



Report on IMAPS Results 2018 Edition

DIGIT

Directorate-General for Informatics

ISA² Action 2016.37

ec.europa.eu/isa2

ISA²

DISCLAIMER

This document is for informational purposes only and the Commission cannot be held responsible for any use which may be made of the information contained therein. References to legal acts or documentation of the European Union (EU) cannot be perceived as amending legislation in force or other EU documentation.

The document contains a brief overview of technical nature and is not supplementing or amending terms and conditions of any procurement procedure; therefore, no compensation claim can be based on the contents of the present document.

The information and views set out in this publication are those of the author(s) and do not necessarily reflect the official opinion of the European Commission. The European Commission does not guarantee the accuracy of the data included in this document. Neither the European Commission nor any person acting on the European Commission's behalf may be held responsible for the use which may be made of the information contained therein

EUROPEAN COMMISSION

Directorate-General for Informatics
Directorate DIGIT.D – Digital Service
Unit D2 – Interoperability

Contact: Raul-Mario Abril-Jimenez

E-mail: Raul-Mario.ABRIL-JIMENEZ@ec.europa.eu

*European Commission
B-1049 Brussels*

***EUROPE DIRECT is a service to help you find answers
to your questions about the European Union***

Freephone number (*):
00 800 6 7 8 9 10 11

(*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you)

LEGAL NOTICE

This document has been prepared for the European Commission however it reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

More information on the European Union is available on the Internet (<http://www.europa.eu>).

Luxembourg: Publications Office of the European Union, 2018

© European Union, 2018

Reproduction is authorised provided the source is acknowledged.

DOCUMENT METADATA

Property	Value
Release date:	16 th May 2018
Status:	Ready
Authors:	Raul-Mario ABRIL-JIMENEZ
Keywords (to increase the SEO presence)	Interoperability, maturity model, IMM, IMAPS, benchmarking, IT service, ICT service, digital service, public service

This publication has been drafted under the Interoperability Maturity Assessment of a Public Service (IMAPS) action (https://ec.europa.eu/isa2/actions/imaps_en), which is supported by the ISA² Programme. ISA² is a EUR 131 million programme of the European Commission, supporting the modernisation of public administrations in Europe through the development of interoperability solutions. More than 20 solutions are already available, with more to come soon. All solutions are open source

EXECUTIVE SUMMARY

Short Abstract

Self-assessment interoperability maturity tool by **Interoperability Maturity Assessment of a Public Service** allows organisations to assess their interoperability capabilities across Member States, Directorates General of the European Commission and other public services by taking the IMAPS survey.

The survey findings indicate that interoperability is hampered more by semantic and technical challenges than by regulatory or organisational settings. All of the public services assessed are on average at the level of Essential Interoperability. The **overall maturity** of the interoperability areas is on average at the Essential level while **service delivery** is on average below the Essential level in domains of service catalogues, multilingualism and accessibility. The interoperability maturity of **service consumption** is also on average below the Essential level in the consumption/reuse of relevant services from public administrations while they are available for reuse. On the other hand, the interoperability maturity of **service management** is on average below the Essential level regarding the reuse/sharing of components and knowledge with the external environment, specification process and concept definitions. All the findings are in line with the previous IMAPS study.

Objectives

The Interoperability Maturity Assessment of a Public Service measures how well a digital public service is able to interact with other organisations to realise mutually beneficial and agreed common goals through the exchange of information and reuse of services.

Method

The IMAPS 2018 study covers 51 public service assessments from 19 countries. An interoperability maturity assessment campaign to collect assessment data was executed from July 2017 to March 2018. Almost all of the analysed survey responses are from November 2017 and onwards. The campaign resulted in 51 valid public service assessments taken by public administrations from 19 countries, with six of them relating to cross-border services and one relating to non-EU countries. The services cover all administrative levels: Local, Regional, National, European, and International. Three quarters of the assessed services cover the National level.

Level 3 (on a scale of 1–5) is Essential Interoperability, which means that the digital public service implements some indispensable practices for interoperability. The desired interoperability level, as suggested by the Interoperability Maturity Model for a digital public service, is at least level 4 which is 'Sustainable'. As from level 4 and upwards, the digital public service is considered to have implemented interoperability according to good or best practices.

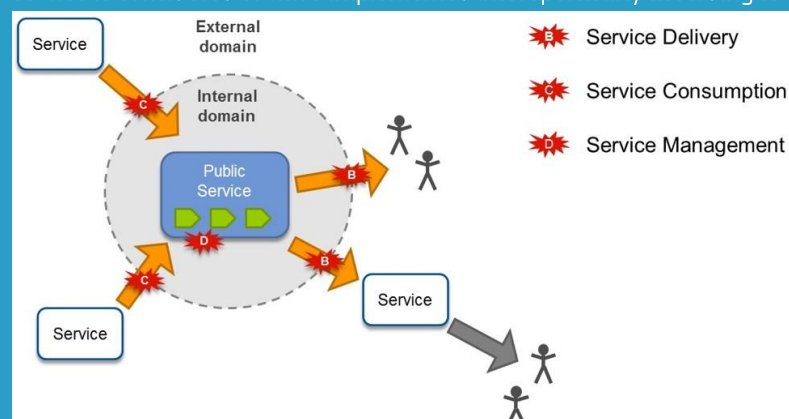


Figure 1: Overview of the interoperability areas of the IMM model

Figure 1 displays all possible instances where interoperability with the outside world may occur from the perspective of a digital public service:

- Service Delivery (B) — Delivery of the digital public service¹
- 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 Management (D) — Controlling and monitoring the process flow related to service interactions with the external domain from trigger to outcome. This area includes service management aspects such as enterprise architecture, procurement, and service level management

The areas (hereafter referred to as **Interoperability Areas**) indicated in **Figure 1** are the objects of measurement in the IMAPS, specifying where interoperability plays a role from the perspective of service management, service delivery and service consumption.

This report also includes the results from the 2017 study². The samples of both of the studies are not chosen as a representative sample of all public services across the various countries. For both studies, voluntary sampling was used. The survey link was sent to a respondent group and a part of this group volunteered to answer the survey questions. Therefore, strong conclusions cannot be made by comparing the 2017 and 2018 results against each other. Moreover, all the summary results (e.g., summary results related to EIF interoperability level-related attributes) are not exactly the same as in the previous report due to re-classification of questions. However, the individual questions used are similar in both of the studies.

Given the 2018 study value distributions of i) all the attributes apart from Question B5 (moderate skewness observed) and ii) the second order IMAPS areas follow a normal distribution, it is suggested that the sample is representative of the population and, therefore, all findings can be extrapolated to the population.

Most of the IMAPS' attributes have been derived from or intrinsically relate to the European Interoperability Framework, which includes nearly 50 specific recommendations on how to improve governance of public services' interoperability activities, establish cross-organisational relationships, streamline processes supporting end-to-end digital services, and ensure that both existing and new legislation do not compromise interoperability efforts. The findings from this IMAPS study give an indication of how well the EIF is being implemented.
IMAPS assesses compliance with the European Interoperability Framework EIF at the level of the individual public service.

¹ The numbering of the areas (B, C, D) is based on the sections of the questionnaire. As there is a service context section (A) in the questionnaire, the numbering of the areas starts at B.

² During year 2017, a broad assessment covering altogether 68 service assessments from 23 countries and seven cross-border assessments was carried out. The results were analysed and documented in a separate report.

Conclusions

IMAPS attributes relate to one or more of the four levels of interoperability of the European Interoperability Framework (Legal, Organisational, Semantic and Technical interoperability). Legal interoperability-related attribute³ has yielded the highest maturity level, as shown in Figure 2, followed by organisational, semantic and technical interoperability. This indicates that for the public services assessed, interoperability is hampered more by semantic and technical challenges than by regulatory or organisational settings.

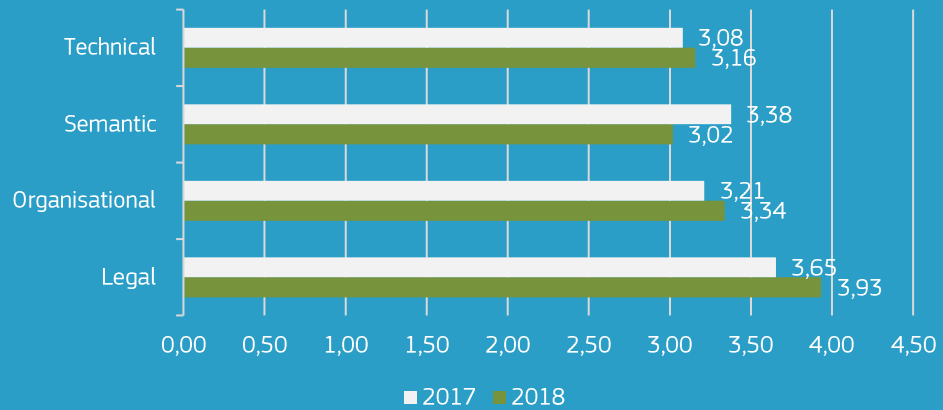


Figure 2: IMAPS Results 2018 — EIF interoperability level-related attributes — average score

The attributes related to interoperability enablers (these are enabling conditions such as having an appropriate governance or managerial setting in place) and interoperability manifestations (that is the actual interoperability performance/results of the public service) as defined in the IMM model show a similar maturity on average. This could indicate that where suitable enablers are in place, a higher interoperability maturity is a logical consequence.

The public services assessed⁴ are on average at the level of Essential Interoperability. Moreover, the overall maturity of interoperability areas is on average at the “Essential” level (as displayed in Figure 3).

³ Legal interoperability is covered in IMAPS via one attribute (Question B4) related to data privacy.

⁴ This study is based on voluntary contributions from Member States, as is the case of the NIFO and other ISA² observatories. The sample of the 51 services assessed is not chosen as a representative sample of all public services across the various countries. An analysis of the distribution of the results (see annex 4) emphasizes this conclusion that the 51 services are not representative because of the non-normal distribution of the results.

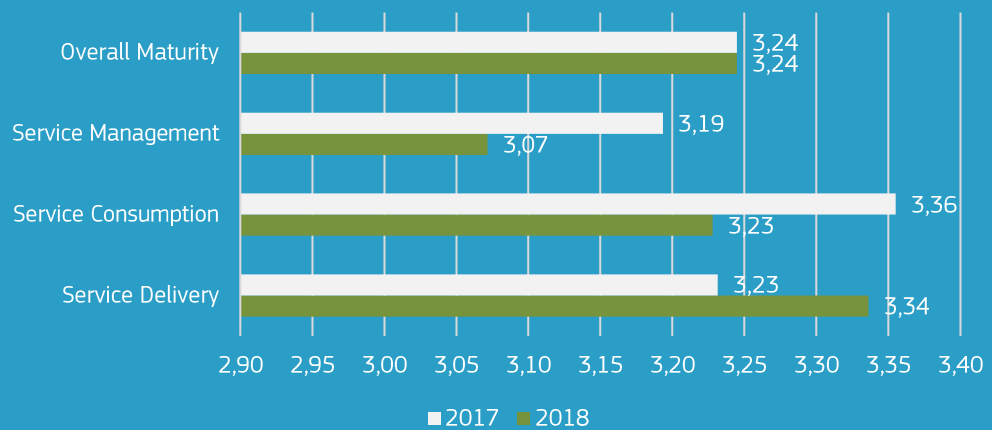


Figure 3: IMAPS results 2017–2018 — all assessments⁵

IMAPS attributes related to European Interoperability Framework’s transparency and data privacy principles, and to manual or digital consumption of other services score the highest in the 2018 study. The interoperability maturity of service delivery is on average below the Essential level in the domains of service catalogues, multilingualism and accessibility. This implies that the services are providing information on rules and processes underlying the digital public services to its users and that data privacy considerations are in many cases transparent to the users. The maturity is above the Essential level in other areas examined by the survey.

The study exposed certain weaknesses in implementation of public service delivery:

- The services are often registered in a catalogue, but this catalogue is only accessible to a restricted user group (i.e., the public service catalogue is not publicly available) and the service description is not based on standards such as Core Public Service Vocabulary Application Profile. Only a couple of services assessed have service descriptions based on standards
- Only one-third of the accessed services are fully multilingual, which can lead to significant barriers for non-nationals/non-residents or the impaired to use public services
- Accessibility features are insufficient and only a few services provide accessibility features for people with disabilities (e.g., visual, auditory, physical, cognitive), but they are in general only fairly compliant with an accessibility standard

The interoperability maturity of service consumption is on average below the Essential level in the consumption/reuse of relevant services from public administrations while they are available for reuse. In other areas examined, the maturity is above the Essential level. Around 60% of the assessed services are consuming other services manually or fully digitally⁶. The public services still rely on some manual intervention to integrate updates/up-to-date information or service flows. Limited amount of relevant services are consumed from other public administrations: one third of respondents say that most of the consumed services are self-produced, while relevant services are available for reuse.

The interoperability maturity of service management is on average below the Essential level regarding the reuse/sharing of components and knowledge with the external environment, specification process and concept definitions. Only 25% of the assessed services share contents and knowledge with the external environment extensively. Around 80% of the

assessed services are subject to SLAs. For other similar services, the components have been at least partly procured based on standards. Over half of the public services assessed continue to reuse authentication and/or the data exchange services. On an average, services reuse nine other services, among these the most frequently cited number of reused services is two. Half of the services assessed are still using some proprietary definitions and/or have closed specification process or such a process into which the stakeholders have been invited only once. There is room for improvement — opportunities to use relevant services available for reuse are still utilized to limited extent. In other service management areas, the maturity is above the Essential level.















⁵ The overall score is the weighted average of the three areas: Service Delivery: 50%, Service Consumption: 20%, Service Management: 30%.

⁶ An example of digital consumption is the tax administration digitally fetching data from the Citizen Base Register. An example of manual consumption is fetching data with the help of a paper form.

AUDIENCE

This document describes the IMM benchmark 2017 results.

This document is intended for the following audiences:

AUDIENCE		TARGETED IN THIS DOCUMENT
POLICY OFFICERS		
IT PROVIDERS		
SERVICE PROVIDERS		
IT ARCHITECTS		
COMM EXPERTS		
LEGAL OFFICERS		
IT ARCHITECTS		

CONTENTS

EXECUTIVE SUMMARY	4
1. INTRODUCTION	12
1.1. DOCUMENT PURPOSE	14
1.2. READER	14
2. NUMBER AND DESCRIPTION OF ASSESSMENTS	16
2.1. VISION STATEMENT	16
3. INTEROPERABILITY MATURITY ASSESSMENT OF PUBLIC SERVICES (IMAPS) MODEL OVERVIEW.....	21
3.1. SERVICE DELIVERY (B).....	22
3.2. SERVICE CONSUMPTION (C).....	22
3.3. SERVICE MANAGEMENT (D)	22
3.4. IMAPS MATURITY STAGES.....	23
4. IMAPS RESULTS ON INTEROPERABILITY MATURITY LEVELS	25
5. IMAPS RESULTS ON EIF INTEROPERABILITY LEVELS	28
6. IMAPS RESULTS ON INTEROPERABILITY ENABLERS AND MANIFESTATIONS	32
7. IMAPS RESULTS ON COMPLEXITY OF SERVICES	34
8. IMAPS DETAILED RESULTS ON SERVICE AREAS	37
8.1. SERVICE DELIVERY	38
8.2. SERVICE CONSUMPTION	41
8.3. SERVICE MANAGEMENT	44
9. IMAPS RESULTS ON EIF IMPLEMENTATION	48
ANNEXES	51
ANNEX 1. IMAPS ATTRIBUTES MAPPED TO THE EUROPEAN INTEROPERABILITY FRAMEWORK (EIF)	51
ANNEX 2. IMAPS ATTRIBUTES AND RELATED CATEGORIES	54
ANNEX 3. IMAPS ATTRIBUTES AND RELATED RECOMMENDATIONS FOR ENHANCING INTEROPERABILITY.....	56
ANNEX 4. DISTRIBUTION ANALYSIS OF THE RESULTS OF THE 51 RESULTS	68
ANNEX 5. IMAPS ATTRIBUTES' MAPPING TO EIRA BUILDING BLOCKS.....	71
ANNEX 6. IMAPS SUPPORT TO THE TALLINN DECLARATION.....	74



Introduction

1. INTRODUCTION

The **Digital Agenda** for Europe has identified the lack of interoperable public services as a major obstacle for growth. Although Member States have accomplished significant work in this domain, it has proven difficult to assess the progress made so far by the different public administrations to reach greater interoperability.

