SIMAPS v1.0.0

Semantic Interoperability Maturity Assessment of a Public Service

Recommendations

LIMAPS Legal Interoperability

OIMAPS Organisational Interoperability

SIMAPS Semantic Interoperability

TIMAPS Technical Interoperability
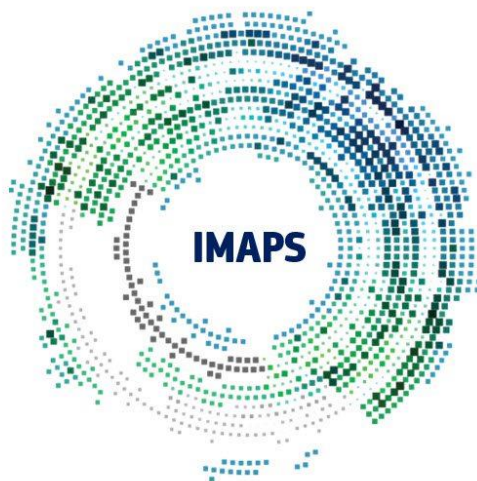
Interoperability Maturity Assessment of Your Digital Public Service

Disclaimer

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 Commission. The Commission does not guarantee the accuracy of the data included in this document. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use, which may be made of the information contained therein.

TABLE OF CONTENTS

Table of Abbreviations

Acronym	Description
ABB	Architectural Building Block
CAMSS	Common Assessment Method for Standards and Specifications
CarTool	Cartography Tool
DIGIT	Directorate-General for Informatics
EC	European Commission
EIF	European Interoperability Framework
EIRA	European Interoperability Reference Architecture
EU	European Union
IQAT	Interoperability Quick Assessment Toolkit
IMM	Interoperability Maturity Model
ISA	Interoperability Services for Public Administrations
IMAPS	Interoperability Maturity Assessment of Public Services
MS	Member State
PA	Public Administration
SIMAPS	Semantic Interoperability Maturity Assessment of Public Services

1 Introduction

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

1.1 Principles

The following five principles are applied to generate recommendations:

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

1.2 Recommendations overview

- For each improvement step, the recommendation tables in the following chapters show:
- The question the recommendation relates to;
- The assessed maturity level;
- The next maturity level to be reached through improvement[2];
- The recommendation as to how to reach the next maturity level.

---

[1] The reason for this is that in this case- according to the model- the service is already implementing a semantic interoperability attribute in a way that it corresponds to best practice. There are no direct recommendations to improve further
[2] With the exception when this is considered a sliding scale

2 SERVICE DELIVERY (D)

2.1 Scoring Table

Table 1: Service Delivery scoring model

Item	Ad hoc (1)	Opportunistic (2)	Essential (3)	Sustainable (4)	Seamless (5)
D1 (10%)	No, although they should as they are displayed to end users	Yes, at some extent	Yes, at some extent	Yes, following specific e-accessibility specs widely recognised (e.g. M376, M420, M473, as per the European accessibility act)	Yes, the data is also compliant with the e-accessbility specifications recommended by the EIRA Library of Interoperability Specifications (ELIS) Not applicable
D2 (20%)	The public service delivers only non-open data semantically aligned at a limited administrative level (same sector and/or at a local level)		The public service delivers only non-open data semantically aligned at a wider administrative level (cross-sector and/or cross-border)	The public service delivers open data semantically aligned at a limited administrative level (same sector and/or at a local level)	The public service delivers open data semantically aligned at a wider administrative level (cross-sector and/or cross-border)
D3 (20%)	The public service does not deliver semantically aligned data to other public services		The public service delivers semantically aligned data to other public services only in the same sector and only at national level	The public service delivers semantically aligned data to other public services, at cross-sector level, but only at national level	The public service delivers semantically aligned data to other public services at a trans-European level
D4 (15%)	The public service does not deliver semantically aligned open			The public service delivers semantically aligned open data to less than three (3) other MS	The public service delivers semantically aligned open data to more

