

# **Interoperability Maturity Model**

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## **IMM Full Questionnaire**

12 February 2016

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# 1 Questionnaire

## 1.1 Service Context (A)

### 1.1.1 Questions

| A.1                   |   |
|-----------------------|---|
| <i>Name</i>           | Contact details   |
| <i>Question type</i>  | Open (three fields; format check on phone number / e-mail address)        |
| <i>Rationale</i>      | Gather contact information for eventual follow-up.                        |
| <i>Question</i>       | Please provide your name and contact details (telephone, e-mail address). |
| <i>Question logic</i> | Next question   |

| A.2                  |  |
|----------------------|--|
| <i>Name</i>          | Public service description   |
| <i>Question type</i> | Open   |
| <i>Rationale</i>     | Gain insight into the public service the administration provides.  |
| <i>Question</i>      | <p>A public service is a service rendered in the public interest. What is the public service you provide to end users (either citizens, businesses or other public administrations)?</p> <p>Use the following criteria to define the public service:</p> <ul style="list-style-type: none"><li>• Define the <b>process and underlying activities</b> to define the public service. The public service always contains three main elements (1. initiation, 2. processing and 3. delivery of an outcome). Focus on the public decision that is the outcome of the service. If there is no public decision and/or outcome, focus on the benefits the service provides to the target audience.</li><li>• Define the <b>owner</b> of the public service (see also question A.3). A public service has typically one owner that is responsible for the outcomes of the public services. If more owners are defined – this probably will lead to the definition of multiple public services.</li><li>• Define the <b>appearance</b> of the public service. How does the public service delivers the outcome towards the end user group? Is this a fully digital process or are manual interactions required (e.g. physical counter, etc.)? Note that IMM addresses both forms.</li><li>• The public services offers benefits and an outcome towards a <b>single end user group</b>. If the service encompasses multiple</li></ul> |

|                       |  |
|-----------------------|--|
|                       | benefits and addresses multiple end user groups, narrow down the scope of the public service to ensure the situation applies to a single, clearly delimited public service only. Please note there are situations in which the public service delivers the outcome not directly towards an end-user group but towards other IT systems. In this scenario we assume that the public service encompasses only machine-to-machine interfacing and that the service delivery component will not be filled in during the questionnaire. |
| <i>Examples</i>       | Submission of yearly tax income declaration for citizens (A2C); change of residence of a citizen (A2C); online information provisioning on relevant jobs to citizens (A2C); posting of vacancies on a job portal for businesses (A2B); providing information on the whereabouts of specific cargo to businesses (A2B); providing classification services towards other related administrations for ensuring international standardisation of patent data (A2A).  |
| <i>Question logic</i> | Next question  |

### A.3

|                       |  |
|-----------------------|--|
| <i>Name</i>           | Service owner  |
| <i>Question type</i>  | Open   |
| <i>Rationale</i>      | This question determines the scope / boundaries of the public administration providing the public service.       |
| <i>Question</i>       | Which public administration is primarily responsible for providing the public service?                           |
| <i>Examples</i>       | A tax administration; A department/unit within a tax administration; A Directorate-General (DG); A municipality. |
| <i>Question logic</i> | Next question  |

### A.4

|                       |  |
|-----------------------|--|
| <i>Name</i>           | End user group to which the service is delivered   |
| <i>Question type</i>  | Open   |
| <i>Rationale</i>      | Determine the primary end user group to which the public service is delivered.   |
| <i>Question</i>       | What is the primary end user group to which the public service is delivered?   |
| <i>Examples</i>       | A specific group of businesses; A specific group of citizens; A specific group of public administrations. Note: a mix of various types of end users (administrations, businesses, citizens) indicates that the public service definition of the public service is too broad. See also the explanations provided under A.2. |
| <i>Question logic</i> | Next question  |

## A.5

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

### 1.1.2 Maturity scoring

Maturity scoring is not applicable to this section.