In an agreement with Member States as part of the **European Interoperability Strategy (EIS)** implementation review, it has been suggested to create an **Interoperability Maturity Model (IMM)** to help verify the level of implementation of the vision laid out in the EIS. The IMM would:

- Deliver a **Self-Assessment Interoperability Maturity Tool**;
- Provide **peer reviews** of interoperability capabilities across Member States and Directorates General of the European Commission;
- Enable interoperability **audits**.

In the first phase of the Action (2011–2013), an **initial version** of the Interoperability Maturity Model (IMM; covering a report documenting IMM method and process, an IMM questionnaire and guidelines to IMM users) was developed. Based on the definition of interoperability in the European Interoperability Framework (EIF), the IMM measures how well a Public Service is able to interact with other organisations to realise mutually beneficial and agreed common goals.

Sixteen Pan-European Public Services, covering different public sector domains and Trans-European Systems, as well as **four national public services** were assessed using the IMM model. Based on the results gathered from these evaluations, important recurring interoperability challenges and best practises in the provisioning of European Public Services were identified leading to a revision of the IMM.

In the period 2014–2015, the IMM was further fine-tuned through **alignment** of the model with nine other **ISA² Actions** and investigating its relationship vis-a-vis other **international initiatives** for measuring interoperability maturity. Moreover, an interoperability **checklist** was published intended for those involved in designing a public service to raise awareness on how to do so in an interoperable way by default.

From the second half of 2015 until the first half of 2016, the IMM was revised once more with a focal point to simplify it so it could more easily be used as a self-assessment tool. A more concise version of the IMM model (the “IMM Lite”) was developed (and implemented using EUSurvey) in complement to the full

model. The “IMM Lite” was deployed by **11 EU and national level public administrations**; in parallel, **9 assessments** were conducted using the full version. Finally, the official professional training institution for the Greek Public Administration received support through the ISA² programme to develop an IMM-based interoperability training module and run IMM assessments — an activity which has been ongoing since.

From the second half 2016 to the first half 2017, the full version of the IMM was abandoned due to its user-reported complexity and focused exclusively on the IMM Lite, the sole version of the model (the IMM). The main objective of this period was to **maximize the impact of the IMM** by providing it as a **fully-fledged, stand-alone self-assessment web survey to the widest possible audience**, in Europe and beyond, and encouraging its usage in **any context** users deem appropriate (as an individual assessment or comparative assessment within a specific country or public domain, for training purposes, for assessing progress with implementing the European Interoperability Framework EIF at EU level, and so forth).

A **broad assessment** covering altogether **68 service assessments from 23 countries and 7 cross-border assessments** was carried out. The results were analysed and documented in a separate report.

From the second half of 2017 to the first half of 2018, the scope of the activities has been as follows:

- To position, update and maintain the IMM product, service and organisation
- To promote awareness and adoption of the IMM by key stakeholders

IMM was renamed as IMAPS during this period. Improvements were made and the IMAPS survey is now implemented on the **EUSurvey platform**. Feedback has been gathered from Focus Group sessions with key experts for further improvement. IMAPS awareness and adoption has been promoted and an **IMAPS assessment campaign** was carried out during the first half of 2018. This report is based on the data gathered during the campaign. This **broad assessment** covers altogether **51 service assessments from 19 countries, including 6 cross-border assessments**. The results of this assessment are presented in this report.

According to the Tallinn Declaration on eGovernment (6th October 2017)¹, digital transformation of the public administration is a collective endeavor at national, regional and local levels within EU countries as well as at the EU institutions and the related efforts can be greatly facilitated by **collaboration, interoperable solutions and sharing of good practices** throughout public

¹<https://ec.europa.eu/digital-single-market/en/news/ministerial-declaration-egovernment-tallinn-declaration>

administrations and across borders. The declaration confirms the commitment to the vision laid out in the EU eGovernment Action Plan 2016- 2020 and in the European Interoperability Framework. **IMAPS supports the Tallinn Declaration by providing an interoperability assessment tool and related methodology to support development and further improvement of interoperable services** via concrete assessment results, assessment data and related best practice recommendations.

1.1. Document purpose

The report at hand presents the IMAPS 2018 results. The report also contains the results from the earlier study executed in 2017.

1.2. Reader

This report starts with an Executive Summary providing an overall summary of the report. Chapter 1 Introduction provides background and context for the study and chapter 2 introduces the sample analysed in this study.

Chapter 3 provides an overview of IMAPS to support the reader in understanding the model and methodology behind the study and analysis.

Chapters 4–9 present the results and related analysis on overall, area and detailed level. The areas analysed include EIF interoperability levels, interoperability enablers, and manifestations and complexity of services. The detailed results per attribute (question) are presented per service area (service delivery/consumption/management).

Annexes 1–6 provide additional information to support interpretation of the results. The topics covered include IMAPS attributes, how they are mapped to EIF and EIRA building blocks as well as view on distribution analysis of the results. Also the IMAPS recommendations are introduced. The last annex provides analysis on relevance of the Tallinn Declaration to the IMAPS.



Number and description of assessments

2. Number and description of assessments

2.1. Vision Statement

The 2018 study covers 51 public service assessments from 19 countries, including 6 cross-border assessments.

The breadth and depth of the study are illustrated by the numbers presented in **Table 1** and **Figure 4**. The study has a broad coverage with 19 countries and 6 cross-border assessments, as well as in-depth coverage for 3 countries: Greece with 8 assessments, Malta with 7 assessments and Cyprus with 6 assessments.

Table 1: IMAPS results 2018 in numbers

Total number of assessments	Number of countries	Number of assessments from EU ¹ countries	Number of cross-border assessments	Number of non-EU assessments
51	19	50	6	1

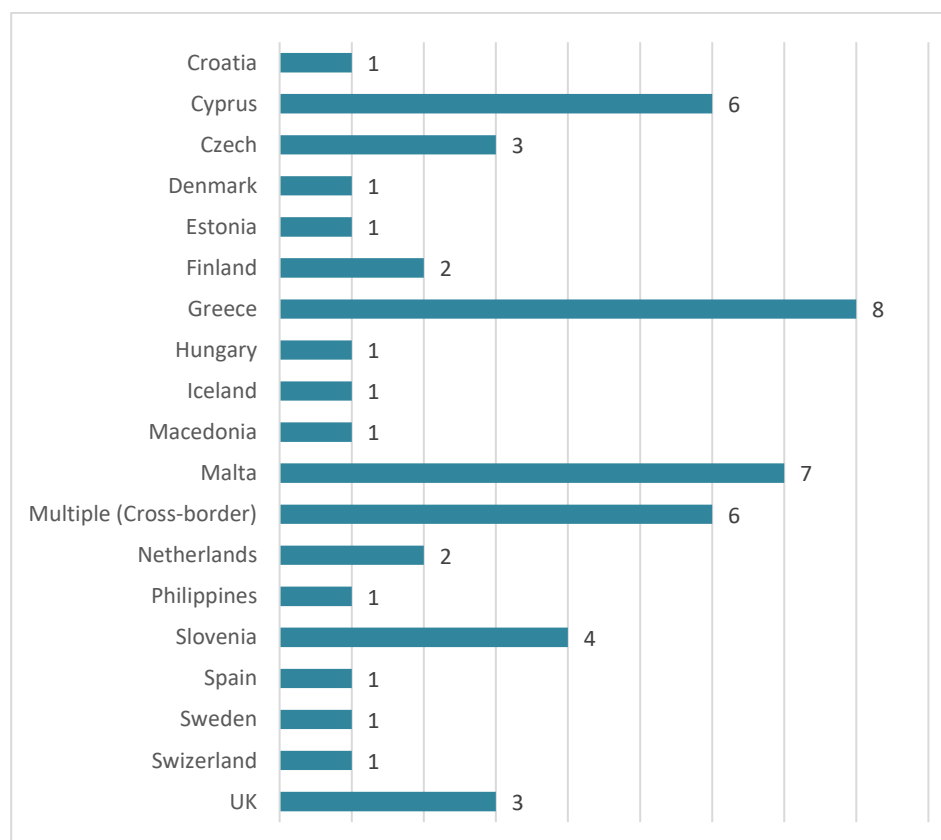


Figure 4: Number of assessments per country

¹ Incl. Switzerland

Assessment data shows that the services assessed are available at different levels of administration. Altogether 55% of the services are at National level. **Figure 5** details the number of services at each level — National, Regional, Local, European or International. Note: A few services are provided simultaneously at different levels.

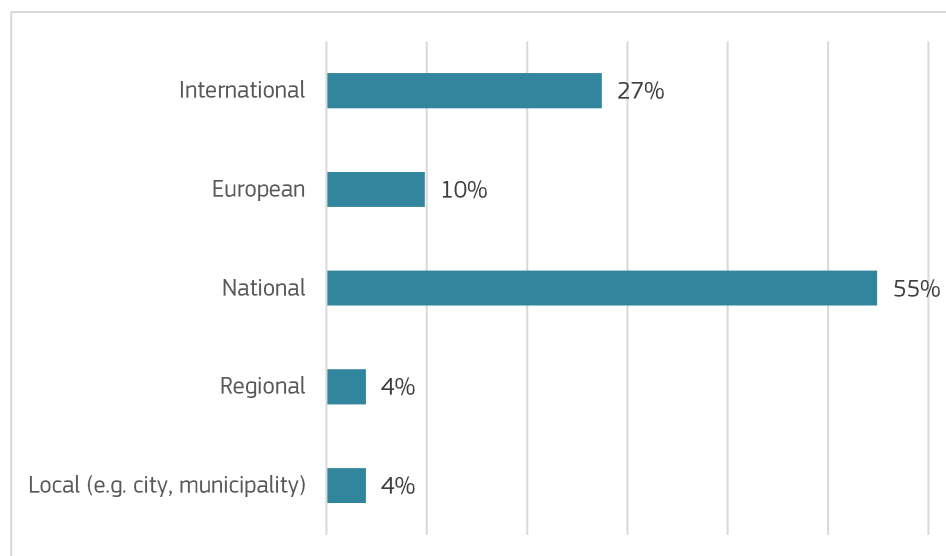


Figure 5: Administrative levels of IMAPS assessments

The public services assessed are grouped into 23 types of services, described in an anonymous way¹ in **Table 2** and **Figure 6**.

Table 2: IMAPS results 2018 — types and description of services assessed

Type of public service	Description of public services assessed
Base Registry	<ul style="list-style-type: none"> Centrally provided data
Citizenship	<ul style="list-style-type: none"> Citizen's folder Residence information service Certificates, e.g., births/marriages
Commercial/business support	<ul style="list-style-type: none"> Information service for businesses Permission related service Provisioning of information related to business related procedure Trade related applications Business financial information services
Criminal records	<ul style="list-style-type: none"> Application of citizens' criminal records Court case information provisioning
Data/document provisioning	<ul style="list-style-type: none"> Provisioning of data/documents for organisations

¹ The assessment service guarantees anonymity to the user of the service.

Type of public service	Description of public services assessed
Decision making support	<ul style="list-style-type: none"> Decision making/cooperation improvement related services
Education	<ul style="list-style-type: none"> Application for study programs Education related information services
Financial	<ul style="list-style-type: none"> Fund information Payment/refund services
Geospatial	<ul style="list-style-type: none"> Provisioning of geospatial data
Government portal providing several services	<ul style="list-style-type: none"> Government portal providing various services
Healthcare	<ul style="list-style-type: none"> Healthcare information service
Internal support services	<ul style="list-style-type: none"> HR services
IT services	<ul style="list-style-type: none"> Supporting services aimed at enabling online interaction of citizens and businesses with various government agencies.
Law related	<ul style="list-style-type: none"> Law related services
Local general services	<ul style="list-style-type: none"> Web based services for citizens
Medical/health	<ul style="list-style-type: none"> Healthcare related information registries/services
Procurement	<ul style="list-style-type: none"> Digital procurement service
Recruitment/employment	<ul style="list-style-type: none"> Recruitment services for citizens/government offices
Social care	<ul style="list-style-type: none"> Social care online applications Social care related data provisioning to citizens
Statistics related services	<ul style="list-style-type: none"> Provisioning of statistical information
Taxation	<ul style="list-style-type: none"> Customer contribution to taxation Tax return services Tax related information provisioning to customers Tax payment service
Tourism	<ul style="list-style-type: none"> Digital tourism related services
Transportation	<ul style="list-style-type: none"> Information about public transportation Transportation data provisioning

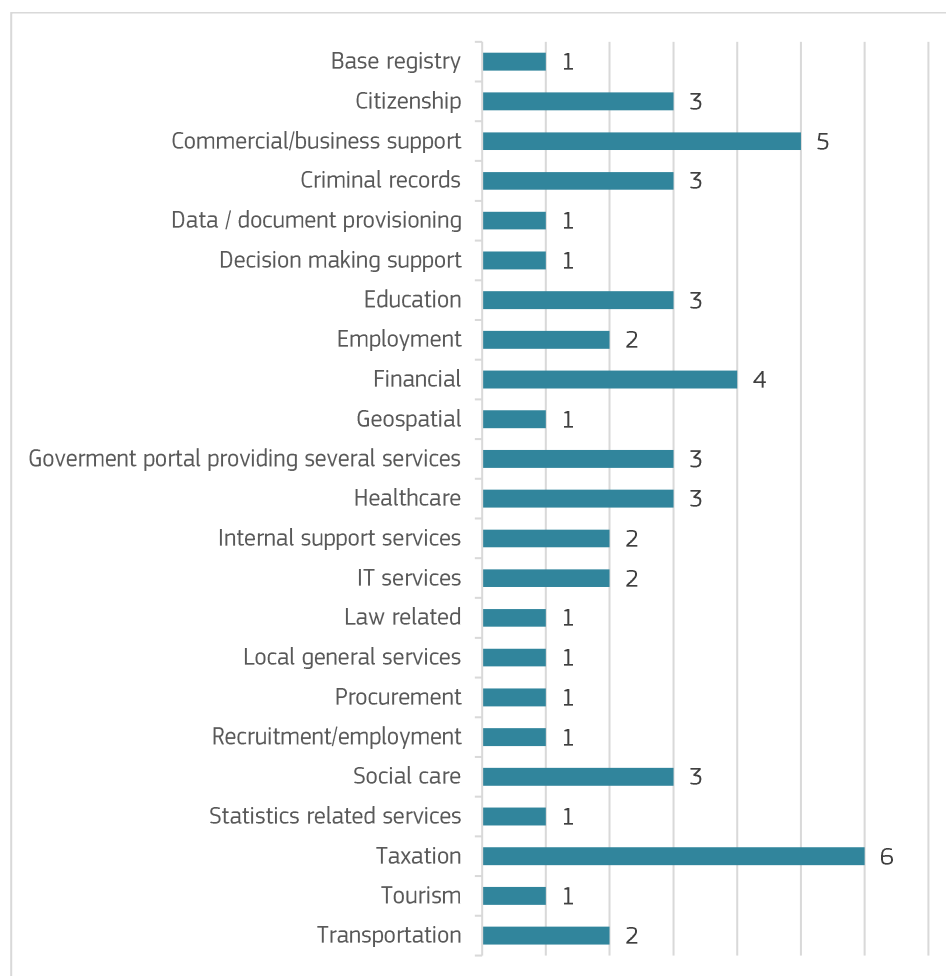


Figure 6: IMAPS results 2018 – EU assessments

In this report also the results from the 2017 study are represented. It needs to be noticed that the samples of both of the studies are not chosen as representative sample of all public services across the various countries. For both of the studies voluntary sampling has been used. The survey link has been sent to a respondent group and part of this group have volunteered to answer the survey questions. Therefore strong conclusions cannot be made by comparing the 2017 and 2018 results against each other. It also needs to be noticed that all the summary results (e.g., summary results related to EIF interoperability level-related attributes) are not exactly the same that in the previous report due to re-classification of questions. The individual questions used are however similar between the studies.