	data to any other MS				than three (3) other MS
D5 (15%)	The public service delivers data only in the national language		The public service delivers data in the national language and in English	The public service delivers data in specific languages (due to collaboration/mutual agreements/...)	The public service delivers data in all EU languages.
D6 (20%)	Mostly unstructured data format (i.e. blob / text)			Mostly flat, structured data format (e.g. csv, flat text, etc.)	Mostly self-describing, structured data format (e.g. XML, JSON, SGML, etc.)
D7 (10%)	No		Yes, defined bilaterally between MS	Yes, under EU/international level standards/specs	Yes, based on the semantic interoperability specifications listed in ELIS e.g. Resource Description Framework (RDF)
D8 (25%)	No reference data with other public services is handled		Reference data is defined bilaterally between MS	Reference data is handled under EU/international level taxonomies/vocabularies	Reference data is handled on the semantic interoperability specifications listed in ELIS
D9 (30%)	No semantic agreements have been made nor semantic standards are in use			Semantic standards are in use (alignment to e-Government Core Vocabularies) but no semantic agreements have been made with other public services	Semantic standards are in use (alignment to e-Government Core Vocabularies) and semantic agreements have been made with other public services
D10 (25%)	No effort is done to make data visible to other public services		Data is visible through ad-hoc communication (e-mail, …)	Data is visible through communication on the website of the public service or other related websites	Data is visible through data portals or data catalogues

D11 (20%)	Data is not easily nor clearly discovered by the public service end users		Data is part of a catalogue available to restricted end user groups	Data is part of a publicly and online discoverable catalogue and includes a public service description (including information such as contact details, provider, preconditions and required input)	Data is part of a publicly and online discoverable catalogue and includes a public service description based on standards such as CPSV-AP
D12 (30%)	No data that could be of use to other public services is discoverable		Certain datasets that are of use to other public services are discoverable	Certain datasets that are of use to other public services are discoverable and there is continuous improvement in this amount of datasets	All datasets that are of use to other public services are discoverable
D13 (35%)	No applications have been developed although the data delivered can be reused			Less than five (5) applications have been developed, keeping the format and syntax of the public service	More than five (5) applications have been developed, keeping the format and syntax of the public service
D14 (35%)	No new applications have been developed to reuse the data delivered by the public service		Only non-open data delivered by the public service are reused to new applications	Less than half of the open data delivered by the public service is reused to newly developed applications	More than half of the open data delivered by the public service is reused to newly developed applications

2.2 Recommendations

The table below presents the respective recommendation to each option in SIMAPS questionnaire. As mentioned above, the purpose of the recommendations is to propose the needed actions to be taken by the public service owners in order to achieve a higher level of semantic interoperability maturity. In case the selected option is associated to "Seamless level (5)", then no action is required from the public service owners and the recommendation is by default "Congratulations, you are at the Seamless level".

Table 2: Service Delivery Recommendations

Question	Addressed Level	Next Level	Recommendation
D1. Is the data, information and knowledge delivered by your public service compliant with e-accessibility specifications?	Ad hoc (1)	Essential (3)	The public service data, information and knowledge delivered is not compliant with e-accessibility specifications. E-accessibility means overcoming the technical barriers and difficulties that people with disabilities, including many elderly people, experience when trying to participate on equal terms in the information society. Consider following at some extent specific e-Accessibility specifications in the data, information and knowledge delivered by your public service
	Essential (3)	Sustainable (4)	The public service data, information and knowledge is delivered to its end users by following at some extent the e-accessibility specifications. Consider following specific e-accessibility specifications that are widely recognised e.g. M376, M420, etc.
	Sustainable (4)	Seamless (5)	The public service data, information and knowledge is delivered to its end users by following specific e-accessibility specifications that are widely recognised. In order to enhance the semantic behavioural interoperability of your public service, consider following the e-accessibility specifications that are recommended by the EIRA Library of Interoperability Specifications (ELIS).
D2. Please indicate if your public service delivers semantically aligned open data	Ad hoc (1)	Sustainable (4)	The public service delivers only non-open data semantically aligned at a limited administrative level (same sector and/or at a local level). Consider delivering data semantically aligned at a wider administrative level (cross-sector and/or cross-border), to improve the

