?**

*More Info*

**Figure 7: TIMAPS questionnaire Section D**

**Service Consumption (C)**



For delivering the digital public service data towards other administrations, businesses and citizens, the digital public service may be required to consume service of other public administrations or businesses. This area is called **Service Consumption**.

This section comprises the "Data, information and knowledge consumed", the "Service Consumption Enablers" and the "Service Consumption Manifestations".

Please answer the following questions regarding the service consumption of your digital public service.

**Figure 8: TIMAPS questionnaire Section C**

**\* C5. To what extent does the digital public service handle the integration with specific technologies and standards while consuming data, information and knowledge from other services?**

*More Info*

*Enabler / Manifestation*

- There is no integration in place to handle the specific technologies and standards (e.g. RPC or CORBA, REST/SOAP) imposed in the consumption of other services
- There is ad-hoc integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services (e.g. if an upstream service uses RPC for communication, the digital public service must adapt to it)
- There is limited integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services
- There is sustainable integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services (e.g. the digital public service integrates with an upstream service that uses SOAP standard for exchanging structured information, but it is not done in a decoupled manner)
- There is full integration in place to handle in a decoupled manner the specific technologies (e.g. RPC, CORBA) and standards (e.g. REST/SOAP) imposed in the consumption of other services

**\* C6. To what extent does the digital public service consume multilingual data, information and knowledge?**

*More Info*

*Enabler / Manifestation*

- The digital public service consumes data, information and knowledge in only one language
- The digital public service consumes certain data, information and knowledge in some of the officially recognised languages by the public administration consuming the digital public service
- The digital public service consumes certain data, information and knowledge in all officially recognised languages by the public administration consuming the digital public service
- The digital public service consumes all data in all officially recognised national languages, as well as in English, French and German
- The digital public service consumes all data, information and knowledge in all EU officially recognised languages

**Figure 9: TIMAPS questionnaire Section C**

## 5.2 TIMAPS Questionnaire

### 5.2.1 Service Identification (A) - Questions

#### A1A.

<i>Name</i>	Contact details
<i>Question type</i>	Free text
<i>Rationale</i>	Gather contact information for eventual follow-up.
<i>Question</i>	Please provide your name.
<i>Question logic</i>	Next question

#### A2A.

<i>Name</i>	Contact details
<i>Question type</i>	Free text
<i>Rationale</i>	Gather contact information for eventual follow-up.
<i>Question</i>	Please provide your email address.
<i>Question logic</i>	Next question

#### A1C.

<i>Name</i>	Contact details
<i>Question type</i>	Free text - format check on phone number
<i>Rationale</i>	Gather contact information for eventual follow-up.
<i>Question</i>	Please provide your phone number.
<i>Question logic</i>	Next question

#### A1D.

<i>Name</i>	Contact details
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	Gather contact information for eventual follow-up.
<i>Question</i>	Please indicate the country of the organisation providing the digital public service.
<i>Question logic</i>	Next question

<b>A2A.</b>	
<i>Name</i>	Digital public service description
<i>Question type</i>	Open
<i>Rationale</i>	Gain insight into the digital public service the administration provides.
<i>Question</i>	<p>A digital public service is a digital service rendered in the public interest.</p> <p>What is the name of the digital public service that you provide to the end users (citizens, businesses or other public administrations)?</p>
<i>Examples</i>	Submission of yearly income tax declaration for citizens (administration-to-citizen); change of residence of a citizen (administration-to-citizen); online information provisioning on relevant jobs to citizens (administration-to-citizen);
<i>Question logic</i>	Next question
<b>A2B.</b>	
<i>Name</i>	Digital public service description
<i>Question type</i>	Open
<i>Rationale</i>	Gain insight into the digital public service the administration provides.
<i>Question</i>	<p>Use the following criteria to define a digital public service: i) Process and underlying activities, ii) Appearance, iii) Owner (see A3).</p> <p>Please describe the process and underlying activities of the digital public service. The digital public service always has three phases (1. initiation, 2. processing and 3. delivery of an outcome). Focus on the public decision that is the outcome of the service. If there is no public decision and/or outcome, focus on the benefits the service provides to the target audience.</p>
<i>Examples</i>	Providing classification services towards other administrations for ensuring international standardisation of patent data via a machine-to-machine interface (administration-to-administration).
<i>Question logic</i>	Next question

**A2C.**

<i>Name</i>	Digital public service description
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	Gain insight into the digital public service the administration provides.
<i>Question</i>	<p>Appearance: How does the digital public service deliver the outcome towards the end user group?</p> <ul style="list-style-type: none"> <li>• The public service does not deliver the outcome directly towards a person but towards other IT systems (machine-to-machine interface)</li> <li>• The public service delivers the outcome towards the end users via traditional channels e.g. phone, postal service</li> <li>• The public service delivers the outcome towards the end users via digital channels, e.g. through a web portal/website or an application</li> </ul>
<i>Question logic</i>	Next question

**A3.**

<i>Name</i>	Service owner
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	This question determines the scope / boundaries of the public administration providing the digital public service.
<i>Question</i>	<p>Owner: Which public administration is primarily responsible for providing the digital public service?</p> <ul style="list-style-type: none"> <li>• Ministry e.g. Ministry of</li> <li>• Public Administration, Ministry of Justice</li> <li>• Public Administration e.g. Tax Administration</li> <li>• Directorate-General of the European Commission e.g. DG COMM, DG JUST, DGIT</li> <li>• Government institution/agency/office e.g. National Agency for Information Society, National Centre for Public Administration and Local Government (EKDDA)</li> <li>• EU institution/agency/office e.g. EU Publications Office</li> <li>• Other Legal Entity</li> </ul>
<i>Question logic</i>	Next question



**A4.**

<i>Name</i>	Sector of the service
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	This question determines the scope / boundaries of the public administration providing the digital public service.
<i>Question</i>	<p>Please indicate in which sector is the digital public service provided.</p> <ul style="list-style-type: none"> <li>• Education</li> <li>• Public Health</li> <li>• Public Safety</li> <li>• Environmental Protection</li> <li>• Justice</li> <li>• Transportation</li> <li>• Infrastructure</li> <li>• Social Services</li> <li>• Economy/Financial</li> <li>• Other</li> </ul>
<i>Question logic</i>	Next question

**A5.**

<i>Name</i>	End user group(s) to which the service is delivered
<i>Question type</i>	Multiple choice (>1 possible answer)
<i>Rationale</i>	Determine the end user group(s) to which the digital public service is delivered.
<i>Question</i>	<p>What is the end user group to whom the digital public service is delivered?</p> <ul style="list-style-type: none"> <li>• Public Administrations (A2A)</li> <li>• Citizens (A2C)</li> <li>• Businesses (A2B)</li> </ul>
<i>Examples</i>	A specific group of businesses; A specific group of citizens; A specific group of public administrations.
<i>Question logic</i>	Next question

**A6.**

<i>Name</i>	Administrative level
<i>Question type</i>	Multiple choice (>1 possible answer)
<i>Rationale</i>	Gain insight into the government providing the digital public service.
<i>Question</i>	At what administrative level is the digital public service provided (multiple answers are possible)? <ul style="list-style-type: none"><li>• Local (e.g. city, municipality)</li><li>• Regional</li><li>• National</li><li>• European</li><li>• International</li></ul>
<i>Question logic</i>	Next question