Given that the 2018 study value distributions of i) all the attributes apart from Question B5 (moderate skewness observed) and ii) the second order IMAPS areas follow a normal distribution, it is suggested that the sample is representative of the population and, therefore, all findings can be extrapolated to the population.

**Interoperability
Maturity
Assessment of
Public Services
(IMAPS) model
overview**



3. Interoperability Maturity Assessment of Public Services (IMAPS) model overview

In the context of interoperability maturity, the IMAPS measures how well a digital public service is able to interact with other organisations to realise mutually beneficial and agreed common goals through the exchange of information and reuse of services.

Figure 7 displays all possible instances where interoperability with the outside world may occur from the viewpoint of a digital public service:

- Service Delivery (B) — Delivery of the digital public service¹;
- 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 Management (D) — Controlling and monitoring the process flow related to service interactions with the external domain from trigger to outcome. This area includes Service Management aspects such as enterprise architecture, procurement, and service level management.

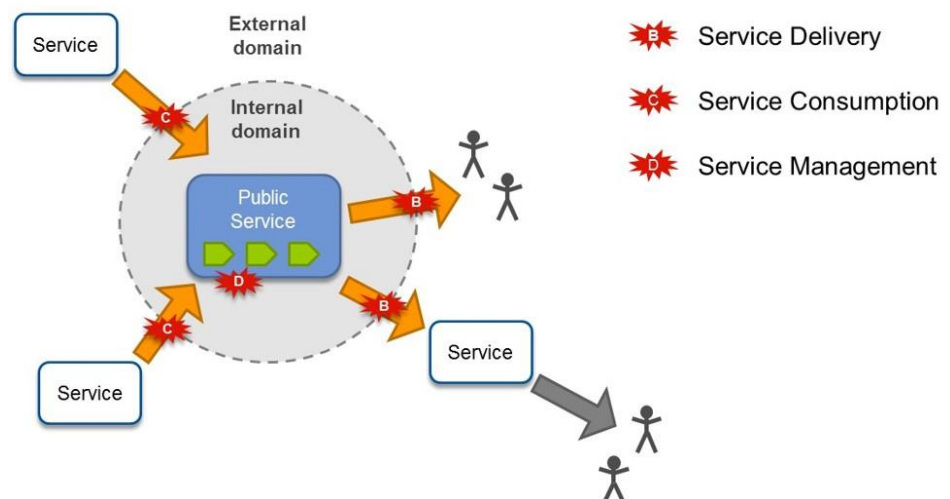


Figure 7: Overview of the interoperability areas of the IMM model

The areas (hereafter referred to as Interoperability Areas) indicated in **Figure 7** are the object of measurement in the IMAPS, specifying where interoperability plays a role from a service management, service delivery and service consumption viewpoint.

¹ The numbering of the areas (B, C, D) is based on the sections of the questionnaire. As there is a service context section (A) in the questionnaire, the numbering of the areas starts at B.

3.1. Service Delivery (B)

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 IMAPS 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 channels through which the digital public service is made available and on important interoperability aspects such as pre-filling, privacy, feedback and open semantic standards.

3.2. 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.

There are various types of services that can be consumed by digital public services:

- *Functional service* — a common functionality (e.g., issuing a license, procurement, planning, a risk assessment module) shared across organisations;
- *Security service* — a specific type of functional service to share common security functions (e.g., identity management and authentication) across organisations;
- *Base registry service* — a specific type of functional service to share trusted, authentic and verified data (about e.g., citizens, land, vehicles) across public administrations.

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.

3.3. Service Management (D)

This area focuses on important Service Management aspects on the area of sharing and reuse and design of the digital public service. Digital public services are considered more interoperable if documentation, source code, services and support is provided towards other administrations and business for reuse. In addition this area covers important design aspects that ensure future-proof interoperability such as architecture, processes, orchestration, procurement and service level management.

3.4. IMAPS Maturity Stages

The IMAPS uses a five stage model to indicate the interoperability maturity of the digital public service (**Table 3**). Using maturity levels allows to:

- Measure the 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 interoperability maturity.

Table 3: Five maturity stages of IMAPS

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



IMAPS results on interoperability maturity levels

4. IMAPS results on interoperability maturity levels

Overall interoperability maturity is on “Essential” level.

The gathered data (**Figure 8**) shows that the overall maturity average is at the “Essential” level with a result of 3.21. All areas — service delivery (3.34), service consumption (3.23) and service management (3.07), achieve a similar result, i.e., also their interoperability is at the essential level. The three interoperability areas are independent from each other, there is no link or overlap between their attributes. The results of 2018 are similar to year 2017 results.

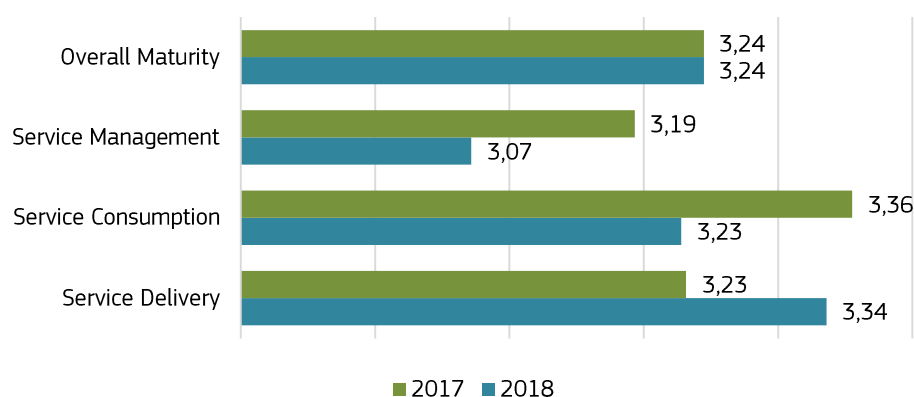


Figure 8: IMAPS results 2017–2018 — all assessments¹

The desired interoperability level as stipulated in the IMAPS for a digital public service is at least level 4: ‘Sustainable’. At this level, the digital public service is considered to have implemented key relevant best practices.

Table 4: IMAPS results 2018 — required performance increase from Levels 3 to 4

Ad Hoc Level 1	Opportunistic	Ad Hoc Level 1	Opportunistic	Ad Hoc Level 1
Poor interoperability — the digital public service cannot be considered interoperable	Fair interoperability — the digital public service implements some elements of interoperability best practices	Essential interoperability — the digital public service implements the essential best practices for interoperability	Good interoperability — all relevant interoperability best practices are implemented by the digital public service	Interoperability leading practice — the digital public service is a leading interoperability practice example for others

¹ The overall score is the weighted average of the three areas: Service Delivery: 50%, Service Consumption: 20%, Service Management: 30%.

Ad Hoc Level 1	Opportunistic	Ad Hoc Level 1	Opportunistic	Ad Hoc Level 1
		Overall maturity — EU assessments	X Desired maturity level	
		Overall maturity —all assessments		
		Average service delivery		
		Average service consumption		
		Average service management		

Table 4 indicates the shift required from Levels 3 to 4 in order to augment the public service’s interoperability performance to a level that can be considered robust enough to systematically enable the reaping of interoperability benefits.

Each attribute is evaluated and a specific recommendation is provided to enhance interoperability maturity level. The detailed recommendations are available in Annex 3.

**IMAPS results
on EIF
interoperability
levels**



5. IMAPS results on EIF interoperability levels

Semantic and technical views get the lowest maturity scores.

IMAPS attributes each relate to one or several of the four **levels of interoperability of the European Interoperability Framework¹** (Legal, Organisational, Semantic and Technical levels). Detailed IMAPS data shows that interoperability levels are implemented rather unevenly, as shown in **Figure 9²**. The legal interoperability-related results are those with the highest score (3.93), followed by the organisational level results (3.34), and the technical interoperability-related results (3.16). The semantic interoperability-related results are those with the lowest score (3.02).

The results are close to year 2017 results apart from the Legal level. From legal interoperability perspective the maturity is clearly higher on year 2018 results than in the previous study.

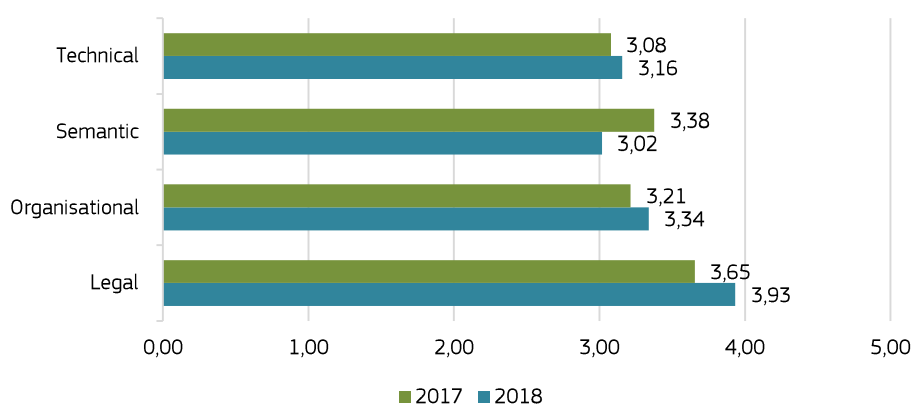


Figure 9: IMAPS results 2017–2018 – EIF interoperability level-related attributes – average score

There is one IMAPS attribute (question B4) which relates to legal interoperability. This is presented in **Figure 10** with the related IMAPS 2018 score. Annex 1 details each individual attribute in terms of what aspect of interoperability is being covered by it.

¹ https://ec.europa.eu/isa2/eif_en

² Each IMM attribute is related to one or several EIF interoperability levels, as listed in the tables in Annex 1.

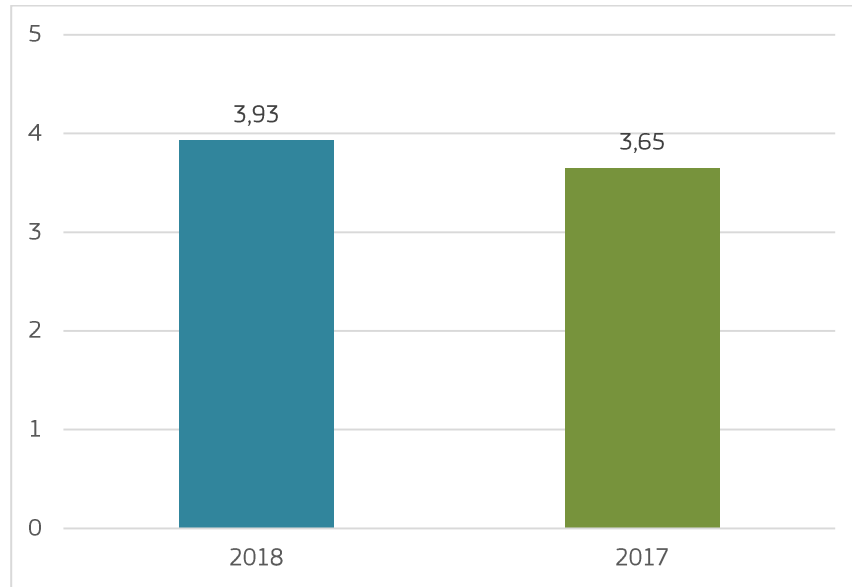


Figure 10: IMAPS results 2017–2018 — average scores for legal interoperability related attributes¹

There are 9 IMAPS attributes which relate to organisational interoperability. They are presented in **Figure 11** with their IMAPS 2018 score.

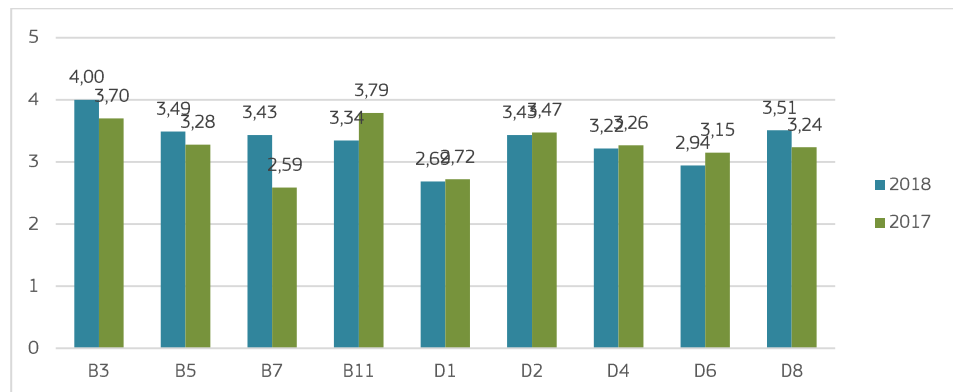


Figure 11: IMAPS results 2017–2018 — average scores for organisational interoperability related attributes²

There are three IMAPS attributes which relate to semantic interoperability. They are presented in **Figure 12** with their IMAPS 2018 score.