			semantic behavioural interoperability of your digital public service with the external environment.
	Essential (3)	Sustainable (4)	Currently, your public service delivers only non-open data semantically aligned at a wider administrative level (cross-sector and/or cross-border). Consider delivering open data semantically aligned at a limited administrative level (same sector and/or at a local level) to improve the semantic behavioural interoperability of your public service.
	Sustainable (4)	Seamless (5)	Currently, your public service delivers open data semantically aligned at a limited administrative level (same sector and/or at a local level). Consider delivering open data semantically aligned at a wider administrative level (cross-sector and/or cross-border) to improve the semantic behavioural interoperability of your public service.
D3. Please indicate to which administrative level the public service delivers semantically aligned data, information and knowledge (same sector, cross-sector, national, trans-European).	Ad hoc (1)	Essential (3)	Currently, the data delivered by your public service is not available to other public services. Consider making available the delivered data to other public services as well, e.g. to other public services in the same sector or at a cross-sector level to increase the semantic behavioural interoperability of your service
	Essential (3)	Sustainable (4)	Currently, the data delivered by your public service is available to other public services, but only in the same sector and at national level. In order to increase the semantic behavioural interoperability of your service, consider enabling the public service data delivery at a cross-sector level
	Sustainable (4)	Seamless (5)	Currently, the data delivered by your public service is available to other public services, at a cross-sector level, but only at national level. Consider enabling the public service data delivery at a trans-European level to enhance

			the semantic behavioural interoperability of your public service.
D4. Please indicate to how many different MS your public service delivers semantically aligned data, information and knowledge.	Ad hoc (1)	Sustainable (4)	Currently, your public service does not deliver semantically aligned open data to any other MS. Consider publishing data beyond the national level, to other MS to enhance the readiness of your data to be consumed by other MS
	Sustainable (4)	Seamless (5)	Currently, your public service delivers semantically aligned open data to less than three (3) other MS. Consider extending the number of MS that the published data of your service is delivered to increase the semantic behavioural interoperability of your public service
D5. Please indicate to which languages your public service delivers data, information and knowledge.	Ad hoc (1)	Essential (3)	Your digital public service delivers data only in the national language. Consider delivering data also in English to enhance the semantic behavioural interoperability of your public service.
	Essential (3)	Sustainable (4)	Your digital public service delivers data in the national language and in English. Consider putting in place mutual agreements with the MS and delivering your data also in their languages.
	Sustainable (4)	Seamless (5)	Your digital public service delivers data in specific languages due to mutual agreements with other MS. Consider delivering data in all EU languages to enhance the semantic behavioural interoperability of your public service
D6. Please indicate the data format that your public service uses to exchange data with other services.	Ad hoc (1)	Essential (3)	Currently, the data format that your public service uses to exchange data with other services is mostly unstructured. Consider gradually use structured data such as csv, flat text,

			etc. to enhance the semantic behavioural interoperability of your public service
	Essential (3)	Sustainable (4)	Currently, the data format that your public service uses to exchange data with other services is mostly flat and structured. Consider use self-describing, structured data format (e.g. XML, JSON, SGML, etc.) to enhance the semantic behavioural interoperability of your public service.
D7. Are semantic formats (Linked Data, RDF, …) being used as a data format for data delivered by your public service?	Ad hoc (1)	Essential (3)	Currently, your digital public service delivers data that is not based on semantic data formats (Linked Data, RDF, …). Consider delivering your data under semantic data formats to increase the level of the semantic behavioural interoperability of your public service.
	Essential (3)	Sustainable (4)	Currently, your digital public service delivers data based on semantic data formats that are bilaterally defined between MS. Consider implementing data based on semantic standards/specifications that are defined at a EU level to reach a higher semantic interoperability level.
	Sustainable (4)	Seamless (5)	Currently, your digital public service delivers data based on semantic data formats that are defined at an EU/international level. Consider implementing data based on the semantic interoperability specifications listed in ELIS to achieve a higher semantic interoperability level.
D8. Please specify how your public service handles the reference data delivered to other public services.	Ad hoc (1)	Essential (3)	Currently, your public service data does not handle any reference data with other public services. Consider gradually define your published data (reference data) bilaterally with other MS to enhance the semantic behavioural interoperability of your public service.
	Essential (3)	Sustainable (4)	Currently, reference data is being handled bilaterally between MS. Consider handle reference data under EU/international level taxonomies and controlled vocabularies to enhance the