**Maturity scoring:** This section is not scored.

## 5.2.2 Service Delivery (D) - Questions

D1.	
<i>Name</i>	Use of synchronous digital communication in data delivery
<i>Category</i>	Enabler
<i>Weight</i>	35%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item examines the type of digital communication (synchronous or asynchronous) that the digital public service uses to deliver data, information and knowledge to its end users.</p> <p>This item examines the technical behavioral interoperability specifications of the data, information and knowledge delivered by the digital public service to its end users. This item is compliant with the EIRA ABB Machine to Machine Interface</p>
<i>Question</i>	<p>To what extent does the digital public service deliver data, information and knowledge using synchronous digital communication?</p> <p>Not applicable, the digital public service does not need to deliver any data to other services</p> <ul style="list-style-type: none"> <li>• The digital public service delivers data, information and knowledge using asynchronous digital communication without any event processing (e.g. the end user should retrieve and download the digital outcome from a website, platform, etc.)</li> <li>• The digital public service delivers data, information and knowledge using asynchronous digital communication with event processing (e.g. asynchronous messaging, where the end user receives an e-mail with the digital outcome of the digital public service)</li> <li>• The digital public service delivers data, information and knowledge using asynchronous digital communication with batch processing (e.g. ETL scheduled jobs)</li> <li>• The digital public service delivers most data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.)</li> <li>• The digital public service delivers any data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.)</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• An API uses web services to communicate using the HTTP protocol. A web service represents a standardized way of providing interoperability between disparate services</li> <li>• Event Based/Brokered Messaging</li> <li>• Data Streaming</li> <li>• Data is transferred by allowing one service to establish a direct connection to another service's database to read and write data (synchronous)</li> </ul>
<i>Question logic</i>	Next question

D2.	
<i>Name</i>	Data delivery via multiple open Machine to Machine (M2M) interfaces
<i>Category</i>	Enabler
<i>Weight</i>	35%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item assesses the technical means (machine to machine interfaces) that are used by the digital public service to deliver of data, information and knowledge to other services (at the level of information systems).</p> <p>This item examines the technical behavioral interoperability specifications of the data, information and knowledge delivered by the digital public service to its end users. This item is compliant with the EIRA ABB Machine to Machine Interface</p>
<i>Question</i>	<p>To what extent does the digital public service deliver data, information and knowledge via multiple open Machine to Machine (M2M) interfaces?</p> <ul style="list-style-type: none"> <li>• The digital public service delivers data, information and knowledge via a single, custom-built, non-open Machine to Machine (M2M) interface (e.g. via a data infrastructure specific to the service, not designed for reuse, including database interconnections, database links, database views, etc.)</li> <li>• The digital public service delivers data, information and knowledge via a single open Machine to Machine (M2M) interface (e.g. via file transfer, exchange of flat files, documents, etc.)</li> <li>• The digital public service delivers most data, information and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.)</li> <li>• The digital public service delivers any data, information and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.)</li> <li>• The digital public service delivers any data, information and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.) using an openAPI specification</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• Data exchange between services is done using file transfers</li> <li>• A specific data exchange mechanism is used such as eDelivery Building Blocks</li> <li>• A data infrastructure is used for promoting data delivery and sharing</li> </ul>
<i>Question logic</i>	Next question

**D3.**

<i>Name</i>	Data delivery via multiple service delivery modes
<i>Category</i>	Manifestation
<i>Weight</i>	30%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item assesses the digital public service ability to deliver data, information and knowledge on multiple devices using different app versions.</p> <p>This item examines the technical behavioral interoperability specifications of the data, information and knowledge delivered by the digital public service to its end users. This item is compliant with the EIRA ABB Human Interface</p>
<i>Question</i>	<p>To what extent does the digital public service deliver data, information and knowledge via multiple service delivery modes? (mobile (Android, iOS), tablets, GUI PC base, voice, sms, video, email)</p> <ul style="list-style-type: none"> <li>• The digital public service delivers data, information and knowledge via a single, non-open service delivery mode (i.e. via a menu-based interface (GUI PC base or equivalent)</li> <li>• The digital public service delivers data, information and knowledge via a single, open service delivery mode (e.g. via a single device, platform and/or browser, like sms-only, email-only, voice-only, etc.)</li> <li>• The digital public service delivers data, information and knowledge via a limited set of service delivery modes (i.e. via limited mobile devices e.g. only on iOS, or via limited platforms and/or browsers e.g. only via Chrome browser, etc.)</li> <li>• The digital public service delivers most data, information and knowledge via multiple service delivery modes, using different app versions, Android versions, third-party library versions, as well as touchscreen GUIs</li> <li>• The digital public service delivers any data, information and knowledge via multiple service delivery modes using different app versions, Android versions, third-party library versions, as well as touchscreen GUIs</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• Command Line Interface.</li> <li>• Menu-driven Interface.</li> <li>• Graphical User Interface.</li> <li>• Touchscreen Graphical User Interface</li> </ul>
<i>Question logic</i>	Next question

D4.	
<i>Name</i>	Technical documentation
<i>Category</i>	Enabler
<i>Weight</i>	40%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item assesses whether the digital public service provides adequate technical documentation to integrate the delivered data, information and knowledge with other services. Guidelines on how to integrate with other services in the context of service delivery means that the digital public service provides the guidelines on how other services can consume its data.</p> <p>This item examines a technical behavioral interoperability capability that enables and facilitates the digital public service to deliver data information and knowledge towards its end users. This item is compliant with the EIRA ABB Interoperable European Solution Service.</p>
<i>Question</i>	<p>To what extent does the digital public service provide technical documentation on how to integrate the data, information and knowledge delivered with the data, information and knowledge of other services?</p> <ul style="list-style-type: none"> <li>• The digital public service provides no technical documentation on how to integrate the data, information and knowledge delivered.</li> <li>• The digital public service provides limited technical documentation on how to integrate the data, information and knowledge delivered (e.g. ad-hoc information on service capability).</li> <li>• The digital public service provides high level technical documentation on how to integrate the data, information and knowledge delivered (e.g. it lacks clarity on how to reuse them).</li> <li>• The digital public service provides adequate technical documentation (e.g. service capability, service usage, data sources) on how to integrate the data, information and knowledge delivered.</li> <li>• The digital public service provides detailed technical documentation about the consumed services (e.g. service capability, service usage, data sources) on how to integrate the data, information and knowledge delivered, using an open expression language (e.g. ODRL)</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• Documentation on the usage of the service</li> <li>• Documentation on how to integrate with other services</li> <li>• Documentation on the capabilities of the service</li> <li>• The Open Digital Rights Language (ODRL) is a policy expression language that provides a flexible and interoperable information model, vocabulary, and encoding mechanisms for representing statements about the usage of content and services. The ODRL Vocabulary and Expression describes the terms used in ODRL policies and how to encode them.</li> </ul>
<i>Question logic</i>	Next question

D5.	
<i>Name</i>	Invocation of other services in data delivery
<i>Category</i>	Manifestation
<i>Weight</i>	40%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item examines the ability of the digital public service to interact and connect with other services to accomplish specific tasks for the data, information and knowledge delivery. An orchestration service is used to describe business process activities for web services in order define how they can be</p> <p>This item examines a technical behavioral interoperability manifestation that facilitates the digital public service to deliver data, information, knowledge towards its end users (in terms of user experience). This item is compliant with the EIRA ABB Orchestration Service.</p>
<i>Question</i>	<p>To what extent is the digital public service able to invoke other services to deliver data, information and knowledge?</p> <ul style="list-style-type: none"> <li>• The digital public service does not invoke any other service to deliver data, information, knowledge to other services</li> <li>• The digital public service invokes other services to deliver data, information, knowledge to other services in an ad-hoc manner</li> <li>• The digital public service uses an orchestration service to invoke other services to deliver data, information and knowledge.</li> <li>• The digital public service uses an orchestration service described in a standardised format (e.g. written in WS-BPEL) to invoke other services to deliver data, information and knowledge</li> <li>• The digital public service uses a cloud orchestration service described in a standardised format (e.g. written in Topology and Orchestration Specification for Cloud Applications (TOSCA)) to invoke other services to deliver data, information and knowledge</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• New parents could get a birth certificate, register for parental leave, and access other relevant services through one easy process instead of interacting with multiple agencies</li> <li>• Instead of visiting multiple websites or apps, people could navigate and access information and services in one place</li> <li>• Using the same solution for recurring service transactions, such as identification or payment</li> </ul>
<i>Question logic</i>	Next question