² A description of IMAPS attributes is available in Annex 2

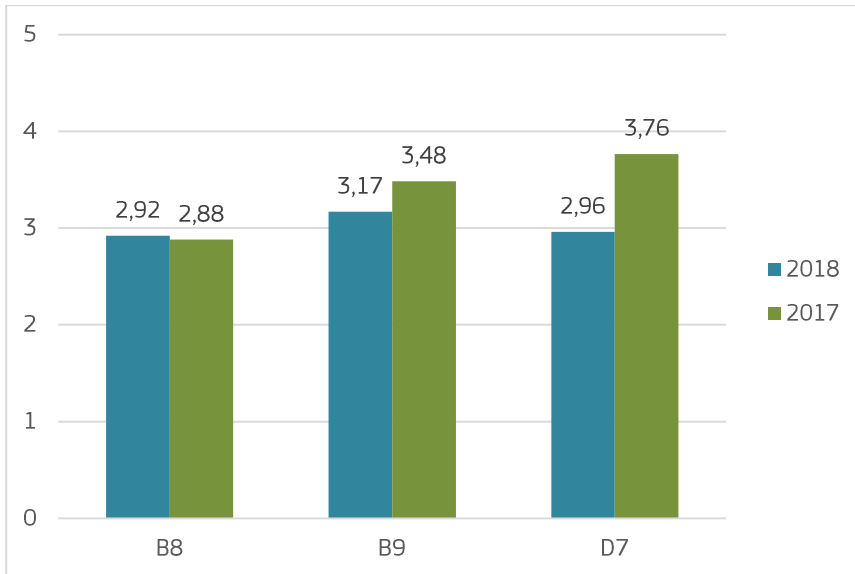


Figure 12: IMAPS results 2017–2018 – semantic interoperability related attributes¹

There are 9 IMAPS attributes which relate to technical interoperability. They are presented in **Figure 13** with their IMAPS 2018 score.

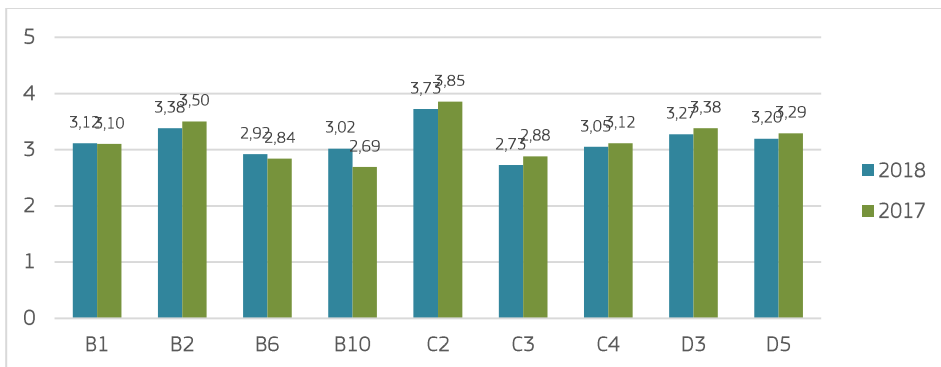


Figure 13: IMAPS results 2017–2018 – technical interoperability related attributes²

¹ A description of IMAPS attributes is available in Annex 2

² A description of IMM attributes is available in Annex 2

IMAPS results on interoperability enablers and manifestations



6. IMAPS results on interoperability enablers and manifestations

An interoperability enabler relates to an attribute, which, when it exists or is implemented, enables interoperability. An example is attribute D.2, which is at the highest interoperability level when procurement of the service is fully standards-based.

An interoperability manifestation relates to an attribute, which shows interoperability. An example is attribute B.2, which is at the highest interoperability level when all possible forms are pre-filled.

Detailed IMAPS assessment data shows that attributes related to interoperability enablers and attributes related to interoperability manifestations show similar maturity results on average¹. **Figure 14** illustrates the average maturity level of the interoperability manifestation attributes (3.28) and the interoperability enabler attributes (3.23). The 2018 results are similar with the year 2017 study.

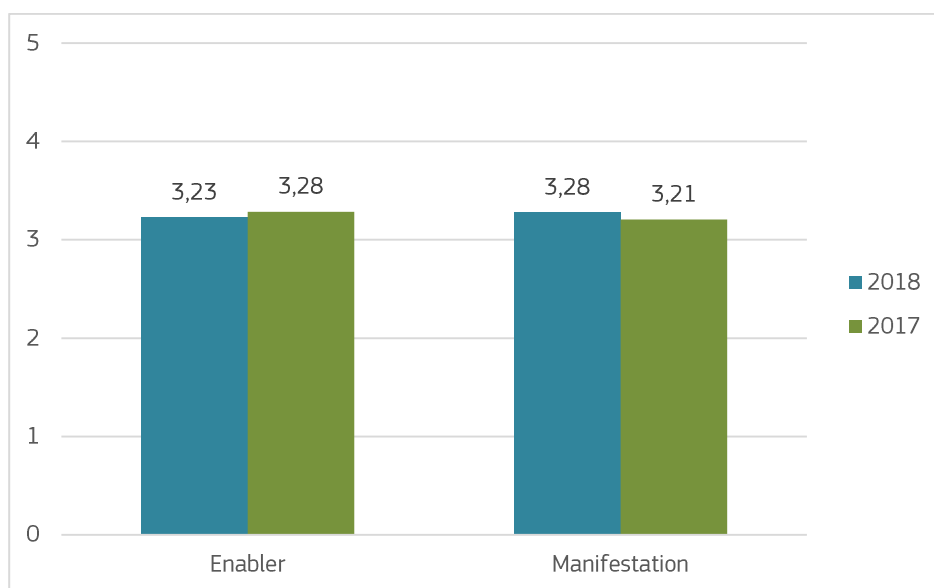


Figure 14: IMAPS results 2017–2018 — interoperability manifestation and enabler attributes’ maturity level

¹ Details on the manifestation-related attributes and enabler-related attributes in terms of what they assess are given in Annex 2



IMAPS results on complexity of services

7. IMAPS results on complexity of services

More than half of the public services assessed are reusing authentication and/or the data exchange services.

The complexity of a public service can be derived as a proxy in the IMAPS by the number of services it reuses. The detailed IMAPS assessment data shows that many different types of services are reused, as listed in **Figure 15**. The most reused service is the authentication service, followed by the data exchange services. Almost 4 out of 5 services reuse an authentication service, whereas more than half reuse data services.

At the other end of the reuse spectrum, only 4% or less of the services use choreography or orchestration services to support e.g., interactions, processes and workflows between components/services.

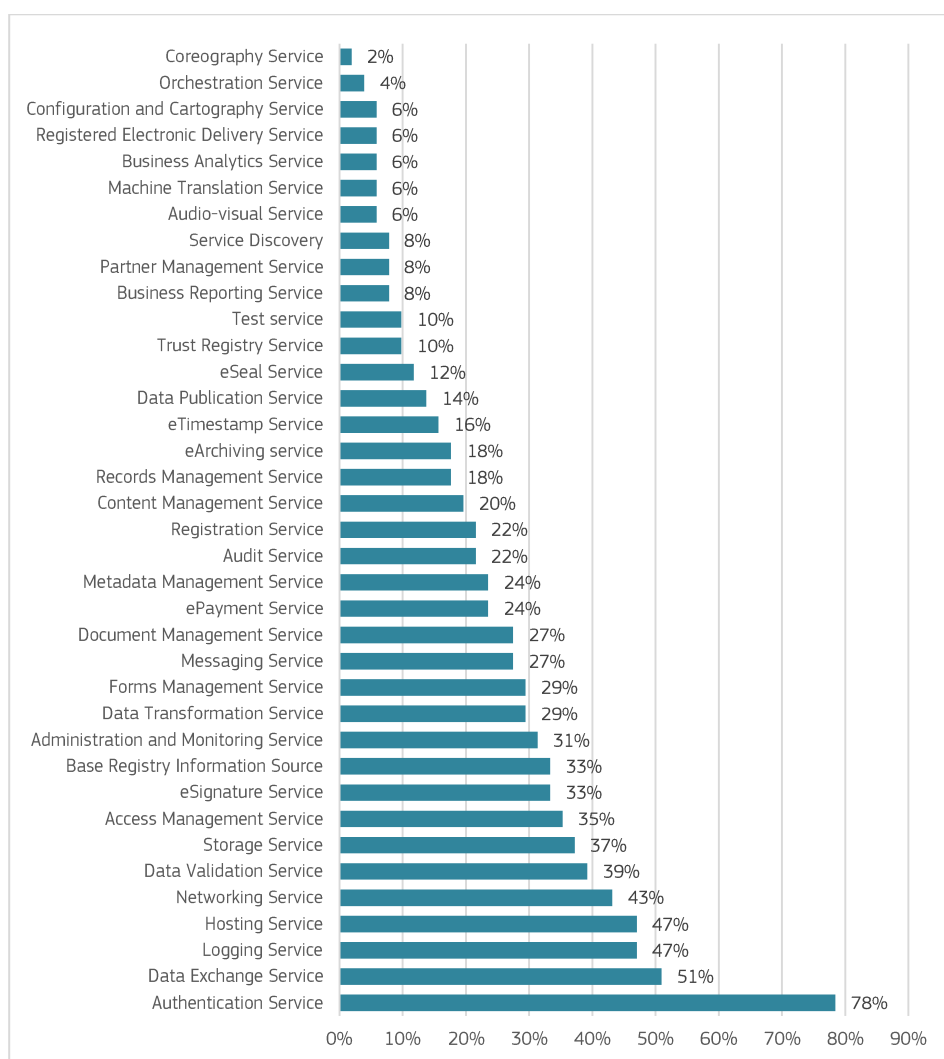


Figure 15: IMAPS results 2017-2018 – services reused by public services assessed

The services assessed are reusing on average 8.8 other services.

Detailed assessment data shows, as illustrated in **Figure 16**, that the maximum number of services reused is 35, the minimum is 1. While on average, services reuse 8.8 other services, the most cited number of reused services is 2. When compared against year 2017 study the average is pretty close while the maximum and mode values deviate between the studies.

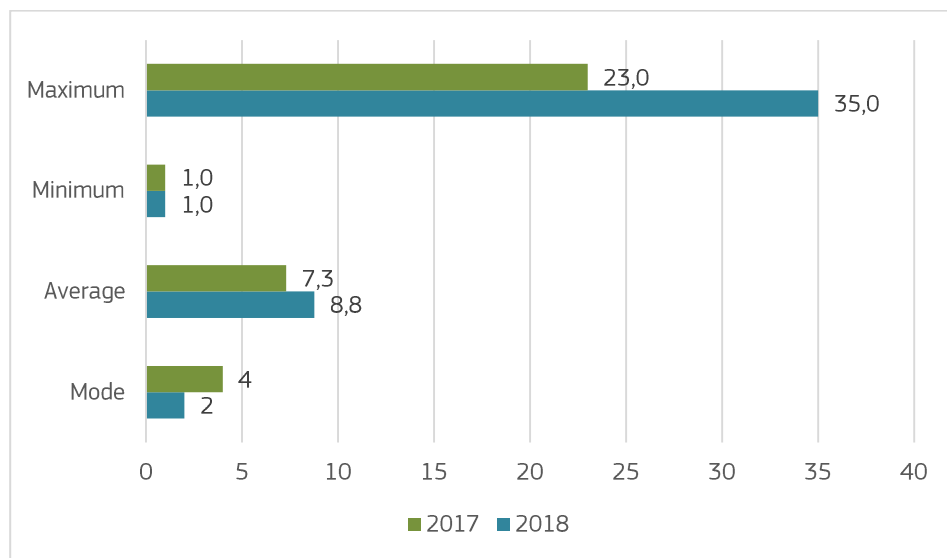


Figure 16: IMAPS results 2017–2018 — number of reused services by public service assessed

IMAPS detailed results on service areas



8. IMAPS detailed results on service areas

Most of the study attributes are above "Essential" level.

Detailed assessment data shows that more than half (17 out of the 22) of all the attributes are above level 3 — essential.

There are lots of similarities with the 2017 results¹ In case of question B7 (cross border service delivery) the maturity is clearly higher in 2018 results. For question D7 (concept definitions) the maturity is clearly lower, also in case of question B11 (formal certification) there is a difference. For other questions the difference between the results is smaller than 0.4 grades. However, as mentioned earlier, the results from years 2017 and 2018 are not directly comparable with each other.

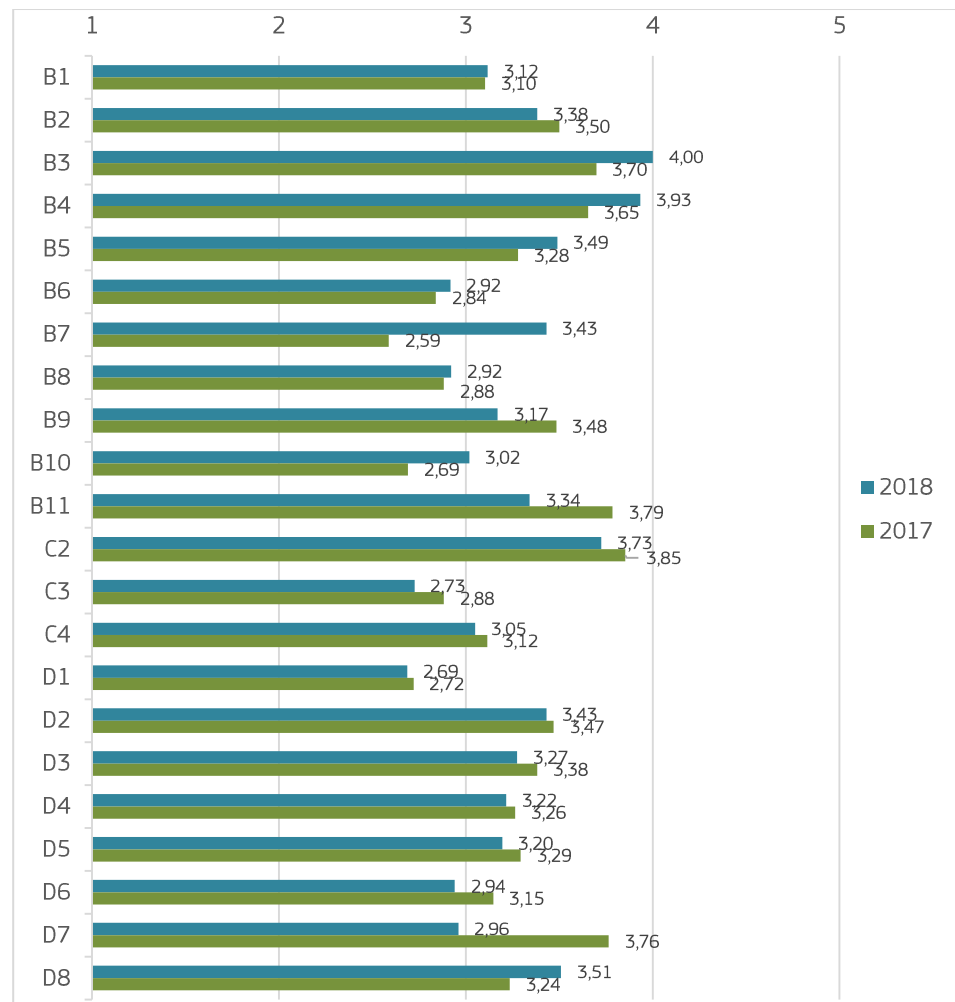


Figure 17: IMAPS results 2017-2018 by attribute (question)

¹ It needs to be noticed that the samples of both of the studies are not chosen as representative sample of all public services across the various countries and that the results cannot be directly compared against each other.

The following sections detail further the three areas of attributes: service delivery, service consumption and service management and the results achieved for them by attribute.

Service Delivery analysis highlights: Information on rules and processes underlying the digital public service is provided to end users and data privacy considerations are often transparent. Only couple of services assessed have service descriptions based on standards and only one third of the assessed services are fully multilingual. Accessibility features for people with disabilities are insufficient.