			semantic behavioural interoperability of your public service.
	Sustainable (4)	Seamless (5)	Currently, reference data is handled under controlled vocabularies and taxonomies handled under EU/international level. Consider handle reference data under the semantic interoperability specifications listed in ELIS
D9. To what extent is semantic interoperability considered when delivering data, information, knowledge to other public services?	Ad hoc (1)	Sustainable (4)	Currently, your digital public service makes its delivered data accessible to its end-users without any semantic agreements or standards in place. Consider use semantic standards and agreements to semantically align the delivered data with other public services.
	Sustainable (4)	Seamless (5)	Currently, your digital public service makes its delivered data accessible to its end-users using semantic standards, but no semantic agreements. Consider use semantic agreements to semantically align the delivered data with other public services.

D10. What kind of activities do you perform to make the data, information, knowledge delivered discoverable by other public services or by end users?	Ad hoc (1)	Essential (3)	Currently, the data delivered by your public service is not discoverable by other public services. Consider enabling the discoverability and visibility of your published data to other public services.
	Essential (3)	Sustainable (4)	Currently, the data delivered by your public service is discoverable by other public services through ad-hoc communication. Consider enabling the discoverability of your published data to other public services through data portals or data catalogues
	Sustainable (4)	Seamless (5)	Currently, the data delivered by your public service is discoverable by other public services through communication on the website of your service or other related websites. Consider enabling the discoverability of your published data to other public services through data portals or data catalogues.
D11. What kind of activities do you perform to make the data, information, knowledge delivered clearly understood its end users?	Ad hoc (1)	Essential (3)	Currently, data is not easily nor clearly discovered by the public service end users. Consider publishing your data in a data catalogue to enhance the semantic behavioural interoperability of your public service.
	Essential (3)	Sustainable (4)	Currently, your digital public service publish its data in a data catalogue available only to a restricted user group. Consider making the data catalogue available to public to achieve a higher semantic interoperability level.
	Sustainable (4)	Seamless (5)	Currently, your digital public service publish its data in a publicly available data catalogue including also the public service description. Consider including your public service description based on standards such as CPSV-AP for a higher semantic interoperability maturity level.

D12. Please indicate to what extent your public service data that could be of use to other public services is discoverable	Ad hoc (1)	Essential (3)	Currently, no public service data that could be of use to other public services are accessible. Consider making accessible gradually certain datasets to other public services.
	Essential (3)	Sustainable (4)	Currently, certain datasets that are of use to other public services are accessible. Consider making a continuous improvement in the amount of datasets that are available to other services
	Sustainable (4)	Seamless (5)	Currently, certain datasets that are of use to other public services are accessible and there is continuous improvement in the amount of datasets that are available. Consider making accessible all datasets that are of use to other public services.
D13. Please indicate if and how many applications have been developed based on data delivered from your public service	Ad hoc (1)	Sustainable(4)	Currently, there are no applications developed based on published data from your public service. The greater the level of data reuse by other public services and by other public administrations, the better, as it

			ensures sustainable (semantic) interoperability among them.
	Sustainable (4)	Seamless (5)	Currently, less than five (5) applications have been developed, keeping the format and syntax of the public service. The greater the level of data reuse by other public services and by other public administrations, the better, as it ensures sustainable (semantic) interoperability among them.
D14. Please indicate the extent of your public service data reuse in newly developed applications	Ad hoc (1)	Essential (3)	Currently, no new applications have been developed to reuse the data delivered by the public service. The greater the level of data reuse by other public services and by other public administrations, the better, as it ensures sustainable (semantic) interoperability among them.
	Essential (3)	Sustainable (4)	Currently, only non-open data delivered by the public service are reused to new applications. Consider delivering open data that will be reused to newly developed applications to enhance the semantic behavioural interoperability of your service
	Sustainable (4)	Seamless (5)	Currently, less than half of the open data delivered by the public service is reused to newly developed applications. Consider extending the amount of open data delivered by the public service to be reused to newly developed applications.