D6.	
<i>Name</i>	Data verification in data delivery
<i>Category</i>	Manifestation
<i>Weight</i>	20%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item examines the potential of the digital public service to provide information about the origin and integrity of the data, information and knowledge delivered against relevant interoperability specifications (like the eIDAS regulation). This is important from a quality control perspective but may also be a prerequisite step before other digital public services can consume and integrate the delivered data, information and knowledge.</p> <p>This item examines a technical behavioral interoperability manifestation that facilitates the digital public service to deliver data, information, knowledge towards its end users (in terms of user experience). This item is compliant with the EIRA ABB e-Signature Verification and Validation Service.</p>
<i>Question</i>	<p>To what extent does the digital public service provide data verification means for the data, information and knowledge delivered?</p> <ul style="list-style-type: none"> <li>• The digital public service does not provide any data verification means for the data, information and knowledge delivered.</li> <li>• The digital public service provides ad-hoc data verification means to give information about the origin and integrity of the data, information and knowledge delivered.</li> <li>• The digital public service provides a custom 'electronic seal', to ensure the origin and integrity of the data, information and knowledge delivered.</li> <li>• The digital public service provides a custom 'electronic seal', following a standard baseline profile, compatible to eIDAS, in order to ensure the origin and integrity of the data, information and knowledge delivered.</li> <li>• The digital public service provides an open-source software library for electronic signature creation and validation (e.g. CEF e-Signature / e-Seal building blocks)</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• An 'electronic seal' means data in electronic form, which is attached to or logically associated with other data in electronic form to ensure the latter's origin and integrity.</li> <li>• DSS (Digital Signature Services) is an open-source software library for electronic signature creation and validation. DSS supports the creation and verification of interoperable and secure electronic signatures in line with European legislation. In particular, DSS aims to follow the eIDAS Regulation and related standards closely.</li> </ul>
<i>Question logic</i>	Next question



D7.	
<i>Name</i>	Accessibility
<i>Category</i>	Manifestation
<i>Weight</i>	25%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item assesses how easy it is for users with disabilities to access and consume the data, information and knowledge delivered by the digital public service.</p> <p>This item examines a technical behavioral interoperability manifestation of the digital public service delivering data, information and knowledge towards its end users (in terms of user experience). This item is compliant with the EIRA ABB Human Interface</p>
<i>Question</i>	<p>To what extent does the digital public service deliver data, information and knowledge in compliance with web accessibility specifications?</p> <ul style="list-style-type: none"> <li>• The digital public service does not publish any data, information and knowledge in compliance with web accessibility specifications</li> <li>• The digital public service publishes limited data, information and knowledge in compliance with some web accessibility specifications (e.g. alternative text linked to images)</li> <li>• The digital public service publishes certain data, information and knowledge in line with most web accessibility specifications (e.g. documents, pdf files, alternative text linked to images, etc.)</li> <li>• The digital public service publishes certain data, information and knowledge in compliance with all web accessibility specifications (e.g. documents, pdf files, alternative text linked to images, etc.) and there is continuous improvement in this amount.</li> <li>• The digital public service delivers any data, information and knowledge in compliance with all web accessibility specifications (i.e. Web Content Accessibility Guidelines (WCAG) 2.0 and 2.1), facilitating the accessibility of individuals with disabilities</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• Certain datasets e.g. alternative text linked to images are published in line with the web accessibility requirements Web Content Accessibility Guidelines 2.0</li> <li>• Datasets are published in line with the web accessibility requirements Web Content Accessibility Guidelines 2.0 and 2.1, facilitating the inclusion and accessibility for all types of people including users with disabilities</li> </ul>
<i>Question logic</i>	Next question

D8.	
<i>Name</i>	Multilingualism
<i>Category</i>	Manifestation
<i>Weight</i>	25%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item assesses the ability and the extent of the digital public service to be available in multilingual environments and be consumed by multilingual end-users.</p> <p>This item examines a technical behavioral interoperability manifestation of the digital public service delivering data, information and knowledge towards its end users (in terms of user experience). This item is compliant with the EIRA ABB Machine Translation Service</p>
<i>Question</i>	<p>To what extent does the digital public service deliver multilingual data, information and knowledge?</p> <ul style="list-style-type: none"> <li>• The digital public service delivers data, information and knowledge in only one language</li> <li>• The digital public service delivers certain data, information and knowledge in some of the officially recognised languages by the public administration delivering the digital public service</li> <li>• The digital public service delivers certain data, information and knowledge in all officially recognised languages by the public administration delivering the digital public service</li> <li>• The digital public service delivers all data, information and knowledge in all officially recognised national languages, as well as in English, French and German</li> <li>• The digital public service delivers all data, information and knowledge in all EU officially recognised languages</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• The electronic procurement platform of Belgium delivers its data in all national languages i.e. Flemish, French and German</li> <li>• The national business register delivers its data only in the national language</li> <li>• The Publications office of EU delivers data in all official EU languages</li> </ul>
<i>Question logic</i>	Next question

D9.	
<i>Name</i>	Discoverability
<i>Category</i>	Manifestation
<i>Weight</i>	50%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item examines the means and the ways that the digital public service is made visible (discoverable) to its end-users and assesses how easy and sustainable it is for them to discover it.</p> <p>This item examines a technical behavioral interoperability capability that enables and facilitates the digital public service to deliver data information and knowledge towards its end users. This item is compliant with the EIRA ABB Service Discovery Service.</p>
<i>Question</i>	<p>To what extent is the digital public service made discoverable towards its end users or other services?</p> <ul style="list-style-type: none"> <li>• The digital public service is made discoverable towards its end users or other services only via ad-hoc communication (e.g. upon request, via e-mail, etc.)</li> <li>• The digital public service is made discoverable towards its end users or other services through service portals or service catalogues</li> <li>• The digital public service is made discoverable towards its end users or other services through communication on the website of the public service or other related websites (e.g. Joinup)</li> <li>• The digital public service is made discoverable towards its end users or other services through digital service registries along with its specifications (description, publication details, etc.)</li> <li>• The digital public service is made discoverable towards its end users or other services through digital service registries along with its specifications (description, publication details, etc.) and it is described based on a formal standard (e.g. Universal Description, Discovery, and Integration (UDDI))</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• Online service portals</li> <li>• Service catalogues such as Joinup enriched with metadata, RDF, etc. about the service for automated discoverability</li> <li>• UDDI is an XML-based standard for describing, publishing, and finding web services.</li> </ul>
<i>Question logic</i>	Next question

**Maturity scoring:** The overall weight of this area in the total maturity score is 70%. For more information, please see [section 7.3](#).

### 5.2.3 Service Consumption (C) - Questions

C1.	
<i>Name</i>	Use of synchronous digital communication in data consumption
<i>Category</i>	Manifestation
<i>Weight</i>	50%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item examines the type of digital communication (synchronous or asynchronous) that the digital public service uses to consume data, information and knowledge.</p> <p>This item examines the technical behavioral interoperability specifications of data, information and knowledge consumed by the digital public service from other services. This item is compliant with the EIRA ABB Machine to Machine Interface.</p>
<i>Question</i>	<p>To what extent does the digital public service consume data, information and knowledge using synchronous digital communication?</p> <ul style="list-style-type: none"> <li>• The digital public service consumes data, information and knowledge using asynchronous digital communication without any event processing (e.g. the digital public service retrieves and downloads data, information and knowledge from a website, platform, etc.)</li> <li>• The digital public service consumes data, information and knowledge using asynchronous digital communication with event processing (e.g. asynchronous messaging, where the digital public service receives an e-mail with the data, information and knowledge required for consumption)</li> <li>• The digital public service consumes data, information and knowledge using asynchronous digital communication with batch processing (e.g. ETL scheduled jobs)</li> <li>• The digital public service consumes most data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.)</li> <li>• The digital public service consumes any data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.)</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• ePayment service consumes data from the tax register for citizens in a synchronous way</li> <li>• eProcurement platform consumes data from the business register for economic operators in a synchronous way</li> <li>• eHealth service consumes data from the register of patients in an asynchronous way (scanning of documents, etc.)</li> </ul>
<i>Question logic</i>	Next question