8.1. Service Delivery

This section assesses how the digital public services assessed deliver their services to end users such as citizens, businesses or other public administrations.

In the service delivery area 3 attributes out of 11 are below essential level (3), as shown in **Figure 18**. The highest score is of 3.98.

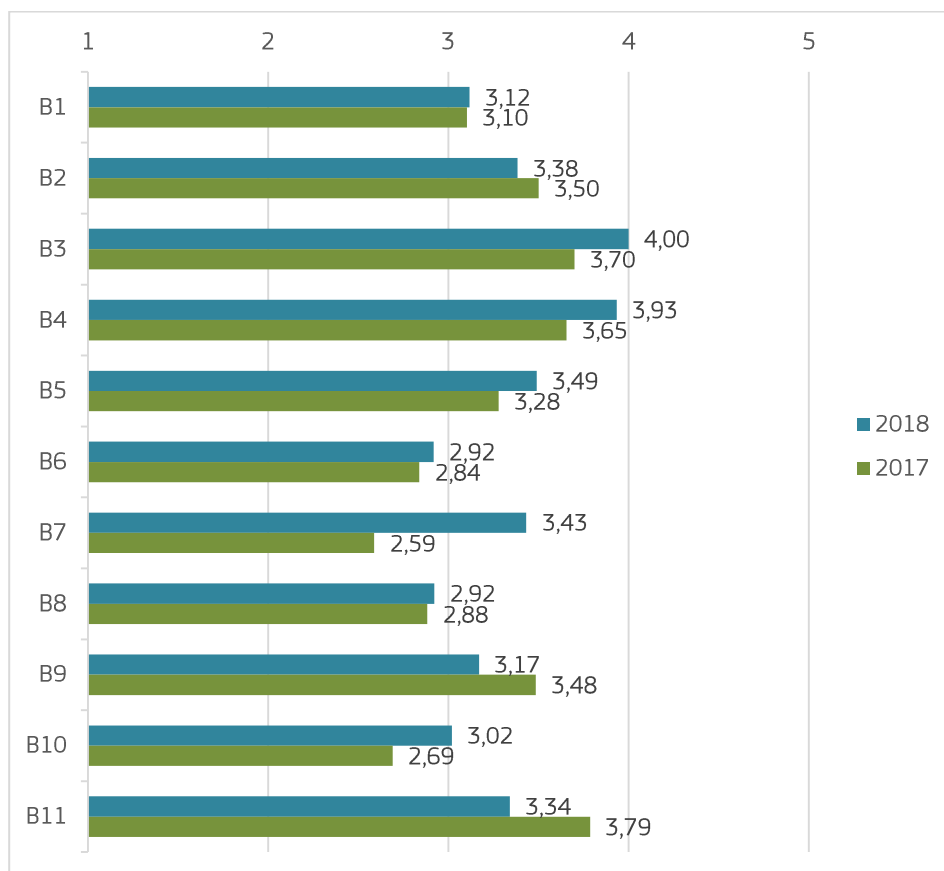


Figure 18: IMAPS Results 2017–2018 — average scores for each service delivery attributes 2018

Detailed data shows (**Figure 19**) that level 3.55 is the most often measured level (mode) of maturity for service delivery attributes. The maximum maturity level measured is 4.43 and the minimum is 1.3. On average, service delivery is above the Essential level 3.

When compared against 2017 results the year 2018 average is close, minimum is smaller, maximum smaller and mode higher.

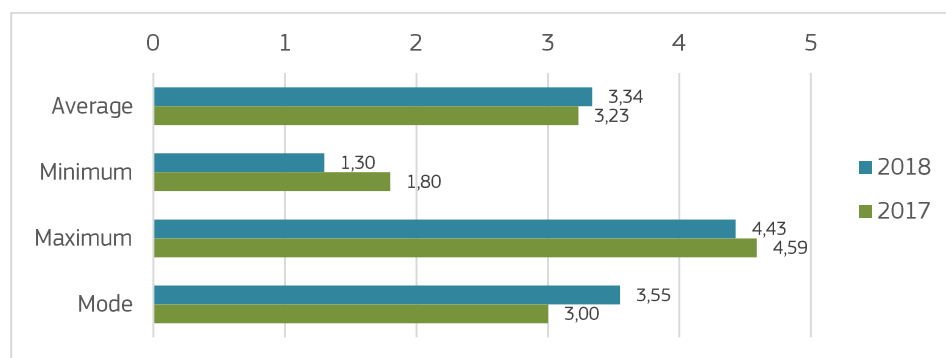


Figure 19: IMAPS results 2017–2018 — scores for all service delivery attributes — mode, maximum, minimum and average

Detailed assessment data shows that there are six service delivery attributes, which are better performing (with a score above 3.2) and five, which have average scores. **Table 5** details these attributes and analyses their relation to the European Interoperability Framework (EIF).

The interoperability maturity of service delivery is on relatively high level from procedural transparency and data privacy perspectives (average maturity scores between 3.93 and 4.00). Lower levels of maturity can be seen in multilingualism and accessibility (average maturity scores 2.92).

Table 5: Service delivery attribute landscape

#	Name	score	Analysis	EIF — related
Better performing service delivery attributes — scores > 3.2				
B3	Procedural transparency	4.00	The services are providing information on rules and processes underlying the digital public service towards its users	Yes — transparency principle
B4	Data privacy	3.93	Data privacy considerations are in many cases transparent to the users	Yes — data privacy principle
B5	User feedback	3.49	Users can often provide feedback on their user satisfaction with the	No

#	Name	score	Analysis	EIF — related
			service via digital or physical channel	
B7	Cross border service delivery	3.43	There are often possibilities for non-residents or foreigners to use the digital public service	Yes — purpose of the EIF: services cross-border by default
B2	Pre-filling	3.38	Forms are partly pre-filled	Yes — reusability principle
B11	Certification	3.34	In many cases certification procedures are available	No
Service delivery attributes — average scores between 3.2 and 2.8				
B9	Data exchange	3.17	The services leverage some open semantic standards for data exchange	Yes — use of semantic specifications
B1	Delivery channels	3.12	The services are often available through multiple delivery channels	Yes — accessibility principle
B10	Service Catalogue	3.02	The services are often registered in a catalogue, but this catalogue is only accessible to a restricted user group (i.e., the public service catalogue is not publicly available) and/or the service description is not based on standards such as CPSV-AP. In only couple of cases there is a service description based on standards.	Yes — conceptual model
B8	Multilingualism	2.92	Only one third of the assessed services are fully multilingual.	Yes — multilingualism principle
B6	Accessibility	2.92	Some services provide some accessibility features for people with disabilities (e.g., visual, auditory, physical, cognitive), but they are in general only fairly compliant with an accessibility standard	Yes — accessibility principle

8.2. Service Consumption

Service Consumption analysis highlights: Around 60 % of the assessed services are consuming other services mainly or fully digitally. The public services still rely on some manual intervention to integrate updates/up-to-date information or service flows. Limited amount of relevant services are consumed from other public administrations: One-third of respondents tell that most of the consumed services are self-produced, while relevant services are available for reuse.

This section assesses if and how services are consumed from other administrations and businesses. In **Figure 23** in the service consumption area, 1 attribute out of 3 is below essential level (3), as shown in **Figure 20**. The highest score is of 3.73.

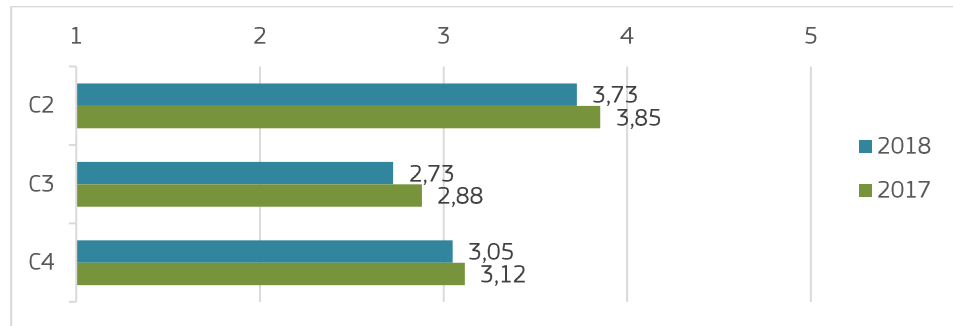


Figure 20: IMAPS results 2017–2018 — average scores for each service consumption attribute

Detailed assessment data shows (**Figure 21**) that level 3.8 is the most often measured level (mode) of maturity for service consumption attributes. The maximum maturity level measured is 5 — the highest possible. The minimum maturity level measured is the lowest possible — 1. On average, service delivery is above the Essential level 3. When compared against 2017 results

the year 2018 average is close, minimum and maximum smaller and mode higher.

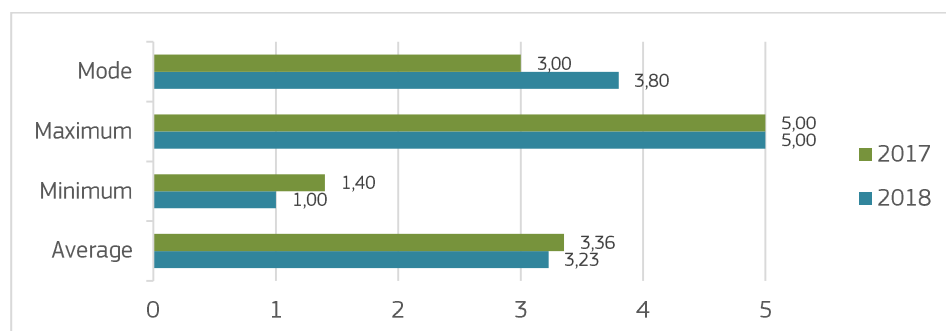


Figure 21: IMAPS results 2017–2018 — scores for all service consumption attributes — mode, maximum, minimum and average

Detailed data shows that there is one service consumption attribute, which is better performing (with a score above 3.2), one which has average scores and one which is lagging behind with score below 2.8. **Table 6** details these attributes and analyses their relation to the European Interoperability Framework (EIF).

The interoperability maturity of service consumption is on average above the Essential level in manual or digital consumption of services. Subscriptions to updates often require manual intervention and the maturity is from this perspective at Essential level. Maturity of reuse of the services is lagging behind (average maturity score 2.73).

Table 6: Service consumption attribute landscape

#	Name	score	Analysis	EIF — related
Better performing service consumption attributes — scores > 3.2				
C2	Manual or digital consumption of services	3.73	Around 60% of the assessed services are consuming other services mainly or fully digitally. On the other hand there are still many services consuming other services manually rather than in digital/automated fashion.	Yes — end-to-end digital services
Service consumption attributes — average scores between 3.2 and 2.8				
C4	Subscriptions to updates	3.05	Currently, the public services still rely on some manual intervention to integrate updates/up-to-date information or service flows.	No
Service consumption attributes lagging behind — scores < 2.8				

IMAPS detailed results on service areas

#	Name	score	Analysis	EIF — related
C3	Reusing or producing services	2.73	The services are currently only consuming limited amount relevant services from other public administrations whilst they are available for reuse. One third of respondents tell that most of the consumed services are self-produced, while relevant services are available for reuse.	Yes — reusability principle

8.3. Service Management

Service Management analysis highlights: Around 80% of the assessed services are subject to SLAs. For similar share of the services the components have been at least partly procured based on standards. Only 25% of the assessed services share contents and knowledge with the external environment extensively. Half of the services assessed are still using some proprietary definitions and / or have closed specification process or such a process into which the stakeholders have been invited only once.

This section assesses how the digital public service arranges the consumption and provisioning of external services and includes Service Management aspects such as architecture, procurement and service level management.

In the service management area, three attributes out of eight are below Essential level (3), as shown in **Figure 22**. The highest score is of 3.51.

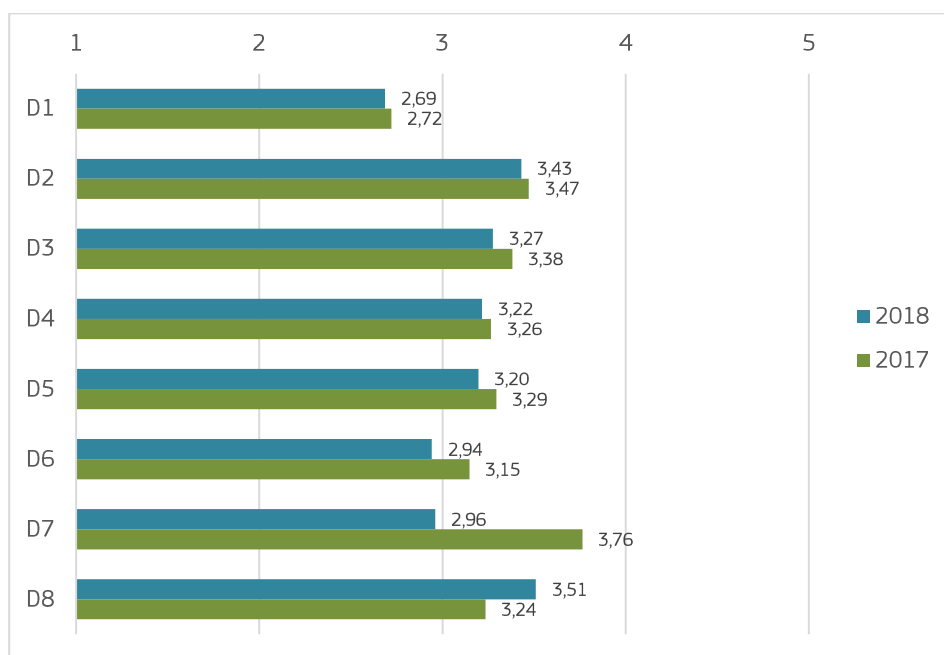


Figure 22: IMAPS results 2017–2018 – average scores for each service management attribute

Detailed assessment data shows (**Figure 23**) that level 3.15 is the most often measured level (mode) of maturity for service management attributes. The maximum maturity level measured is 4.45. The minimum maturity level measured is 1.4. On average, service delivery is slightly above the Essential level 3. When compared against 2017 results the year 2018 average is close, minimum is smaller, maximum smaller and mode higher.

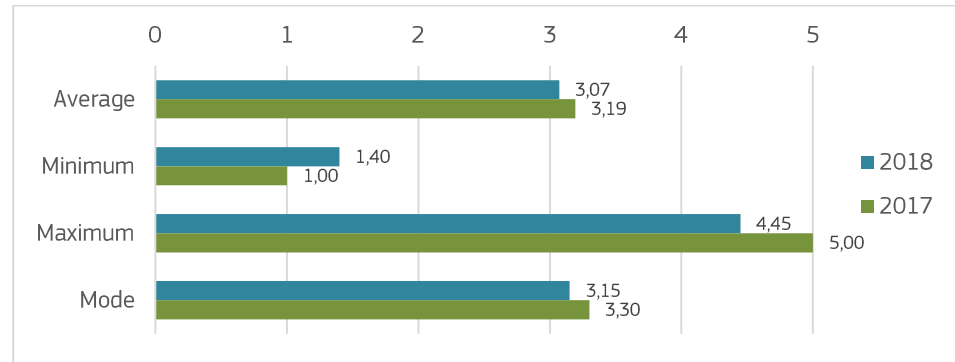


Figure 23: IMAPS results 2017–2018 — scores for all service consumption attributes — mode, maximum, minimum and average

Detailed assessment data shows that there are four service delivery attributes which are top performing (with a score above 3.2), three which have average scores and one which are lagging behind with scores below 2.8. **Table 7** details these attributes and analyses their relation to the European Interoperability Framework (EIF).