3   SERVICE CONSUMPTION (C)

3.1   Scoring Table

Table 3: Service Consumption scoring model

Item	Ad hoc (1)	Opportunistic (2)	Essential (3)	Sustainable (4)	Seamless (5)
C1 (15%)	The public service only consumes data collected by the public service itself.		The public service consumes data collected from other public services (government authorities, official statistics, …) but is not semantically aligned	The public service consumes data collected from other public services and certain data is semantically aligned	The public service consumes data collected from other public services and all data is semantically aligned
C2 (10%)	No		Yes, but they are only used as reference material	Yes, some public datasets are fully integrated in the public service	Yes, some public datasets are fully integrated in the public service and are semantically aligned
C3 (10%)	No			Yes, but they are only used as reference material	Yes, some non-open datasets are fully integrated in the public service
C4 (15%)	No		Yes, but they are only used as reference material	Yes, some Linked Open datasets are fully integrated in the public service and are semantically aligned (bilaterally between MS)	Yes, some Linked Open datasets are fully integrated in the public service and are semantically aligned (following formal specs defined in ELIS e.g. Resource

					Description Framework (RDF))
C5 (5%)	No, the public service does not consume data from other MS			Yes, but under specific conditions/agreements.	Yes, there is smooth consumption without specific agreements for most data sets
C6 (5%)	No data is being consumed from other MS			The public service can consume data from a few specific MS	The public service can consume data from all MS
C7 (5%)	The public service consumes data only in the national language		The public service consumes data in the national language and in English	The public service consumes data in specific languages (due to collaboration/mutual agreements/...)	The public service consumes data in all EU languages
C8 (25%)	No semantic standards or technologies are used when consuming data		Data consumption is supported by semantic technologies (Linked Data, RDF, …).	Data consumption is supported by recommended semantic agreements (e-Government Core Vocabularies	Data consumption is supported by semantic technologies (Linked Data, RDF, …) and recommended semantic agreements (e-Government Core Vocabularies)
C9 (10%)	No, although it should as the data are displayed to end users		Yes, at some extent	Yes, following specific e-accessibility specs widely recognised (e.g. M376, M420, M473, as per the European accessibility act)	Yes, the public service is compatible with the e-accessibility specs listed in the ELIS Not applicable (e.g. there is only M2M consumption

					that is not meant to be displayed to end users)
C10 (40%)	The public service does not handle the alignment of the consumed data			Consuming data from specific other public services is semantically aligned through the use of specific semantic agreements.	Consuming data from specific other public services is semantically aligned through the use of recommended semantic standards (e-Government Core Vocabularies)
C11 (20%)	Leveraging the data is an ad-hoc manual process			Some of the consumed data are semantically aligned automatically and some manually	All the consumed data are semantically aligned automatically
C12 (40%)	No, reference data is being interpreted ad-hoc		Yes, with specific agreements with the other public services (common vocabs, ontologies, etc.).	Yes, recommended vocabularies or taxonomies at EU level are used in the semantic agreements	Reference data is handled on the semantic interoperability specifications listed in ELIS
C13 (40%)	No data is being discovered. The public service only consumes data collected by the public service itself			Data is being discovered via data portals and data catalogues (national level)	Data is being discovered through data portals and data catalogues (trans-European level)
C14 (30%)	No data is being discovered. The public			Less than half of the consumed data is being discovered.	More than half of the consumed data

	service only consumes data collected by the public service itself.			is being discovered.
C15 (30%)	No data is being consumed from other MS		Less than half of the total data consumed	More than half of the total data consumed

3.2 Recommendations

The table below presents the respective recommendation to each option in SIMAPS questionnaire. As mentioned above, the purpose of the recommendations is to propose the needed actions to be taken by the public service owners in order to achieve a higher level of semantic interoperability maturity. In case the selected option is associated to "Seamless level (5)", then no action is required from the public service owners and the recommendation is by default "Congratulations, you are at the Seamless level".