C2.	
<i>Name</i>	Data consumption via multiple open Machine to Machine (M2M) interfaces
<i>Category</i>	Manifestation
<i>Weight</i>	50%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item assesses the technical means (machine to machine interfaces) that are used by the digital public service to consume data, information and knowledge from other services (at the level of information systems).</p> <p>This item examines the technical behavioral interoperability specifications of the data, information and knowledge consumed by the digital public service from other services. This item is compliant with the EIRA ABB Machine to Machine Interface</p>
<i>Question</i>	<p>To what extent does the digital public service consume data, information and knowledge via multiple open Machine to Machine (M2M) interfaces?</p> <ul style="list-style-type: none"> <li>• The digital public service consumes data, information and knowledge via a single, custom-built, non-open Machine to Machine (M2M) interface (e.g. via a data infrastructure specific to the service, not designed for reuse, including database interconnections, database links, database views, etc.)</li> <li>• The digital public service consumes data, information and knowledge via a single open Machine to Machine (M2M) interface (e.g. via file transfer, exchange of flat files, documents, etc.)</li> <li>• The digital public service consumes most data, information and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.)</li> <li>• The digital public service consumes any data, information and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.)</li> <li>• The digital public service consumes any data, information and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.) using an openAPI specification</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• Data exchange between services is done using file transfers</li> <li>• A specific data exchange mechanism is used such as eDelivery Building Blocks</li> <li>• A data infrastructure is used for promoting data delivery and sharing</li> </ul>
<i>Question logic</i>	Next question

C3.	
<i>Name</i>	Discoverability
<i>Category</i>	Manifestation
<i>Weight</i>	50%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item assesses the technical behavioral interoperability capabilities in place to ensure how easily the consumed services is being discovered by other services or by end users. This item checks the means by which the consumed digital public service is visible (discoverable) to other public services or end-users. This item is also compliant with the EIRA v4.0.0 ABB 'Shared Platform'.</p> <p>This item examines a technical behavioral interoperability capability that enables and facilitates the digital public service to consume data information and knowledge towards its end users. This item is compliant with the EIRA ABB Service Discovery Service</p>
<i>Question</i>	<p>To what extent is the digital public service able to discover services to consume data, information and knowledge?</p> <ul style="list-style-type: none"> <li>• The digital public service is not able to discover services to consume data, information and knowledge (e.g. it discovers them only upon request, via e-mail, etc.)</li> <li>• The digital public service is able to discover services to consume data, information and knowledge via limited online means (e.g. service portals or service catalogues)</li> <li>• The digital public service is able to discover services to consume data, information and knowledge via major online means (e.g. shared platform of digital public services, like Joinup)</li> <li>• The digital public service is able to discover services to consume data, information and knowledge via major online means, along with their specifications (description, publication details, etc.)</li> <li>• The digital public service is able to discover services to consume data, information and knowledge via major online means, along with their specifications on a formal standard (e.g. UDDI, RDF, etc.)</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• Online service portals</li> <li>• Service catalogues such as Joinup enriched with metadata, RDF, etc. about the service for automated discoverability</li> <li>• Shared platform of digital public services</li> </ul>
<i>Question logic</i>	Next question

C4.	
<i>Name</i>	Technical documentation
<i>Category</i>	Manifestation
<i>Weight</i>	50%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item aims to assess how the digital public service manifests its technical behavioral interoperability performance towards its end users, by assessing through which channels the digital public service consumes data, information and knowledge from other services.</p> <p>This question captures both traditional (non-digital) and digital channels.</p> <p>This item examines a technical behavioral interoperability manifestation of the digital public service consuming data, information and knowledge (in terms of performance). This item is compliant with the EIRA ABB Interoperable European Solution Service</p>
<i>Question</i>	<p>To what extent does the digital public service has access to technical documentation about the consumed services on how to integrate the data, information and knowledge consumed?</p> <ul style="list-style-type: none"> <li>• The digital public service has no access to any technical documentation on how to integrate the data, information and knowledge consumed from other services.</li> <li>• The digital public service has access to limited technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. ad-hoc information on service capability).</li> <li>• The digital public service has access to high level technical documentation on how to integrate the data, information and knowledge consumed from other services, but it lacks clarity on how to reuse them.</li> <li>• The digital public service has access to adequate technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. service capability, service usage, data sources).</li> <li>• The digital public service has access to detailed technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. service capability, service usage, data sources) using an open expression language (e.g. ODRL).</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• The digital public service consumes data from business registers and it provides in its documentation the guidelines on how to reuse these data</li> <li>• The digital public service consumes data from national land registers, but it is not describe the data consumption process in detail in its documentation</li> <li>• The National Criminal Records Portal consumes data from national registries, but the consumed data are meant for internal use</li> </ul>
<i>Question logic</i>	Next question

C5.	
<i>Name</i>	Integration with specific technologies and standards of the data consumed
<i>Category</i>	Manifestation
<i>Weight</i>	50%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item aims to assess how technical behavioral interoperability performance is realised by assessing how the digital public service handles the integration with specific technologies e.g. RPC, CORBA or standards e.g. REST/SOAP. This goes towards the rigidity with which upstream services are integrated. The digital public service should ensure that such cases are handled in a decoupled manner and that an upstream service's bad choice of technologies doesn't impact its own design and operation.</p> <p>This item examines a technical behavioral interoperability manifestation of the digital public service consuming data, information and knowledge (in terms of performance). This item is compliant with the EIRA ABB Machine to Machine Interface.</p>
<i>Question</i>	<p>To what extent does the digital public service handle the integration with specific technologies and standards while consuming data, information and knowledge from other services?</p> <ul style="list-style-type: none"> <li>• There is no integration in place to handle the specific technologies and standards (e.g. RPC or CORBA, REST/SOAP) imposed in the consumption of other services</li> <li>• There is ad-hoc integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services (e.g. if an upstream service uses RPC for communication, the digital public service must adapt to it)</li> <li>• There is limited integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services</li> <li>• There is sustainable integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services (e.g. the digital public service integrates with an upstream service that uses SOAP standard for exchanging structured information, but it is not done in a decoupled manner)</li> <li>• There is full integration in place to handle in a decoupled manner the specific technologies (e.g. RPC, CORBA) and standards (e.g. REST/SOAP) imposed in the consumption of other services</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• If an upstream service uses RPC for communication, the digital public service must adapt to it</li> <li>• The digital public service integrates with an upstream service that uses SOAP standard for exchanging structured information, but it is not done in a decoupled manner</li> </ul>
<i>Question logic</i>	Next question



C6.	
<i>Name</i>	Multilingualism
<i>Category</i>	Manifestation
<i>Weight</i>	50%
<i>Question type</i>	Multiple choice (1 answer possible)
<i>Rationale</i>	<p>This item assesses the ability and the extent of the digital public service to consume multilingual data, information and knowledge from multilingual environments.</p> <p>This item examines a technical behavioral interoperability manifestation of the digital public service consuming data, information and knowledge (in terms of performance). This item is compliant with the EIRA ABB machine translation service.</p>
<i>Question</i>	<p>To what extent does the digital public service consume multilingual data, information and knowledge?</p> <ul style="list-style-type: none"> <li>• The digital public service consumes data, information and knowledge in only one language</li> <li>• The digital public service consumes certain data, information and knowledge in some of the officially recognised languages by the public administration consuming the digital public service</li> <li>• The digital public service consumes certain data, information and knowledge in all officially recognised languages by the public administration consuming the digital public service</li> <li>• The digital public service consumes all data in all officially recognised national languages, as well as in English, French and German</li> <li>• The digital public service consumes all data, information and knowledge in all EU officially recognised languages</li> </ul>
<i>Examples</i>	<ul style="list-style-type: none"> <li>• The national business register consumes data from national portals only in the national language</li> <li>• The Publications office of EU consumes public procurement notices from all the Member States in all official EU languages</li> </ul>
<i>Question logic</i>	Next question

**Maturity scoring:** The overall weight of this area in the total maturity score is 30%. For more information, please see [section 7.3](#).