The interoperability maturity of service management is on average above the Essential level regarding the Service Level Agreements (SLAs), procurement criteria and business process model (average maturity scores 3.22 — 3.46). The maturity of reuse and sharing of components and knowledge with the external environment is lagging behind (average maturity score 2.69).

Table 7: Service management attribute landscape

#	Name	Score	Analysis	EIF — related
Better performing service management attributes — scores > 3.2				
D8	Service Level Agreements (SLAs)	3.46	Around 80% of the assessed services are subject to SLAs.	Yes — interoperability agreements
D2	Procurement criteria	3.43	For around 80% of the assessed services have part or all of the components have been procured based on standards.	Yes — technological neutrality and data portability principle
D3	Yes — technological neutrality and data portability principle	3.27	The service choreography of the digital public services is typically semi-automated and still requires some manual interference.	No
D4	Service choreography	3.22	Business processes and rules are increasingly streamlined but not yet always according to	Yes — process alignment recommendation

#	Name	Score	Analysis	EIF — related
			Business Process Modelling standards.	
Service management attributes — average scores between 3.2 and 2.8				
D5	Architectural Framework	3.20	Existing enterprise architecture frameworks are leveraged in many cases for the design of public services.	Yes — use of EIRA
D7	Concept definitions	2.96	Of the services assessed 50% are still using some proprietary definitions.	Yes — semantic interoperability
D6	Specification process	2.94	Of the services assessed 50% have closed specification process (no participation by administrations, citizens and/or businesses) or the stakeholders have been invited only once (no regular participation).	Yes — openness principle
Service management attributes lagging behind — scores < 2.8				
D1	Reuse and sharing	2.69	Only 25% of the assessed services share contents and knowledge with the external environment extensively ¹ .	Yes — reusability principle

¹ “Extensively” refers to the respondents who told that they share contents and knowledge via three or all of the options below:

- Sharing documentation to provide other (related) organisations valuable insights into processes, organisation, governance, technology choices, etc.
- Sharing source code or downloadable software to enable other organisations to effectively build their services.
- Making available open Web-API services to enable other organisations and individuals to (re)use functionality and/or gain access to data via web and/or mobile apps.
- Providing support to organisations leveraging the resources provided



IMAPS results on EIF implementation

9. IMAPS results on EIF implementation

This section analyses the results in the light of the EIF implementation. **Table 8** maps the IMAPS attributes to the EIF dimensions used in the National Interoperability Framework Observatory (NIFO). While each attribute does not provide information on a complete dimension, it can give an indication on levels of implementation of a specific aspect of it.

As shown in **Table 8**, IMAPS attributes related to the **transparency and data privacy principles get the highest scores** in the 2018 results.

IMAPS attributes relating to the **principles** of technological neutrality and data portability, accessibility (delivery channels) and reusability (prefilling) score above the “Essential” level.

IMAPS attributes relating to the **principles** of accessibility (accessibility), openness, reusability (Reuse and sharing, reusing or producing services) and multilingualism score below the “Essential” level.

IMAPS attributes relating to the **interoperability levels** get varying average scores. Semantic interoperability is below the Essential level and process alignment recommendation above.

IMAPS attributes relating to the **interoperability agreements** score above the “Essential” level.

The IMAPS attribute relating to the **interoperability governance** (use of an architecture framework) scores above the “Essential” level.

The IMAPS attribute relating to the **conceptual model** (service catalogue as part of the conceptual model) scores at the “Essential” level.

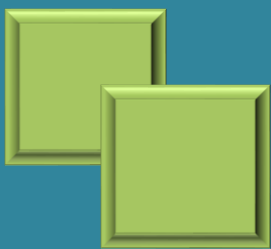
The IMAPS attribute relating to the **purpose of the EIF** (cross-border by default) scores above the “Essential” level.

Table 8: IMAPS assessment data contributing to the evaluation of the implementation of the EIF

EIF dimension		Score	#	Name
Principles	Transparency principle	4.00	B3	Procedural transparency
	Data privacy principle	3.93	B4	Data privacy

EIF dimension		Score	#	Name
	Technological neutrality and data portability principle	3.43	D2	Procurement criteria
	Openness principle	2.94	D6	Specification process
	Accessibility principle	3.12	B1	Delivery channels
		2.92	B6	Accessibility
	Multilingualism principle	2.92	B8	Multilingualism
	Reusability principle	2.73	C3	Reusing or producing services
		3.38	B2	Pre-filling
		2.69	D1	Reuse and sharing
Interoperability levels	Semantic interoperability	2.96	D7	Concept definitions
	Process alignment recommendation	3.22	D4	Process alignment recommendation
Interoperability Agreements	Use of semantic specifications	3.17	B9	Data exchange
	Interoperability agreements	3.51	D8	Service Level Agreements (SLAs)
Interoperability Governance	Use of the EIRA	3.20	D5	Architectural Framework
Conceptual model	Part of the conceptual model	3.02	B10	Service Catalogue
Purpose of the EIF	cross-border by default	3.43	B7	Cross border service delivery

Legend	Underperforming: below level 3 "Essential"	Achieved the Essential level 3	Over-performing: in the top three high scores
--------	--	--------------------------------	---



Annexes

Annexes

Annex 1. IMAPS attributes mapped to the European Interoperability Framework (EIF)

Interoperability Attributes

The IMAPS assesses each interoperability area using a set of interoperability attributes. These interoperability attributes form the core of the IMAPS and are used for measurement and improvement of interoperability maturity. This section explains how the interoperability attributes are defined and categorised.

- Sources of input

Various related programmes and initiatives inside and outside ISA have been leveraged to build the current set of Interoperability Attributes. The most important ones are:

- *European Interoperability Framework* — 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 the Interoperability Attributes. To make this interrelation explicit, each interoperability attribute within the IMAPS is linked to one or more EIF-levels (aka technical interoperability, semantic interoperability, organisational interoperability and legal interoperability);
- *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 the IMAPS overall embraces the key concepts of “digitalisation” in its various aspects;
- *Alignment with various other ISA initiatives* — the IMAPS is continuously being aligned with and provides input into the following ISA initiatives: EIRA¹; TES²; NIFO³; CAMSS⁴; SEMIC⁵; Base registries⁶; Cost-Benefit model⁷; ICT implications⁸; Sharing & Reuse⁹.

¹ http://ec.europa.eu/isa/Actions/02-IOP-architecture/2-1Action_en.htm

² http://ec.europa.eu/isa/Actions/02-IOP-architecture/2-14Action_en.htm

³ http://ec.europa.eu/isa/Actions/04-accompanying-measures/4-2-3Action_en.htm

⁴ http://ec.europa.eu/isa/Actions/02-IOP-architecture/2-2Action_en.htm

⁵ http://ec.europa.eu/isa/Actions/01-trusted-information-exchange/1-1Action_en.htm

⁶ http://ec.europa.eu/isa/Actions/01-trusted-information-exchange/1-2Action_en.htm

⁷ Action tbc in next ISA work program

⁸ http://ec.europa.eu/isa/Actions/03-ict-implications-assessment/index_en.htm

⁹ http://ec.europa.eu/isa/Actions/04-accompanying-measures/4-2-5Action_en.htm

IMAPS attributes mapped to the EIF

Table 9 provides a mapping of the IMAPS attributes with:

- The various levels of interoperability as described in the EIF (legal, organisational, semantic and technical)
- The elements in the EIF to which they are related (principles, etc.)

Table 9: IMAPS assessment data contributing to the evaluation of the implementation of the EIF interoperability levels

#	Name	EIF interoperability level
B1	Delivery channels	Technical
B2	Pre-filling	Technical
B3	Procedural transparency	Organisational
B4	Data privacy	Legal
B5	User feedback	Organisational
B6	Accessibility	Technical
B7	Cross border service delivery	Organisational
B8	Multilingualism	Semantic
B9	Data exchange	Semantic
B10	Service Catalogue	Technical
B11	Certification	Organisational
C1	Landscaping Service Consumption	Organisational
C2	Manual or digital consumption of services	Technical
C3	Reusing or producing services	Technical
C4	Subscriptions to updates	Technical
D1	Reuse and sharing	Organisational
D2	Procurement criteria	Organisational
D3	Service choreography	Technical
D4	Business process model	Organisational
D5	Architectural Framework	Technical
D6	Specification process	Organisational

#	Name	EIF interoperability level
D7	Concept definitions	Semantic
D8	Service Level Agreements (SLAs)	Organisational

Table 10: IMAPS assessment data contributing to the evaluation of the implementation of the EIF dimensions

EIF dimension			Name
12 Principles	Subsidiarity and proportionality		
	Openness	Y	D6: specification process
	Transparency	Y	B3: procedural transparency
	Reusability	Y	C3: reusing or producing services B2: pre-filling D1: reuse and sharing
	Technological neutrality and data portability	Y	D2: procurement criteria
	User-centricity		
	Inclusion and accessibility	Y	B1: delivery channels B6: accessibility
	Security and privacy	Y	B4: data privacy
	Multilingualism	Y	B8: multilingualism
Interoperability levels	Semantic interoperability	Y	D7: Concept definitions
	Process alignment recommendation	Y	D4: Business process model
Interoperability Agreements	Use of semantic specifications	Y	B9: Data exchange
	Interoperability agreements	D8	Service Level Agreements (SLAs)
Interoperability Governance	Use of the EIRA	D5	Architectural Framework
Conceptual model	Part of the conceptual model	B10	Service Catalogue
Purpose of the EIF	cross-border by default	B7	Cross border service delivery

Annex 2. IMAPS attributes and related categories¹

#	Name	Manifestation	Enabler	Average score 2018 results
B1	Delivery channels	Y		3.12
B2	Pre-filling	Y		3.38
B3	Procedural transparency	Y		4.00
B4	Data privacy		Y	3.93
B5	User feedback	Y		3.49
B6	Accessibility	Y		2.92
B7	Cross border service delivery	Y		3.43
B8	Multilingualism	Y		2.92
B9	Data exchange		Y	3.17
B10	Service Catalogue		Y	3.02
B11	Certification Organisational		Y	3.34
C1	Landscaping Service Consumption	Y		N/A
C2	Manual or digital consumption of services		Y	3.73
C3	Reusing or producing services		Y	2.73
C4	Subscriptions to updates		Y	3.05
D1	Reuse and sharing		Y	2.69
D2	Procurement criteria		Y	3.43
D3	Service choreography		Y	3.27
D4	Business process model		Y	3.22
D5	Architectural Framework		Y	3.20

¹ Disclaimer: The data presented here is in alignment with the current version of the IMAPS. A future version of the IMAPS will provide updates regarding the naming of attributes and the conventions of enablers and manifestations in order to align with EIRA Building Blocks' definitions, as well as with the naming convention of ISA² key enablers.

#	Name	Manifestation	Enabler	Average score 2018 results
D6	Specification process		Y	2.94
D7	Concept definitions	Y		2.96
D8	Service Level Agreements (SLAs)		Y	3.51

Annex 3. IMAPS attributes and related recommendations for enhancing interoperability

Question	Assessed level	Next level	Recommendation
B.1 Delivery channels	Ad Hoc (1)	Essential (3)	Not all end users will be able to use your service due to the fact only one digital channel is available as access point to it. In order to ensure accessibility to all end users, the addition of a traditional channel would be beneficial.
	Essential (3)	Sustainable (4)	In addition to one digital and one traditional channel, your service could improve its accessibility by adding more digital channels.
	Sustainable (4)	Seamless (5)	Frontrunners use interactive digital collaboration tools such as a virtual agents based on artificial intelligence to provide 24/7 direct interactions towards end users. Investigate the possibilities of adding such features to the current set of service delivery channels.

B.2 Form pre-filling	B.2 Form pre-filling	B.2 Form pre-filling	<p>Currently, your service does not require pre-filling or does not make use of pre-filling.</p> <p>If the former is the case, periodically evaluate whether pre-filling is not becoming relevant as your service evolves.</p> <p>For both cases, consult peer practices in order to make sure that you don't miss out on opportunities to pre-fill. Evaluate and map the different sources that you could use for pre-filling. Run user testing if appropriate to define which fields could be pre-filled and what impact the pre-filling has.</p>
	B.2 Form pre-filling	B.2 Form pre-filling	<p>Your service pre-fills selected, but not all data fields which would be electronically available. Pre-filling is one of the strongest manifestations of interoperability as it adds significant value to users in terms of reducing user burden and speeding up the service request process. Within your administration, pre-filling minimizes the risk of erroneous data entries.</p> <p>Map all information that would be electronically available and design your service to consume it electronically. Start with authentic sources first, but also consider using sources of information which do not have this formal status, but possibly offer similar added value.</p>
B3. Procedural transparency	Ad Hoc (1)	Essential (3)	<p>Currently, your service does not provide information on rules & processes to its end users. This may negatively impact the perception of your service and might lead to wrong assumptions and/or expectations of end users. Map all information that would be beneficial to end users (such as decision mechanisms, lead times, and reporting obligations) and communicate these via the available channels.</p>
	Essential (3)	Seamless (5)	<p>Currently, your service is providing limited information on rules & processes. Map all information that would be beneficial to end users (such as decision mechanisms, lead times, and reporting obligations) and communicate these via the available channels.</p>

B4. Data privacy	Ad Hoc (1)	Essential (3)	Currently, end users are not provided with any information on data privacy. This is however essential in fostering users' trust in the digital public service. Map all information that would be beneficial to end users and communicate these via the available channels.
	Essential (3)	Sustainable (4)	Currently, end users are only provided with a subset of information on their data privacy. Map all information that would be beneficial to end users and focus on closing the gaps to ensure full transparency.
	Sustainable (4)	Seamless (5)	Your digital public service provides detailed information on data privacy to users. However it is currently not possible for the user to manage (some of this) data privacy information online. This is though considered a desirable end state. As a first step, analyse which fields are important for the end user to manage by defining and testing a set of use cases.
B5. User feedback	Ad Hoc (1)	Essential (3)	At this moment your digital public service does not provide the possibility to give feedback. This is though beneficial to capture information on areas for improvement and/or insight into the particular strengths of the digital public service. Ensure you have a physical and/or digital channel available to capture this information and/or address complaints.
	Essential (3)	Sustainable (4)	Your digital public service has a physical feedback mechanism available to users (e.g., phone, postal). Consider adding a digital channel to capture feedback. Options are a dedicated email address, functionality via the website or a live chat function. Having a digital feedback channel reduces end user effort and likely enhances the amount and detail of feedback you will receive.
	Sustainable (4)	Seamless (5)	Currently, your digital public service offers the possibility for feedback. It would be beneficial to provide additional insights into the (anonymised) feedback from other end users. This way, end users will have a clear view of the quality of the functionalities offered, their limitations and are able to learn from each other's user experiences.