Table 4: Service Consumption Recommendations

Question	Addressed Level	Next Level	Recommendation
C1. To what extent is the public service consuming semantically aligned data (data that is compliant to e-Government Vocabularies or to semantic agreements)?	Ad hoc (1)	Essential (3)	Currently,your public service only consumes data collected by the public service itself. Consider gradually consuming data collected from other public servies to enhance the semantic behavioural interoperability of your public service
	Essential (3)	Sustainable (4)	Currently, the public service consumes data collected from other public services, but it is not semantically aligned. Consider semantically aligning the consumed data to improve the semantic behavioural interoperability of your public service.
	Sustainable (4)	Seamless (5)	Currently, the public service consumes data collected from other public services and certain data is semantically aligned. Consider making all data semantically aligned to improve the semantic behavioural interoperability of your public service
C2. Does your public service consume open data sets from	Ad hoc (1)	Essential (3)	Currently, your public service does not consume open data sets from other public services. Consider consuming gradually public datasets from other services to enhance the semantic

other public services?			behavioural interoperability of your public service
	Essential (3)	Sustainable (4)	Currently, your public service consumes open data sets from other public services, but they are only used as reference material. Consider fully integrating in your public service the public datasets that are consumed from other services
	Sustainable (4)	Seamless (5)	Currently, your public service consumes some open data sets from other public services that are fully integrated in your public service. Consider making semantically aligned all the consumed datasets from your public service
C3. Does the public service consume non-open data from other public services?	Ad hoc (1)	Sustainable (4)	Currently, your digital public service does not consume non-public data from other services. Consider gradually consuming non-public data from other services to improve the semantic behavioural interoperability of your public service.
	Sustainable (4)	Seamless (5)	Currently, your digital public service consumes non-public data from other services, but they are only used as reference material. Consider fully integrating the non-public data sets services in your public service and making them semantically aligned.
C4. Are Linked Open Data sets being consumed by the public service?	Ad hoc (1)	Essential (3)	Currently, your digital public service does not consume Linked Open data sets. Consider gradually consuming Linked Open data sets to improve the semantic behavioural interoperability of your public service.
	Essential (3)	Sustainable (4)	Currently, your digital public service consumes Linked Open data sets, but they are only used as reference material. Consider fully integrating the Linked Open Data sets in your public service and making them semantically aligned.
	Sustainable (4)	Seamless (5)	Currently, some Linked Open datasets are fully integrated in the public service and are semantically aligned (bilaterally between MS). Consider fully integrating Linked Open datasets in your public service to enhance the semantic behavioural interoperability of your service.
C5. Is the public service able to consume data, information and knowledge from other MS?	Ad hoc (1)	Sustainable (4)	Currently, your public service is not able to consume data, information and knowledge from other MS. Consider gradually enabling the consumption of data, information and knowledge from other MS for a better level of achieved semantic interoperability.

(semantially aligned)	Sustainable (4)	Seamless (5)	Currently, your public service consumes data, information and knowledge from other MS under specific condtions/agreements. Consider gradually removing specific agreements for most data sets to achieve a smooth consumption of data, information and knowledge from other MS
C6. From how many MS can your public service consume data, information and knowledge? (semantically aligned)	Ad hoc (1)	Sustainable (4)	Currently, the public service does not consume data, information and knowledge from any MS. Consider gradually enabling the consumption of data, information and knowledge from other MS to enhance the semantic behavioural interoperability of your service
	Sustainable (4)	Seamless (5)	Currently, the public service consumes data, information and knowledge few MS. Consider gradually enabling the consumption of data, information and knowledge from all MS to enhance the semantic behavioural interoperability of your service
C7. Is the public service able to consume data, information and knowledge available in more than one languages?	Ad hoc (1)	Essential (3)	Currently, your public service consumes data only in the national language. Consider at least consuming data in English as well to enhance the semantic behavioural interoperability of your service.
	Essential (3)	Sustainable (4)	Currently, your public service consumes data in the national language and in English. Consider consuming data in other languages as well to enhance the semantic behavioural interoperability of your service
	Sustainable (4)	Seamless (5)	Currently, your public service consumes data in specific languages (due to collaboration/mutual agreements). Consider consuming data in all EU languages to enhance the semantic behavioural interoperability of your service.
C8. To what extent is the consumption of data, information and knowledge based on existing semantic standards?	Ad hoc (1)	Essential (3)	Currently, there are no semantic standards nor technologies used when consuming data from other services. Consider supporting data consumption with semantic technologies and agreements to achieve a higher level of semantic interoperability.
	Essential (3)	Sustainable (4)	Currently, data consumption from your public service is supported by semantic technologies (Linked Data, RDF). Consider supporting data consumption with semantic agreements as well