## 6 TIMAPS RECOMMENDATIONS

The main objective of the **Technical Interoperability Maturity Assessment of a Public Service (TIMAPS)** is to provide insight into how digital public services can improve their technical behavioral interoperability maturity. After filling in the online questionnaire, the respondent receives a PDF with advice on how to improve the technical behavioral interoperability of his digital public service. This section presents how these recommendations are generated.

### 6.1 Principles

The following five principles are applied to generate recommendations:

- **Principle 1:** Each technical interoperability attribute differentiates between at least two maturity levels;
- **Principle 2:** The improvement tables provide recommendations on how to improve maturity gradually for a specific technical interoperability attribute;
- **Principle 3:** When a digital public service does not yet reach the maximum level for a specific technical interoperability attribute, a recommendation is given to make the step towards the next technical interoperability level;
- **Principle 4:** When a digital public service successfully attains the maximum maturity level for a technical interoperability attribute, no recommendation is given<sup>8</sup>;
- **Principle 5:** When the maturity improvement is not based on specific technical interoperability characteristics per level, a sliding scale (e.g. from less to more) is used. In this scenario, a generic recommendation (not maturity level specific) is given to improve the maturity further along the sliding scale.

### 6.2 Recommendations overview

For each improvement step, the recommendation tables in the following chapters show:

- The question the recommendation relates to;
- The assessed maturity level;
- The next maturity level to be reached through improvement<sup>9</sup>;
- The recommendation as to how to reach the next maturity level.

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<sup>8</sup> The reason for this is that in this case- according to the model- the service is already implementing a technical interoperability attribute in a way that it corresponds to best practice. There are no direct recommendations to improve further

<sup>9</sup> With the exception when this is considered a sliding scale

### 6.3 Recommendations

#### 6.3.1 Service Delivery (D) – Scoring table

Table 3: Service Delivery scoring model

Item	Ad hoc (1)	Opportunistic (2)	Essential (3)	Sustainable (4)	Seamless (5)
D1	The digital public service delivers data, information and knowledge using asynchronous digital communication without any event processing (e.g. the end user should retrieve and download the digital outcome from a website, platform, etc.)	The digital public service delivers data, information and knowledge using asynchronous digital communication with event processing (e.g. asynchronous messaging, where the end user receives an e-mail with the digital outcome of the digital public service)	The digital public service delivers data, information and knowledge using asynchronous digital communication with batch processing (e.g. ETL scheduled jobs)	The digital public service delivers most data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.)	The digital public service delivers any data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.)
D2	The digital public service delivers data, information and knowledge via a single, custom-built, non-open Machine to Machine (M2M) interface (e.g. via a data infrastructure specific to the service, not designed for reuse, including database interconnections, database links, database views, etc.)	The digital public service delivers data, information and knowledge via a single open Machine to Machine (M2M) interface (e.g. via file transfer, exchange of flat files, documents, etc.)	The digital public service delivers most data, information and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.)	The digital public service delivers any data, information and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.)	The digital public service delivers any data, information and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.) using an openAPI specification
D3	The digital public service delivers data, information and	The digital public service delivers data, information	The digital public service delivers data, information	The digital public service delivers most data, information and knowledge via multiple	The digital public service delivers any data, information and

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	knowledge via a single, non-open service delivery mode (i.e. via a menu-based interface (GUI PC base or equivalent))	and knowledge via a single, open service delivery mode (e.g. via a single device, platform and/or browser, like sms-only, email-only, voice-only, etc.)	and knowledge via a limited set of service delivery modes (i.e. via limited mobile devices e.g. only on iOS, or via limited platforms and/or browsers e.g. only via Chrome browser, etc.)	service delivery modes, using different app versions, Android versions, third-party library versions, as well as touchscreen GUIs	knowledge via multiple service delivery modes using different app versions, Android versions, third-party library versions, as well as touchscreen GUIs
D4	The digital public service provides no technical documentation on how to integrate the data, information and knowledge delivered.	The digital public service provides limited technical documentation on how to integrate the data, information and knowledge delivered (e.g. ad-hoc information on service capability).	The digital public service provides high level technical documentation on how to integrate the data, information and knowledge delivered (e.g. it lacks clarity on how to reuse them).	The digital public service provides adequate technical documentation (e.g. service capability, service usage, data sources) on how to integrate the data, information and knowledge delivered.	The digital public service provides detailed technical documentation about the consumed services (e.g. service capability, service usage, data sources) on how to integrate the data, information and knowledge delivered, using an open expression language (e.g. ODRL)
D5	The digital public service does not invoke any other service to deliver data, information, knowledge to other services	The digital public service invokes other services to deliver data, information, knowledge to other services in an ad-hoc manner	The digital public service uses an orchestration service to invoke other services to deliver data, information and knowledge.	The digital public service uses an orchestration service described in a standardised format (e.g. written in WS-BPEL) to invoke other services to deliver data, information and knowledge	The digital public service uses a cloud orchestration service described in a standardised format (e.g. written in Topology and Orchestration Specification for Cloud Applications (TOSCA)) to invoke other services to

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					deliver data, information and knowledge
D6	The digital public service does not provide any data verification means for the data, information and knowledge delivered.	The digital public service provides ad-hoc data verification means to give information about the origin and integrity of the data, information and knowledge delivered.	The digital public service provides a custom 'electronic seal', to ensure the origin and integrity of the data, information and knowledge delivered.	The digital public service provides a custom 'electronic seal', following a standard baseline profile, compatible to eIDAS, in order to ensure the origin and integrity of the data, information and knowledge delivered.	The digital public service provides an open-source software library for electronic signature creation and validation (e.g. CEF e-Signature / e-Seal building blocks)
D7	The digital public service does not publish any data, information and knowledge in compliance with web accessibility specifications	The digital public service publishes limited data, information and knowledge in compliance with some web accessibility specifications (e.g. alternative text linked to images)	The digital public service publishes certain data, information and knowledge in line with most web accessibility specifications (e.g. documents, pdf files, alternative text linked to images, etc.)	The digital public service publishes certain data, information and knowledge in compliance with all web accessibility specifications (e.g. documents, pdf files, alternative text linked to images, etc.) and there is continuous improvement in this amount.	The digital public service delivers any data, information and knowledge in compliance with all web accessibility specifications (i.e. Web Content Accessibility Guidelines (WCAG) 2.0 and 2.1), facilitating the accessibility of individuals with disabilities
D8	The digital public service delivers data, information and knowledge in only one language	The digital public service delivers certain data, information and knowledge in some of the officially recognised languages by the public administration delivering the digital public service	The digital public service delivers certain data, information and knowledge in all officially recognised languages by the public administration delivering the digital public service	The digital public service delivers all data, information and knowledge in all officially recognised national languages, as well as in English, French and German	The digital public service delivers all data, information and knowledge in all EU officially recognised languages
D9	The digital public service is made discoverable	The digital public service is made	The digital public service is made	The digital public service is made discoverable towards	The digital public service is made discoverable

	towards its end users or other services only via ad-hoc communication (e.g. upon request, via e-mail, etc.)	discoverable towards its end users or other services through service portals or service catalogues	discoverable towards its end users or other services through communication on the website of the public service or other related websites (e.g. Joinup)	its end users or other services through digital service registries along with its specifications (description, publication details, etc.)	towards its end users or other services through digital service registries along with its specifications (description, publication details, etc.) and it is described based on a formal standard (e.g. Universal Description, Discovery, and Integration (UDDI))
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### 6.3.2 Service Delivery (D) – Recommendations

The table below presents the respective recommendation to each option in TIMAPS questionnaire. As mentioned above, the purpose of the recommendations is to propose the needed actions to be taken by the digital public service owners in order to **achieve a higher level of technical interoperability maturity**.

In case the selected option is associated to “Seamless level (5)”, then no action is required from the public service owners and the recommendation is by default “Congratulations, you are at the Seamless level”.