B6. Accessibility	Ad Hoc (1)	Essential (3)	Currently, your digital public service is not equally accessible to all end users. Implement accessibility features to make navigation, information and interaction with the digital public service convenient for people with disabilities. Consider an accessibility standard such as Web Content Accessibility (WAI) Guidelines 2.0, level AA for this purpose.
	Essential (3)	Seamless (5)	Although your digital public services provides some accessibility features, it is not fully compliant with an accessibility standard such as Web Content Accessibility (WAI) Guidelines 2.0, level AA. Work towards implementing an accessibility standard to the full extent to ensure your digital public service can obtain the conformance (compliance) logo.
B.7 Cross border service delivery	Ad Hoc (1)	Seamless (5)	At this moment there are restriction for non-residents or foreigners using the digital public service. Determine how many users are potentially impacted by this and draft a plan to ensure cross border service delivery by opening up the digital public service to foreign users (requiring e.g., alternative authentication mechanisms).
B.8 Multilingualism	Ad Hoc (1)	Essential (3)	Your digital public service is not multilingual. Consider at a minimum offering a multi-lingual interface. Offer it in one or several languages which best reflect the composition of your user community. You may start with offering multilingual basic information first, and then expand the scope of the translation.
	Essential (3)	Seamless (5)	Currently, some of the pages and/or documentation are multilingual. Whilst this is a good starting point, you may consider providing the entire service (including functional and technical documentation) in multiple languages. Make use of automated translation tools to achieve this goal. Consider collaborating with pan-European peers to spread burden, streamline functionalities and make multilingualism an integral part of your service delivery strategy.

B.9 Data Exchange	Ad Hoc (1)	Essential (3)	Currently, your digital public service is only using proprietary standards and is not leveraging existing (open) semantic standards for data exchange. Consider using (open) semantic standards to improve the interoperability of your digital public service with the outside environment.
	Essential (3)	Seamless (5)	Your digital public service leverages some (open) semantic standards for data exchange but combines this with proprietary standards. Investigate if it will be possible for your service to move towards a situation where the data exchange is entirely based on existing (open) semantic standards and specifications. Eliminating the reliance on proprietary-defined data flows will improve the interoperability of your digital public service significantly.

B.10 Service Catalogue	Ad Hoc (1)	Opportunistic (2)	Currently, your digital public service is not registered in a Service Catalogue. Registering your public service within a catalogue is recommended to promote and increase the usage of the service.
	Opportunistic (2)	Essential (3)	Your digital public service is registered in a catalogue only accessible to a restricted user group. Consider leveraging a publicly available catalogue to reach a larger target audience.
	Essential (3)	Sustainable (4)	Your digital public service is registered in a publicly available catalogue but is not discoverable online. Ensuring online discoverability is important to promote the machine-to-machine consumption of the digital public service. Focus on providing interoperable machine readable descriptions of the public service such as the contact details, public service info, provider, eligibility criteria and required input or evidences. Leverage standards such as CPSV-AP to ensure a solution that fits the needs of potential users.
	Sustainable (4)	Seamless (5)	Your digital public service is registered in a publicly and online discoverable catalogue and includes a public service description. However at this moment you are not (fully) leveraging standards such as CPSV-AP. Adopting these standards will help in the delivery of interoperable public service descriptions and group services according to life or business events.
B.11 Certification	Ad Hoc (1)	Seamless (5)	<p>You are providing your digital public service towards other administrations and/or organisations without a certification procedure. As a result, you create the risk of interconnections not working properly e.g., in terms of security, governance, technological and semantic interoperability and availability.</p> <p>Consider developing a formalised certification procedure in order to ensure your service can be delivered in a stable and safe manner to end users.</p>

C.2 Manual or digital consumption of services	Sliding scale (when not already seamless) — 5 levels		You are currently consuming all, most or some of the services manually. You could enhance your interoperability by 'digitalizing' the consumption further. This will create benefits in the areas of data quality, throughput time, costs and interoperability. Fully digital consumption of services also enables straight through processing and/or real-time processing. Try to find ways to interact more digitally with related organisations and define business cases to understand the added value of digitalization compared to manual interactions.
C.3 Reusing or producing services	Sliding scale (when not already seamless) — 3 levels		You are currently not consuming all relevant services from other public administrations whilst they are available for reuse. This shows that you are not making use of existing services to increase the effectiveness and efficiency of your own digital public service. Elaborate why this is the case. Before producing your own services, always take the time to map existing ones to possibly adapt them for your own purposes. Understand how you can improve your view on which services are being provided by other organisations.
C.4 Subscriptions to updates	Ad Hoc (1)	Essential (3)	At this moment, all updates stemming from other services require manual intervention. This means manual effort and potentially quality issues. Determine the business case for improving the automatic processing of updates in terms of efficiency, quality, responsiveness and security. Start with (life) events that have the highest impact on the functioning of the digital public service.
	Essential (3)	Seamless (5)	Currently, your digital public service still relies on some manual intervention when it receives updates. This means manual effort and potentially quality issues. Determine the business case for improving the automatic processing of updates in term of efficiency, quality, responsiveness and security. Proceed with (life) events that have the highest impact on the functioning of the digital public service.

D.1 Reuse and sharing	Sliding scale (when not already seamless) — 5 levels	D.1 Reuse and sharing	<p>Currently, your digital public service shares no or only some components and knowledge with the external environment. Work towards reuse and sharing on four areas:</p> <ol style="list-style-type: none"> 1. Provisioning of open Web-API services 2. Sharing source code and/or downloadable software components (including required licensing) 3. Sharing documentation 4. Provisioning of knowledge (direct Q&A support)
D.2 Procurement criteria	Ad hoc (1)	Essential (3)	<p>At this moment, your public service does not use a set of defined procurement criteria to steer on reuse and interoperability. Institutionalising a set of criteria or principles would benefit the service and administration because common pitfalls (e.g., proprietary development while services are available for reuse) can be prevented.</p>
	Essential (3)	Seamless (5)	<p>Although there is a set of defined procurement criteria, not all components have been procured based on standards. Focus on strict enforcement to ensure that procurement criteria are an effective steering mechanism to foster greater interoperability.</p>

D.3 Service choreography	Ad hoc (1)	Essential (3)	Currently, your digital public service does not have an automated service choreography. This means that all the coordination with external services is highly dependent on manual actions, potentially implying quality issues. Determine the business case for improving the automatic service choreography in term of efficiency, quality, responsiveness and security. Start with automating the choreography for services that have the highest impact on the functioning of the digital public service.
	Essential (3)	Seamless (5)	Currently, the service choreography of your digital public services is semi-automated and still requires some manual interference. This means manual effort and potentially quality issues. Determine the business case for improving the automation of service choreography in terms of efficiency, quality, responsiveness and security. Proceed with automating the choreography for services that have the highest impact on the functioning of the digital public service.
D.4 Business process model	Ad Hoc (1)	Essential (3)	At this stage, you do not have coherent business process definitions and rules in place. This means that in day-to-day operations, your collaboration with other services is governed ad hoc, burdening your own and other services' organisation. Consider putting in place a more manageable, consistent framework for establishing business processes, in particular where interdependencies between organisations are considerable.
	Essential (3)	Sustainable (4)	Business processes and rules are increasingly streamlined but not yet according to Business Process Modelling standards. Identify which standards in your domain are relevant to implement and leverage the best practices and lessons learned.
	Sustainable (4)	Seamless (5)	Processes are modelled to conform to business process standards but the whole process is still performed in a silo. Leveraging the insights of partners (of the consumed and/or shared services) can benefit you substantially in working towards a future proof interoperable process flow in your domain.

D.5 Architectural Framework	Ad hoc (1)	Seamless (5)	<p>Consider leveraging existing frameworks in your domain for the design of your digital public service and integrate their principles in the target state architecture to ensure proper steering and guidance. Consider implementing best practices in architectural flexibility such as the European Interoperability Reference Architecture and web-service based solutions to optimise your architecture further.</p> <p>References:</p> <p>European Interoperability Reference Architecture: https://joinup.ec.europa.eu/asset/eia/home</p> <p>TOGAF http://pubs.opengroup.org/architecture/togaf9-doc/arch/</p> <p>NORA: http://www.noraonline.nl/wiki/Hoofdpagina</p>
-----------------------------------	---------------	-----------------	---

D.6 Specification process	Ad Hoc (1)	Essential (3)	Currently, your digital public service does not provide the opportunity to other external organisations to participate in the specifications process. Opening up the specification process would have a series of benefits: upfront alignment in terms of interoperability with other services; learning and good practice sharing with other organisations; identification of additional opportunities to further foster interoperability, etc. Thus consider opening up the specification process.
	Essential (3)	Sustainable (4)	Within the specification process, stakeholders have been invited once to express their concerns. There is however no periodic process in which stakeholders are invited more regularly to ensure that the continuous development of the digital public service also addresses their (future) needs. Determine a suitable frequency to interact with stakeholders based on the speed of development of your digital public service.
	Sustainable (4)	Seamless (5)	The specification process of your public service is “upon invitation only.” This is selective and you risk excluding organisations which could well be willing to participate. You should consider opening up the specifications process to a wider public. To do so, carefully assess the benefits of doing so (creating an environment of continuous knowledge sharing; ensuring the widest possible interoperability) against any possible disadvantages (such as increasing the specification process’ complexity). Think of innovative collaborative tools (Web 2.0) to at least partly web-enable the specification process.
D.7 Concept definitions	Ad Hoc (1)	Seamless (5)	At this moment your digital public service is using proprietary definitions. The use of common concepts and definitions ensures alignment between organisations. Consider leveraging common/standardised concept definitions and controlled vocabularies (e.g., code lists, thesauri).

D.8 Service Level Agreements (SLAs)	Ad Hoc (1)	Essential (3)	Currently, your digital public service is not using Service Level Agreements (SLAs) to make the expected service performance transparent and predictable for users. Ensuring SLAs and institutionalizing a Service Level Management process is considered a good practice and helps the organisation to steer on service stability and outcome. Leverage existing frameworks such as ITIL v3 for the implementation of this process.
	Essential (3)	Seamless (5)	As part of the Service Level Management process, good practice organisations monitor the compliance monthly and provide reports to their users to indicate compliance or provide an overview of the corrective actions that were taken to restore the service.

Annex 4. Distribution analysis of the results of the 51 results

Table 11 allow to assess whether the IMAPS survey results follow a normal distribution, based on kurtosis and skewness. Note that: Values outside the +/- 1 range for skewness and +/-3 for kurtosis are deemed as departures from normality.

It has been found that:

- All (sic) attributes apart from Question B5 follow a normal distribution. This allows to make the analysis at the 2nd order level.
 - In case of Question B5 the skewness is -1.19 which indicates moderate skewness.
- All areas — Service Delivery, Service Consumption and Service Management — follow a normal distribution.

This implies that:

- Given that the value distributions of
 - all the attributes apart from Question B5 (moderate skewness observed) and
 - the second order IMAPS areas follow a normal distribution, it is suggested that the sample is representative of the population and, therefore, all findings can be extrapolated to the population.

Attribute	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
Std. Dev	1,37	1,29	1,32	1,45	1,30	1,47	1,97	1,60	1,17	1,12	2,00
Count	51	47	46	45	51	49	51	51	47	51	41
Variance	1,87	1,68	1,73	2,11	1,69	2,16	3,89	2,55	1,36	1,26	3,98
Kurtosis	-0,92	-0,59	-0,12	-0,36	0,09	-1,10	-1,87	-1,42	0,07	-0,55	-1,97
Skewness	-0,40	-0,19	-0,95	-0,96	-1,19	0,06	-0,44	0,07	0,00	-0,55	-0,35
<i>Normal?</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>No¹</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Attribute	C2	C3	C4	D1	D2	D3	D4	D5	D6	D7	D8
Std. Dev	1,30	1,44	1,47	1,38	1,46	1,20	1,21	2,01	1,61	2,02	1,49
Count	51	51	40	51	51	51	51	51	51	51	51
Variance	1,68	2,08	2,15	1,90	2,13	1,44	1,45	4,04	2,58	4,08	2,21
Kurtosis	-0,35	-1,01	-1,08	-0,99	-1,02	-0,20	-0,25	-2,04	-1,65	-2,08	-1,04
Skewness	-0,76	0,21	-0,04	0,35	-0,35	-0,05	-0,70	-0,20	-0,20	0,04	-0,44
<i>Normal?</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Table 11: Analysis of distribution: IMAPS attributes

¹ In case of Question B5 the skewness is -1.19 which indicates moderate skewness.

Table 12: Analysis of distribution: IMAPS areas

Service Delivery	Service Delivery	Service Consumption	Service Management
Average	3,34	3,23	3,07
Minimum	1,30	1,00	1,40
Maximum	4,43	5,00	4,45
Mode	3,55	3,80	3,15
Median	3,35	3,29	3,05
Standard Deviation	0,62	0,85	0,78
Kurtosis	1,37	0,82	-0,81
Skewness	-0,87	-0,53	-0,09
<i>Normal?</i>	<i>Yes¹</i>	<i>Yes</i>	<i>Yes</i>

¹ Service Delivery follows normal distribution as an area. All Service Delivery related individual questions apart from question B5 follow a normal distribution. In case of question B5 the skewness is -1.19 which indicates moderate skewness (**Table 10**).

Annex 5. IMAPS attributes' mapping to EIRA building blocks

Table 13 maps the IMAPS attributes to the EIRA building blocks as per EIRA version 2.0.0¹ showing whether there is equivalence between the two in terms of meaning, even though the terminology used in the IMAPS versus the EIRA may not fully be consistent. A future version of the IMAPS will provide updates regarding the naming of attributes and the conventions of enablers and manifestations in order to align with EIRA Building Blocks' definitions, as well as with the naming convention of ISA² key enablers.

Table 13: IMAPS attributes and related categories

#	IMAPS Attribute Name	Is there an equivalent or related EIRA Building Block: Y/N	If yes, EIRA term for the Building Block
B1	Delivery channels	Y, related	Service delivery model Human Interface Machine to Machine Interface
B2	Pre-filling	N	
B3	Procedural transparency	N	
B4	Data privacy	Yes, related	Security and Privacy policy
B5	User feedback	N	
B6	Accessibility	N	
B7	Cross border service delivery	Y, related	Service delivery model
B8	Multilingualism	Y, related	Machine Translation Component Machine Translation Service
B9	Data exchange	Y, related	Semantic Interoperability specification Data exchange service Data exchange component

¹ <https://joinup.ec.europa.eu/catalogue/distribution/eira-v200-overview>; accessed on September 9, 2017.

² Related refers to having a relationship with the meaning of the IMAPS attribute. Here, the EIRA attribute should be used to refine the definition of the IMAPS attribute. Equivalent means that the IMM attribute and the EIRA attribute already define the same aspect of interoperability and that thus their "names" should be aligned.