			to achieve a higher level of semantic interoperability.
	Sustainable (4)	Seamless (5)	Currently, data consumption is supported by recommended semantic agreements (e-Government Core Vocabularies). Consider supporting data consumption with semantic technologies as well to achieve a higher level of semantic interoperability.
C9. Can the public service consume data compliant with e-accessibility specifications?	Ad hoc (1)	Essential (3)	Currently, your public service cannot consume data compliant with e-accessibility specifications. Consider gradually consume data that is compatible to some e-accessibility specifications.
	Essential (3)	Sustainable (4)	Currently, your public service is compatible with some e-accessibility specs. Consider gradually consume data that is compatible to a larger amount of e-accessibility specifications
	Sustainable (4)	Seamless (5)	Currently, your public service is compatible with major e-accessibility specs. Consider consume data that is compatible with the e-accessibility specs listed in the ELIS.
C10. Please indicate how your public service handles the alignment of the consumed data, information and knowledge from other public services.	Ad hoc (1)	Sustainable (4)	Currently, your public service does not handle the alignment of the consumed data. Consider semantically aligning the consumed data through the use of semantic agreements and standards to enhance the semantic behavioural interoperability of your public service.
	Sustainable (4)	Seamless (5)	Currently, the consumption of data from your public service is semantically aligned through the use of specific semantic agreements. Consider semantically aligning the consumed data through the use of recommended semantic agreements and standards to enhance the semantic behavioural interoperability of your public service.

C11. Please indicate how your public service leverages semantically aligned data.	Ad hoc (1)	Sustainable (4)	Currently, leveraging the data is an ad-hoc manual process. Consider gradually leveraging the data automatically to enhance the semantic behavioural interoperability of your service.
	Sustainable (4)	Seamless (5)	Currently, some of the consumed data are semantically aligned automatically and some manually. Consider leveraging the data automatically to enhance the semantic behavioural interoperability of your service.
C12. Are there semantic agreements (controlled vocabularies, code lists, …) in place with other public services for the consumption of reference data?	Ad hoc (1)	Essential (3)	Currently, reference data is being interpreted ad-hoc. Consider using semantic agreements with other public services for the consumption of reference data to enhance the semantic behavioural interoperability of your service.
	Essential (3)	Sustainable (4)	Currently, there are specific agreements in place with the other public services (common vocabs, ontologies, etc.) for the consumption of reference data. Consider using recommended vocabularies or taxonomies at EU level for the consumption of reference data to enhance the semantic behavioural interoperability of your service.
	Sustainable (4)	Seamless (5)	Currently, recommended vocabularies or taxonomies at EU level are used in the semantic agreements. Consider handle reference data via the semantic interoperability listed in ELIS to enhance the semantic behavioural interoperability of your service.
C13. To what extent does the public service discover open public data?	Ad hoc (1)	Sustainable (4)	Currently, your public service only consumes data collected by the public service itself. Consider discovering open data through data portals or data catalogues to enhance the semantic interoperability.

	Sustainable (4)	Seamless (5)	Currently, your public service consumes open public data from other services at a national level. Consider enabling the consumption of open public data from an open data catalogue at a trans-EU level. The greater the consumption and reusability of open data the better for establishing smooth interoperation among public services.
C14. What proportion of the consumed data is being discovered?	Ad hoc (1)	Sustainable (4)	Currently, your public service only consumes data collected by the public service itself. Consider enabling the discoverability of the published data to enhance the semantic behavioural interoperability of your service
	Sustainable (4)	Seamless (5)	Currently, less than half of the consumed data is being discovered. Consider discovering a greater proportion of the consumed data to enhance the semantic behavioural interoperability of your service.
C15. What proportion of the data that your public service consumes is semantically aligned with data coming from other MS?	Ad hoc (1)	Sustainable (4)	Your public service does not consume semantically aligned data from other MS. You may consider, if applicable and as deemed necessary, to consume datasets coming from other MS to achieve a level of reusability of data.
	Sustainable (4)	Seamless (5)	Currently, less than half of the total data consumed by your public service comes from other MS. Consider consuming more data coming from other MS to improve the semantic interoperability level of your public service.