**Table 4: Service Delivery Recommendations**

Question	Addressed Level	Next Level	Recommendation
<b>D1.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service delivers data, information and knowledge using asynchronous digital communication without any event processing. 'Consider performing the necessary actions so as to enable the digital public service to deliver data, information and knowledge using asynchronous digital communication with some event processing.
	Opportunistic (2)	Essential (3)	Currently, the digital public service delivers data, information and knowledge using asynchronous digital communication with event processing. 'Consider performing the necessary actions so as to enable the digital public service to deliver data, information and knowledge using asynchronous digital communication with batch processing (e.g. ETL scheduled jobs).
	Essential (3)	Sustainable (4)	Currently, the digital public service delivers data, information and knowledge using asynchronous digital communication with batch processing (e.g. ETL scheduled jobs).

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			'Consider performing the necessary actions so as to enable the digital public service to deliver most data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.).
	Sustainable (4)	Seamless (5)	Currently, the digital public service delivers most data, information and knowledge via synchronous digital communication. 'Consider performing the necessary actions so as to enable the digital public service to deliver any data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.).
<b>D2.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service delivers data, information and knowledge via a single, custom-built, non-open M2M interface. 'Consider performing the necessary actions so as to enable the digital public service to deliver data, information and knowledge via a single open M2M interface (e.g. via file transfer, exchange of flat files, documents, etc.).
	Opportunistic (2)	Essential (3)	Currently, the digital public service delivers data, information and knowledge via a single open M2M interface (e.g. via file transfer, exchange of flat files, documents, etc.). 'Consider performing the necessary actions so as to enable the digital public service to deliver most data, information and knowledge via multiple, open M2M interfaces (e.g. APIs, web services (REST, SOAP) etc.).
	Essential (3)	Sustainable (4)	Currently, the digital public service delivers most data, information and knowledge via multiple, open M2M interfaces (e.g. APIs, web services (REST, SOAP) etc.). 'Consider performing the necessary actions so as to enable the digital public service to deliver any data, information and knowledge via multiple, open M2M interfaces (e.g. APIs, web services (REST, SOAP) etc.).
	Sustainable (4)	Seamless (5)	Currently, the digital public service delivers any data, information and knowledge via multiple, open M2M interfaces (e.g. APIs, web services (REST, SOAP) etc.). 'Consider performing the necessary actions so as to enable the digital public service to deliver any data, information and knowledge via multiple, open M2M interfaces (e.g. APIs, web services (REST, SOAP) etc.) using an openAPI specification.
<b>D3.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service delivers data, information and knowledge via a single, non-open service delivery mode (i.e. via a menu-based interface (GUI PC base or equivalent)). 'Consider performing the necessary actions so as to

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			enable the digital public service to deliver data, information and knowledge via a single, open service delivery mode (e.g. via a single device, platform and/or browser, like sms-only, email-only, voice-only, etc.).
	Opportunistic (2)	Essential (3)	Currently, the digital public service delivers data, information and knowledge via a single, open service delivery mode (e.g. via a single device, platform and/or browser, like sms-only, email-only, voice-only, etc.). 'Consider performing the necessary actions so as to enable the digital public service to deliver data, information and knowledge via a limited set of service delivery modes (i.e. via limited mobile devices e.g. only on iOS, or via limited platforms and/or browsers e.g. only via Chrome browser, etc.)
	Essential (3)	Sustainable (4)	Currently, the digital public service delivers data, information and knowledge via a limited set of service delivery modes (i.e. via limited mobile devices e.g. only on iOS, or via limited platforms and/or browsers e.g. only via Chrome browser, etc.). 'Consider performing the necessary actions so as to enable the digital public service to deliver most data, information and knowledge via multiple service delivery modes, devices using different app versions, Android versions, third-party library versions, as well as touchscreen GUIs.
	Sustainable (4)	Seamless (5)	Currently, the digital public service delivers some data, information and knowledge via multiple service delivery modes, devices using different app versions, Android versions, third-party library versions, as well as touchscreen GUIs. 'Consider performing the necessary actions so as to enable the digital public service to deliver any data, information and knowledge via multiple service delivery modes using different app versions, Android versions, third-party library versions, as well as touchscreen GUIs.
<b>D4.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service provides no technical documentation on how to integrate the data, information and knowledge delivered.'Consider performing the necessary actions so as to enable the digital public service to provide limited technical documentation on how to integrate the data, information and knowledge delivered (e.g. ad-hoc information on service capability).
	Opportunistic (2)	Essential (3)	Currently, the digital public service provides limited technical documentation on how to integrate the data, information and knowledge delivered (e.g. ad-hoc information on service capability).



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			'Consider performing the necessary actions so as to enable the digital public service to provide high level technical documentation on how to integrate the data, information and knowledge delivered, but it lacks clarity on how to reuse them.
	Essential (3)	Sustainable (4)	Currently, the digital public service provides high level technical documentation on how to integrate the data, information and knowledge delivered, but it lacks clarity on how to reuse them. 'Consider performing the necessary actions so as to enable the digital public service to provide adequate technical documentation (e.g. service capability, service usage, data sources) on how to integrate most data, information and knowledge delivered.
	Sustainable (4)	Seamless (5)	Currently, the digital public service provides adequate technical documentation (e.g. service capability, service usage, data sources) on how to integrate most data, information and knowledge delivered. 'Consider performing the necessary actions so as to enable the digital public service to provide detailed technical documentation about the consumed services (e.g. service capability, service usage, data sources) and detailed guidelines on how to integrate the data, information and knowledge delivered, using an open expression language (e.g. ODRL).
<b>D5.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service does not invoke any other service to deliver data, information, knowledge to other services. 'Consider performing the necessary actions so as to enable the digital public service to invoke other services to deliver data, information, knowledge to other services in an ad-hoc manner.
	Opportunistic (2)	Essential (3)	Currently, the digital public service invokes other services to deliver data, information, knowledge to other services in an ad-hoc manner. 'Consider performing the necessary actions so as to enable the digital public service to use an orchestration service to invoke other services to deliver data, information and knowledge.
	Essential (3)	Sustainable (4)	Currently, the digital public service uses an orchestration service to invoke other services to deliver data, information and knowledge. 'Consider performing the necessary actions so as to enable the digital public service to use an orchestration service described in a standardised format (e.g. WS-BPEL) to invoke other services to deliver data, information and knowledge.
	Sustainable (4)	Seamless (5)	Currently, the digital public service uses an orchestration service described in a standardised format (e.g. WS-BPEL) to invoke other services to

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			<p>deliver data, information and knowledge.          'Consider performing the necessary actions so as to enable the digital public service to use an orchestration service described in a standardised cloud application format (e.g. Topology and Orchestration Specification for Cloud Applications (TOSCA)) to invoke other services to deliver data, information and knowledge.</p>
<b>D6.</b>	Ad hoc (1)	Opportunistic (2)	<p>Currently, the digital public service does not provide any data verification means for the data, information and knowledge delivered.          'Consider performing the necessary actions so as to enable the digital public service to provide ad-hoc data verification means to give information about the origin and integrity of the data, information and knowledge delivered.</p>
	Opportunistic (2)	Essential (3)	<p>Currently, the digital public service provides ad-hoc data verification means to give information about the origin and integrity of the data, information and knowledge delivered.          'Consider performing the necessary actions so as to enable the digital public service to provide a custom 'electronic seal' in electronic form, to ensure the origin and integrity of the data, information and knowledge delivered.</p>
	Essential (3)	Sustainable (4)	<p>Currently, the digital public service provides a custom 'electronic seal' in electronic form, to ensure the origin and integrity of the data, information and knowledge delivered.          'Consider performing the necessary actions so as to enable the digital public service to provide a custom 'electronic seal' in electronic form, following a standard baseline profile, compatible to eIDAS, in order to ensure the origin and integrity of the data, information and knowledge delivered.</p>
	Sustainable (4)	Seamless (5)	<p>Currently, the digital public service provides a custom 'electronic seal' in electronic form, following a standard baseline profile, compatible to eIDAS, in order to ensure the origin and integrity of the data, information and knowledge delivered..          'Consider performing the necessary actions so as to enable the digital public service to provide an open-source software library for electronic signature creation and validation (e.g. CEF e-Signature / e-Seal building blocks).</p>
<b>D7.</b>	Ad hoc (1)	Opportunistic (2)	<p>Currently, the digital public service does not publish any data, information and knowledge in compliance with web accessibility specifications. Consider performing the necessary actions so as to enable the digital public service to publish limited data, information and knowledge in compliance with some web accessibility specifications (e.g. alternative text linked to images).</p>