#	IMAPS Attribute Name	Is there an equivalent or related EIRA Building Block: Y/N	If yes, EIRA term for the Building Block
B10	Service Catalogue	Y, equivalent	Public Service Catalogue
B11	Certification	Y, related	Test component Test service Test scenario
C1	Landscaping Service Consumption	Y, included in the example listing of services that can be consumed as per the IMAPS are the following EIRA Building Blocks	Base Registry Access Management Service Audit Service Business Analytics Service Logging Service Trust Registry Service (partly overlapping with the IMAPS's eSignature service in meaning) e-Payment Service Messaging Service Audio-visual Service Data Transformation Service Data Validation Service Machine Translation Service Data Exchange Service Business Analytics Service Business Reporting Service Forms Management Service Records Management Service (part of EIRA's e-Archiving service) Document Management Service (part of EIRA' Content Management Service Logging Service Audit Service Metadata Management Service Networking Service Hosting Service Storage Service

#	IMAPS Attribute Name	Is there an equivalent or related EIRA Building Block: Y/N	If yes, EIRA term for the Building Block
C2	Manual or digital consumption of services	N	
C3	Reusing or producing services	N	
C4	Subscriptions to updates	N	
D1	Reuse and sharing	N	
D2	Procurement criteria	N	
D3	Service choreography	Y, equivalent	Choreography service
D4	Business process model	Y, related	Business process management Business process management component Business rule
D5	Architectural Framework	N	
D6	Specification process	Y, related	Interoperability specification
D7	Concept definitions	Y, related	Data model
D8	Service Level Agreements (SLAs)	Y, related	Interoperability agreement

Annex 6. IMAPS support to the Tallinn Declaration

This annex presents an analysis made on whether the policy action lines included in the Tallinn Declaration are relevant to the activities conducted the IMAPS (i.e., ISA2 Action 2016.36 — Interoperability Maturity Model). **Table 14** presents the Tallinn Declaration policy actions lines, the actors responsible for the implementation of each policy line (i.e., Member States, Commission or EU Institutions) and whether the policy line is relevant to the activities performed by the IMAPS (i.e., Yes or No). When the policy line is relevant or maybe relevant to the TES Action, comments on the analysis are added to a dedicated column.

Table 14: Impact of the Tallinn Declaration

Policy action line	Responsible actor(s)	Relevant to the IMAPS Action?	Comments
Digital-by-default, inclusiveness and accessibility			
Provide citizens and businesses with the option to interact digitally with public administrations, if they choose to, while following the “User-centricity principles for design and delivery of digital public services” as set out in the Annex of this declaration;	Member States	Yes	IMAPS supports digital interactions as well as following the user centricity principles as it is a tool to improve interoperability aspects of a digital service.
Take steps to reduce the need for citizens and businesses to unnecessarily interact with public administrations, for example, by relying on (re)use of data;	Member States	Yes	IMAPS assessment and related recommendations direct public services to reuse data/other services.
Take steps to further increase the readiness of citizens and businesses to interact digitally with public administrations by developing their digital skills as well as promoting the available digital public services (including cross-border ones);	Member States	No	

Policy action line	Responsible actor(s)	Relevant to the IMAPS Action?	Comments
Ensure better digital accessibility of public services and information for all citizens and businesses, including by improving the accessibility of public administration websites and mobile apps;	Member States	Yes	IMAPS tool promotes usage of several digital channels as well as e.g., services in multiple languages and also for people with disabilities.
Take steps to enable seamless digital delivery of services across sectors and collaboration in public service provision, by allowing EU institutions, private sector and civil society linkages to information held in public administration databases and systems in appropriate policy areas.	Member States	Yes	IMAPS' main focus is on improving interoperability which greatly focuses on seamless service delivery and collaboration.
Adopt the digital-by-default principle and commitments similar to the annexed "User-centricity principles for design and delivery of digital public services" for all service interactions with EU institutions — by 2019.	Commission and other EU institutions	No	One of the use cases for IMAPS is to use the tool already in the planning phase of digital services. This is in accordance with digital-by-default principle.

Once only			
Take steps to identify redundant administrative burden in public services and introduce once only options for citizens and businesses in digital public services by collaboration and data exchange across our administrations at national, regional and local level as well as with other countries for cross-border digital public services;	Member States	Yes	IMAPS promotes e.g., reuse of existing data and digital services. IMAPS can be used by administrations at national, regional and local level as well as for cross-border digital services.
Take steps to increase the findability, quality and technical accessibility of data in key base registers and/or similar databases, to build up readiness for applying the once only principle for national or cross-border digital public services;	Member States	Yes	IMAPS promotes e.g.re-use of existing data and digital services, usage of Service Catalogues and e.g., certifications that support in ensuring working interconnections.
Work to create a culture of reuse, including responsible and transparent reuse of data within our administrations;	Member States	Yes	IMAPS promotes the culture of reuse of data and digital services.
Make use of available funding to digitise all necessary key data and implement data exchange services between administrations for applying once only on both national and/or cross-border levels.	Member States	No	

Step up the work to define the organisational and technical steps necessary for applying the once only principle to key cross-border digital public services in support of the Single Market, building on the results from pilot projects and programmes;	Commission	No	
Further explore possibilities of Standard Business Reporting in view of the implementation of the ESMA European Single Electronic Format to make company data comparable, transparent and accessible digitally to reduce administrative burdens;	Commission	No	
Apply the once only principle for the EU-level digital public services they own and coordinate, in all policy areas — by 2022.	EU institutions	Yes	IMAPS promotes the culture of reuse of data and digital services.

Trustworthiness and Security			
Speed up preparations in our countries to ensure timely implementation and promote the widespread use across sectors of the Regulation on electronic identification (eID) and trust services for electronic transactions in the internal market (eIDAS), including to undertake the voluntary notification of electronic identity schemes used for access to public services at earliest possibility;	Member States	No	
Work to make our digital public services secure and properly identifiable by using the eIDAS framework for qualified electronic trust services, including by advancing the take-up of qualified website authentication certificates and qualified electronic seals;	Member States	Yes	The interoperability of eID services can be improved by proper use of IMAPS toolset.
Enable the private sector to make use of national eID schemes and trust services in securing the delivery of their digital services, where beneficial to the citizen, including by the further development of single sign-on, mandates and delegations;	Member States	Yes	The interoperability of eID services can be improved by proper use of IMAPS toolset.

Coordinate, exchange and collaborate more with each other to increase our strategic, operational, research and development capacity in the area of cybersecurity, in particular via the implementation of the network and information security (NIS) directive to strengthen the security and resilience of our public administration and services.	Member States	No	Coordinate, exchange and collaborate more with each other to increase our strategic, operational, research and development capacity in the area of cybersecurity, in particular via the implementation of the network and information security (NIS) directive to strengthen the security and resilience of our public administration and services.
Work jointly with our countries to develop proposals on how take EU research and development funding more into use for the development of cybersecurity and privacy tools and technologies and their deployment in the public administration — in 2018;	Commission	No	Work jointly with our countries to develop proposals on how take EU research and development funding more into use for the development of cybersecurity and privacy tools and technologies and their deployment in the public administration — in 2018;
Take steps to increase the recognition of eIDAS compliant solutions by global market players, in particular, for notified electronic identification means and qualified website authentication certificates, and to provide support to accelerate the uptake of those services for cross-border activities	Commission	No	Take steps to increase the recognition of eIDAS compliant solutions by global market players, in particular, for notified electronic identification means and qualified website authentication certificates, and to provide support to accelerate the uptake of those services for cross-border activities

Continue promoting the development and use of standards that ensure uniform conditions for the implementation of eIDAS Regulation.	Commission	No	Continue promoting the development and use of standards that ensure uniform conditions for the implementation of eIDAS Regulation.
Openness and transparency			
Make it possible for citizens and businesses to digitally manage their personal data held by the public administration (e.g., access, check and inquire about the use of, submit corrections to, authorise (re)use of), at least for base registries and/or similar databases;	Member States	Yes	IMAPS supports transparency and reuse of data.
Increase the availability and quality of open government data that is of value to economy and society, including by adopting the open-by-default approach and enabling more the automatic linkages to databases (for example, by application programming interfaces)	Member States	Yes	IMAPS supports improving interoperability of digital services. E.g., better reusability of services is partly enabled by improving APIs.
Take steps to ensure long-term reservation of public information resources in a cost-effective way by taking it into consideration in design of public administration ICT solutions.	Member States	Yes	IMAPS supports reuse of data and digital services. This improves cost efficiency.

<p>Make it easier for citizens and businesses to fully digitally manage (e.g., access, check and inquire about the use of, submit corrections to, authorise (re)use of) their personal data that EU institutions hold — by the end of 2020;</p>	<p>EU institutions</p>	<p>Yes</p>	<p>Accessibility of digital services is one of the IMAPS assessment areas. Accessibility ensures that people with all abilities and disabilities can perceive, understand, navigate, and interact with the digital public service.</p>
<p>Take the lead and involve Member States in preparing an initiative on accessibility and reuse of public and publicly funded data, based on the evaluation of existing legislation and subject to an impact assessment, and further explore the possibility of opening up privately held data of public interest, as proposed in the Digital Single Market midterm review — by spring 2018</p>	<p>Commission</p>	<p>No</p>	<p>Take the lead and involve Member States in preparing an initiative on accessibility and reuse of public and publicly funded data, based on the evaluation of existing legislation and subject to an impact assessment, and further explore the possibility of opening up privately held data of public interest, as proposed in the Digital Single Market midterm review — by spring 2018</p>
<p>Become more active in the area of open government at global level, to advance this transformation and relevant mutual learning across the world.</p>	<p>Commission</p>	<p>No</p>	<p>Become more active in the area of open government at global level, to advance this transformation and relevant mutual learning across the world.</p>

Interoperability by default			
Enhance the reuse of emerging joint solutions under the Connecting Europe Facility (CEF) programme or other common frameworks — in particular eID, eSignature, eDelivery, eProcurement and eInvoicing and promote their implementation in more domains, while avoiding sectoral duplication of service infrastructures;	Member States	Yes	IMAPS supports reuse of data and digital services as well as certifications/standardization.
Make more use of open source solutions and/or open standards when (re)building ICT systems and solutions (among else, to avoid vendor lock-ins), including those developed and/or promoted by EU programmes for interoperability and standardisation, such as ISA2	Member States	Yes	IMAPS is an action of ISA2 programme and focuses on improving interoperability of digital services.
Make ICT solutions owned by or developed for the public administrations more readily available for reuse in private sector and civil society, for example, by developing and publishing terms and conditions on how third parties may reuse the solutions.	Member States	Yes	IMAPS tool supports improving both reuse and reusability of digital services.

<p>Implement the European Interoperability Framework and the Interoperability Action Plan (including within all Commission services), especially for cross-border services within the Single Market — by the end of 2021;</p>	<p>EU institutions</p>	<p>Yes</p>	<p>IMAPS is an action of ISA2 programme and focuses on improving interoperability of digital services. The European Interoperability Framework has been leveraged to build the current set of IMAPS Interoperability Attributes.</p>
<p>Discuss cross-border interoperability principles and work to reach relevant agreements with global partners, especially the eIDAS framework for global interoperability and mutual recognition of electronic identities and trust services</p>	<p>Commission</p>	<p>No</p>	
<p>Building on the Council Conclusions on mainstreaming digital solutions and technologies in EU development policy, to submit proposals on how to fully integrate digital considerations into the EU's external development policy support instruments, to ensure interoperability with EU frameworks and standards when third countries make investments to digital infrastructure and services with EU assistance — by the end of 2019</p>	<p>Commission</p>	<p>Yes</p>	<p>IMAPS can support this activity by providing information and analysis on the state of the interoperability in the digital services assessed by using IMAPS.</p>

Consider strengthening the requirements for use of open source solutions and standards when (re)building of ICT systems and solutions takes place with EU funding, including by an appropriate open licence policy — by 2020.	Commission	No	
Horizontal enabling policy steps			
Take steps to increase the digital leadership skills among top civil and public servants and digital skills more widely within the public administration at all levels, as a necessary precondition to any successful digital transformation of public administrations;	Member States	Yes	One of the use cases for IMAPS is analysis of the level of interoperability and related root causes based on the assessment data gathered. This supports improvement of digital skills and competence.
Prepare and implement initiatives to widen and deepen the use of data and analytics (including big data) in our countries to move to data-driven public services and make full use of data for better decision-making;	Member States	Yes	IMAPS supports reuse of data and digital services.

Commit to expand and deepen the exchange and sharing of good eGovernment practices and successful domestic solutions, to speed up the digital transformation at all levels of government — including by enhancing the joint governance structures with local and regional authorities	Member States	Yes	IMAPS supports sharing of good practices and information about solutions as well as improvement of interoperability by publishing assessment result analysis reports, providing specific recommendations for individual services and e.g., publishing success stories from IMAPS users.
Make efforts to ensure adequate and timely funding resources for the prioritised digital transformation in our public administrations, at all levels	Member States	No	
Devote resources for more and faster experimentation with emerging ICT within the public administration, including by the offering of 'testbeds' for researchers and businesses	Member States	No	
Work to modernise the design of public services, procurement and contracting arrangements, to make them compatible with modern and agile ways of developing and deploying digital technology	Member States	Yes	IMAPS supports use of standards in IT procurement.

Improve the inter-institutional cooperation and step up individual efforts for thorough digital transformation of their organisations, following the EU eGovernment Action Plan and the European Interoperability Framework principles	EU institutions	Yes	IMAPS supports the improvement of interoperability of digital services. The European Interoperability Framework has been leveraged to build the current set of IMAPS Interoperability Attributes.
Building on the Council Conclusions on mainstreaming digital solutions and technologies in EU policy, to fully integrate digital considerations into existing and future policy and regulatory initiatives	Commission	No	
Prepare a roadmap on how to fully embrace digital transformation for all Commission-managed funding distribution processes, which is a key area of red tape right now — by 2018;	Commission	No	
Launch initiatives to improve digital skills more widely within its services, especially the digital leadership skills among management — by the end of 2018	Commission	No	
Take steps to harmonise and consolidate indicators of eGovernment progress in the EU across policy areas, including to reinforce the coordination with statistical work of Eurostat	Commission	No	

<p>Prepare proposals on the future (post 2020) and sustainability of existing EU level cross-border digital service infrastructures and building blocks, including their funding and management, in anticipation of the end of the current Connecting Europe Facility programme and based on the experiences and evaluation of the large scale pilots — within the process of the next EU multiannual financial framework preparations</p>	Commission	Yes	<p>Data gathered via IMAPS assessments can be used for future proposals regarding cross border digital service infrastructure and building blocks. Various aspects related to the state of interoperability of digital public services can be analysed via the assessment data.</p>
<p>Convene and support the work of groups of interested countries and other parties to exchange practices and develop reference guidelines and standards for taking emerging ICT into use in the public administration, for example, starting with data analytics, artificial intelligence and blockchain</p>	Commission	Yes	<p>Interoperability is an important viewpoint also in taking emerging ICT into use. IMAPS supports making services interoperable by design.</p>
<p>Support our countries in the digital transformation of our public administrations, including by making resources more and easily available through EU-level instruments for research and practical deployment of emerging ICT in the public administration, with due attention for connected ethical issues.</p>	Commission	Yes	<p>The IMAPS action provides the IMAPS survey tool to support in the digital transformation of public administrations across Member States and the Commission especially from interoperability perspective.</p>

Any questions regarding this Report should be addressed to:

Guido Van Der Harst
Managing Partner
Gartner Belgium BVBA
Corporate Village Figueras
Da Vincilaan 11
B-1930 Zaventem
Belgium

Telephone: +31 610 583559
Facsimile: +32 2 725 71 09
Email: guido.vanderharst@gartner.com

This Report was prepared for:

DG DIGIT — D.2:
Raul-Mario Abril-Jimenez
DG DIGIT — D.2
Rue Montoyer 15
B-1000 Bruxelles
Belgium
Email: Raul-Mario.ABRIL-JIMENEZ@ec.europa.eu