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			This refinement, will enable limited the accessibility of individuals with disabilities.
	Opportunistic (2)	Essential (3)	Currently, the digital public service publishes limited data, information and knowledge in compliance with some web accessibility specifications (e.g. alternative text linked to images). Consider performing the necessary actions so as to enable the digital public service to publish certain data, information and knowledge in line with most web accessibility specifications (e.g. documents, pdf files, alternative text linked to images, etc.). This refinement, will foster the currently limited accessibility of individuals with disabilities.
	Essential (3)	Sustainable (4)	Currently, the digital public service publishes certain data, information and knowledge in line with most web accessibility specifications (e.g. documents, pdf files, alternative text linked to images, etc.). Consider performing the necessary actions so as to enable the digital public service to publish certain data, information and knowledge in compliance with all web accessibility specifications (e.g. documents, pdf files, alternative text linked to images, etc.) and to continuously improve this amount of data, information and knowledge. This refinement, will establish essential accessibility of individuals with disabilities.
	Sustainable (4)	Seamless (5)	Currently, the digital public service publishes certain data, information and knowledge in compliance with all web accessibility specifications (e.g. documents, pdf files, alternative text linked to images, etc.) and there is continuous improvement in this amount. Consider performing the necessary actions so as to enable the digital public service to deliver any data, information and knowledge in compliance with all web accessibility specifications (i.e. Web Content Accessibility Guidelines (WCAG) 2.0 and 2.1). This refinement, will establish full accessibility of individuals with disabilities.
<b>D8.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service delivers data, information and knowledge in only one language. Consider performing the necessary actions so as to enable the digital public service to deliver certain data, information and knowledge in some of the officially recognised languages by the public administration delivering the digital public service. This refinement, will enable limited semantic behavioral interoperability with some of its end users.

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	Opportunistic (2)	Essential (3)	Currently, the digital public service delivers certain data, information and knowledge in some of the officially recognised languages by the public administration delivering the digital public service. Consider performing the necessary actions so as to enable the digital public service to deliver certain data, information and knowledge in all officially recognised languages by the public administration delivering the digital public service. This refinement, will foster semantic behavioral interoperability with most of its end users.
	Essential (3)	Sustainable (4)	Currently, the digital public service delivers certain data, information and knowledge in all officially recognised languages by the public administration delivering the digital public service. Consider performing the necessary actions so as to enable the digital public service to deliver all data in all officially recognised national languages, as well as in English and French. This refinement, will establish more robust behavioral interoperability maturity with its end users.
	Sustainable (4)	Seamless (5)	Currently, the digital public service delivers all data in all officially recognised national languages, as well as in English and French. Consider performing the necessary actions so as to enable the digital public service to deliver all data, information and knowledge in all EU officially recognised languages. This refinement, will enable seamless behavioral interoperability maturity with its end users.
<b>D9.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service is made discoverable towards its end users or other services only via ad-hoc communication (e.g. upon request, via e-mail, etc.). 'Consider performing the necessary actions so as to enable the digital public service to be made discoverable towards its end users or other services through service portals or service catalogues.
	Opportunistic (2)	Essential (3)	Currently, the digital public service is made discoverable towards its end users or other services through service portals or service catalogues. 'Consider performing the necessary actions so as to enable the digital public service to be made discoverable towards its end users or other services through communication on the website of the public service or other related websites (e.g. Joinup).
	Essential (3)	Sustainable (4)	Currently, the digital public service is made discoverable towards its end users or other services through communication on the website of

			the public service or other related websites (e.g. Joinup). 'Consider performing the necessary actions so as to enable the digital public service to be made discoverable towards its end users or other services through digital service registries along with its specifications (description, publication details, etc.).
	Sustainable (4)	Seamless (5)	Currently, the digital public service is made discoverable towards its end users or other services through digital service registries along with its specifications (description, publication details, etc.). 'Consider performing the necessary actions so as to enable the digital public service to be made discoverable towards its end users or other services through digital service registries along with its specifications (description, publication details, etc.) following a formal standard (e.g. Universal Description, Discovery, and Integration (UDDI)).

### 6.3.3 Service Consumption (C) – Scoring table

Table 5: Service Consumption scoring model

Item	Ad hoc (1)	Opportunistic (2)	Essential (3)	Sustainable (4)	Seamless (5)
C1	The digital public service consumes data, information and knowledge using asynchronous digital communication without any event processing (e.g. the digital public service retrieves and downloads data, information and knowledge from a website, platform, etc.)	The digital public service consumes data, information and knowledge using asynchronous digital communication with event processing (e.g. asynchronous messaging, where the digital public service receives an e-mail with the data, information and knowledge required for consumption)	The digital public service consumes data, information and knowledge using asynchronous digital communication with batch processing (e.g. ETL scheduled jobs)	The digital public service consumes most data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.)	The digital public service consumes any data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.)
C2	The digital public service consumes data, information and knowledge via a single, custom-	The digital public service consumes data, information and knowledge via a single open	The digital public service consumes most data, information and knowledge via	The digital public service consumes any data, information	The digital public service consumes any data, information

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	built, non-open Machine to Machine (M2M) interface (e.g. via a data infrastructure specific to the service, not designed for reuse, including database interconnections, database links, database views, etc.)	Machine to Machine (M2M) interface (e.g. via file transfer, exchange of flat files, documents, etc.)	multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.)	and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.)	and knowledge via multiple, open Machine to Machine (M2M) interfaces (e.g. APIs, web services (REST, SOAP) etc.) using an openAPI specification
C3	The digital public service is not able to discover services to consume data, information and knowledge (e.g. it discovers them only upon request, via e-mail, etc.)	The digital public service is able to discover services to consume data, information and knowledge via limited online means (e.g. service portals or service catalogues)	The digital public service is able to discover services to consume data, information and knowledge via major online means (e.g. shared platform of digital public services, like Joinup)	The digital public service is able to discover services to consume data, information and knowledge via major online means, along with their specifications (description, publication details, etc.)	The digital public service is able to discover services to consume data, information and knowledge via major online means, along with their specifications on a formal standard (e.g. UDDI, RDF, etc.)
C4	The digital public service has no access to any technical documentation on how to integrate the data, information and knowledge consumed from other services.	The digital public service has access to limited technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. ad-hoc information on service capability).	The digital public service has access to high level technical documentation on how to integrate the data, information and knowledge consumed from other services, but it lacks clarity on how to reuse them.	The digital public service has access to adequate technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. service capability, service usage, data sources).	The digital public service has access to detailed technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. service capability, service usage, data sources) using an open expression language (e.g. ODRL).
C5	There is no integration in place	There is ad-hoc integration in	There is limited integration in	There is sustainable	There is full integration in

	to handle the specific technologies and standards (e.g. RPC or CORBA, REST/SOAP) imposed in the consumption of other services	place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services (e.g. if an upstream service uses RPC for communication, the digital public service must adapt to it)	place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services	integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services (e.g. the digital public service integrates with an upstream service that uses SOAP standard for exchanging structured information, but it is not done in a decoupled manner)	place to handle in a decoupled manner the specific technologies (e.g. RPC, CORBA) and standards (e.g. REST/SOAP) imposed in the consumption of other services
C6	The digital public service consumes data, information and knowledge in only one language	The digital public service consumes certain data, information and knowledge in some of the officially recognised languages by the public administration consuming the digital public service	The digital public service consumes certain data, information and knowledge in all officially recognised languages by the public administration consuming the digital public service	The digital public service consumes all data in all officially recognised national languages, as well as in English, French and German	The digital public service consumes all data, information and knowledge in all EU officially recognised languages

### 6.3.4 Service Consumption (C) – Recommendations

Table 6: Service Consumption Recommendations

Question	Addressed Level	Next Level	Recommendation
C1.	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service consumes data, information and knowledge using asynchronous digital communication without any event processing (e.g. the digital public service retrieves and downloads data, information and knowledge

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			<p>from a website, platform, etc.).</p> <p>'Consider performing the necessary actions so as to enable the digital public service to consume data, information and knowledge using asynchronous digital communication with event processing (e.g. asynchronous messaging, where the digital public service receives an e-mail with the data, information and knowledge required for consumption).</p>
	Opportunistic (2)	Essential (3)	<p>Currently, the digital public service consumes data, information and knowledge using asynchronous digital communication with event processing (e.g. asynchronous messaging, where the digital public service receives an e-mail with the data, information and knowledge required for consumption).</p> <p>'Consider performing the necessary actions so as to enable the digital public service to consume data, information and knowledge using asynchronous digital communication with batch processing (e.g. ETL scheduled jobs).</p>
	Essential (3)	Sustainable (4)	<p>Currently, the digital public service consumes data, information and knowledge using asynchronous digital communication with batch processing (e.g. ETL scheduled jobs).</p> <p>'Consider performing the necessary actions so as to enable the digital public service to consume most data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.).</p>
	Sustainable (4)	Seamless (5)	<p>Currently, the digital public service consumes most data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.).</p> <p>'Consider performing the necessary actions so as to enable the digital public service to consume any data, information and knowledge via synchronous digital communication (e.g. through web services, APIs, etc.).</p>
<b>C2.</b>	Ad hoc (1)	Opportunistic (2)	<p>Currently, the digital public service consumes data, information and knowledge via a single, custom-built, non-open M2M interface.</p> <p>'Consider performing the necessary actions so as to enable the digital public service to consume data, information and knowledge via a single open M2M interface (e.g. via file transfer, exchange of flat files, documents, etc.).</p>
	Opportunistic (2)	Essential (3)	<p>Currently, the digital public service consumes data, information and knowledge via a single open M2M interface (e.g. via file transfer, exchange of flat files, documents, etc.).</p> <p>'Consider performing the necessary actions so as to enable the digital public service to consume most</p>



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			data, information and knowledge via multiple, open M2M interfaces (e.g. APIs, web services (REST, SOAP) etc.).
	Essential (3)	Sustainable (4)	Currently, the digital public service consumes some data, information and knowledge via multiple, open M2M interfaces (e.g. APIs, web services (REST, SOAP) etc.). 'Consider performing the necessary actions so as to enable the digital public service to consume any data, information and knowledge via multiple, open M2M interfaces (e.g. APIs, web services (REST, SOAP) etc.).
	Sustainable (4)	Seamless (5)	Currently, the digital public service consumes any data, information and knowledge mostly via multiple, open M2M interfaces (e.g. APIs, web services (REST, SOAP) etc.). 'Consider performing the necessary actions so as to enable the digital public service to consume any data, information and knowledge via multiple, open M2M interfaces (e.g. APIs, web services (REST, SOAP) etc.) using an openAPI specification.
<b>C3.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service is not able to discover services to consume data, information and knowledge (e.g. it discovers them only upon request, via e-mail, etc.) 'Consider performing the necessary actions so as to enable the digital public service to discover services to consume data, information and knowledge via limited, custom online means (e.g. via websites)
	Opportunistic (2)	Essential (3)	Currently, the digital public service is able to discover services to consume data, information and knowledge via limited online means (e.g. service portals or service catalogues). 'Consider performing the necessary actions so as to enable the digital public service to discover services to discover services to consume data, information and knowledge via major online means (e.g. shared platform of digital public services, like Joinup)
	Essential (3)	Sustainable (4)	Currently, the digital public service is able to discover services to consume data, information and knowledge via major online means (e.g. shared platform of digital public services, like Joinup). 'Consider performing the necessary actions so as to enable the digital public service to discover services to consume data, information and knowledge via major online means, along with their specifications (description, publication details, etc.)
	Sustainable (4)	Seamless (5)	Currently, the digital public service is able to discover services to consume data, information and knowledge via major online means, along with their specifications (description, publication details, etc.). 'Consider performing the necessary actions so as to

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			enable the digital public service to discover services to consume data, information and knowledge via major online means, along with their specifications on a formal standard (e.g. UDDI, RDF, etc.)
<b>C4.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service has no access to any technical documentation on how to integrate the data, information and knowledge consumed from other services. 'Consider performing the necessary actions so as to enable the digital public service to have access to limited technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. ad-hoc information on service capability).
	Opportunistic (2)	Essential (3)	Currently, the digital public service has access to limited technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. ad-hoc information on service capability). 'Consider performing the necessary actions so as to enable the digital public service to have access to high level technical documentation on how to integrate the data, information and knowledge consumed from other services, but it lacks clarity on how to reuse them.
	Essential (3)	Sustainable (4)	Currently, the digital public service has access to high level technical documentation on how to integrate the data, information and knowledge consumed from other services, but it lacks clarity on how to reuse them. 'Consider performing the necessary actions so as to enable the digital public service to have access to adequate technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. service capability, service usage, data sources).
	Sustainable (4)	Seamless (5)	Currently, the digital public service has access to adequate technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. service capability, service usage, data sources). 'Consider performing the necessary actions so as to enable the digital public service to have access to detailed technical documentation on how to integrate the data, information and knowledge consumed from other services (e.g. service capability, service usage, data sources) using an open expression language (e.g. ODRL).
<b>C5.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service has no integration in place to handle the specific technologies and standards (e.g. RPC or CORBA, REST/SOAP) imposed in the consumption of other services.

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			'Consider performing the necessary actions so as to enable the digital public service to have some ad-hoc integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services (e.g. if an upstream service uses RPC for communication, the digital public service must adapt to it).
	Opportunistic (2)	Essential (3)	Currently, the digital public service has ad-hoc integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services. 'Consider performing the necessary actions so as to enable the digital public service to perform limited integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services.
	Essential (3)	Sustainable (4)	Currently, the digital public service has limited integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services. 'Consider performing the necessary actions so as to enable the digital public service to introduce sustainable integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services (e.g. to integrate with an upstream service that uses SOAP standard for exchanging structured information, even if in a decoupled manner)
	Sustainable (4)	Seamless (5)	Currently, the digital public service has sustainable integration in place to handle the specific technologies (e.g. RPC, CORBA) or specific standards (e.g. REST/SOAP) imposed in the consumption of other services (e.g. the digital public service integrates with an upstream service that uses SOAP standard for exchanging structured information, but it is not done in a decoupled manner). 'Consider performing the necessary actions so as to enable the digital public service to establish full integration in place to handle in a decoupled manner the specific technologies (e.g. RPC, CORBA) and standards (e.g. REST/SOAP) imposed in the consumption of other services.
<b>C6.</b>	Ad hoc (1)	Opportunistic (2)	Currently, the digital public service consumes data, information and knowledge in only one language. 'Consider performing the necessary actions so as to enable the digital public service to consume certain data, information and knowledge in some of the

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			officially recognised languages by the public administration consuming the digital public service.
	Opportunistic (2)	Essential (3)	Currently, the digital public service consumes certain data, information and knowledge in some of the officially recognised languages by the public administration consuming the digital public service. 'Consider performing the necessary actions so as to enable the digital public service to consume certain data, information and knowledge in all officially recognised languages by the public administration consuming the digital public service.
	Essential (3)	Sustainable (4)	Currently, the digital public service consumes certain data, information and knowledge in all officially recognised languages by the public administration consuming the digital public service. 'Consider performing the necessary actions so as to enable the digital public service to consume all data in all officially recognised national languages, as well as in English, French and German.
	Sustainable (4)	Seamless (5)	Currently, the digital public service consumes all data in all officially recognised national languages, as well as in English, French and German. 'Consider performing the necessary actions so as to enable the digital public service to consume all data, information and knowledge in all EU officially recognised languages.