## 1.2 Service Delivery (B)

### 1.2.1 Questions

| B.1            |  |
|----------------|--|
| Name           | Delivery channels  |
| Category       | Manifestation  |
| EIF-layer      | Technical interoperability   |
| Weight         | 0%   |
| Question type  | Multiple choice (>1 possible answer)   |
| Rationale      | Assesses through which channels the service is delivered towards the end user. This includes traditional (non-digital) and digital channels.   |
| Question       | <p>Through which delivery channels is the public service made available to the end user (<i>multiple answers are possible</i>)?</p> <p><i>Traditional</i></p> <ul style="list-style-type: none"><li>■ Counter / desk</li><li>■ Postal</li><li>■ Telephone</li></ul> <p><i>Digital</i></p> <ul style="list-style-type: none"><li>■ Dedicated application (<i>functionality that needs be installed on a device by the end user before it can be used. This includes apps from an online application store</i>)</li><li>■ Website and/or web portal (<i>functionality that is directly accessible for the end user via an Internet URL</i>)</li><li>■ Not applicable – the public service offers no direct delivery channel towards the end user</li></ul> |
| Examples       | Telephone only; Functionality that is only available via a dedicated application that needs to be installed via a software download; Functionality that is made available via a portal that provides access to a set of public services ( <a href="http://www.mijnrijksverheid.nl">www.mijnrijksverheid.nl</a> ); The service is made available via a dedicated website (unique to the public service); There is no direct delivery channel for the end user – the public service is delivered machine-to-machine only (for example a public services that provides information to another IT system).   |
| Question logic | If 'the following options are checked ('Dedicated application, Website / Portal') go to next question, else go to next area (C).   |
| B.2            |  |
| Name           | Device, platform and/or browser dependency   |
| Category       | Manifestation  |

|                       |  |
|-----------------------|--|
| <i>EIF-layer</i>      | Technical interoperability   |
| <i>Weight</i>         | 40%  |
| <i>Question type</i>  | Multiple choice (1 answer possible)  |
| <i>Rationale</i>      | Assesses whether the delivery channel is device / platform / browser independent.  |
| <i>Question</i>       | <p>Can the public service be accessed using multiple devices, platforms or browsers?</p> <ul style="list-style-type: none"> <li>■ No, the public service is offered for a single device, platform and/or browser</li> <li>■ Yes, the public service is offered for multiple but not all available devices, platform and/or browsers</li> <li>■ Yes, the public service is offered for all common available devices, platforms and/or browsers</li> </ul> |
| <i>Examples</i>       | <p>Yes, all common browsers, platforms and devices are supported to access the public service; no, only Internet Explorer 8 is supported.</p> <ul style="list-style-type: none"> <li>- Devices: PC; Tablet; Mobile Phone, ...</li> <li>- Platforms: Windows OS; Mac OS; Mobile OS, Android, iOS, ...</li> <li>- Browsers: Internet Explorer, Google Chrome; Firefox; Opera, ...</li> </ul>   |
| <i>Question logic</i> | Next question  |

### B.3

|                      |   |
|----------------------|---|
| <i>Name</i>          | Form pre-filling  |
| <i>Category</i>      | Manifestation   |
| <i>EIF-layer</i>     | Semantic interoperability; Technical interoperability   |
| <i>Weight</i>        | 40%   |
| <i>Question type</i> | Multiple choice (1 answer possible)   |
| <i>Rationale</i>     | Re-use of existing trustworthy data sources to pre-fill forms should be stimulated as it minimizes end user effort and reduces the risk for erroneous data entries.   |
| <i>Question</i>      | <p>Does the public service use pre-filling of forms?</p> <ul style="list-style-type: none"> <li>■ No</li> <li>■ Yes, pre-filling is used but only for some data fields that are electronically available</li> <li>■ Yes, pre-filling is used for all data fields that are electronically available</li> <li>■ Not applicable, the public service does not require the entry of user data</li> </ul> |
| <i>Examples</i>      | Existing internal or external base registries (or other data sources) are used for the pre-filling of forms so name and address data are  |

accurate. Pre-filling includes also the filling of drop-down boxes and/or auto-filling (automatic completion of key words).

*Question logic*

Next question

## B.4

|                       |   |
|-----------------------|---|
| <i>Name</i>           | Multilingualism   |
| <i>Category</i>       | Manifestation   |
| <i>EIF-layer</i>      | Organisational interoperability; Semantic interoperability; Technical interoperability  |
| <i>Weight</i>         | 10%   |
| <i>Question type</i>  | Multiple choice (1 answer possible)   |
| <i>Rationale</i>      | Multilingualism in the context of computing indicates that an application dynamically supports two or more languages.   |
| <i>Question</i>       | To what extent is multilingualism supported? <ul style="list-style-type: none"><li>■ Not at all</li><li>■ Partly, only the user interface is multilingual (two or more official EU languages supported)</li><li>■ Fully, the entire service (user interface, support documentation, technical specifications, etc.) as such is multilingual (two or more official EU languages supported)</li></ul> |
| <i>Examples</i>       | Multilingual support is provided for the user interface only; the entire service (user interface, functional & technical documentation, online- and offline support documentation, etc.) is made available to end users in three languages.   |
| <i>Question logic</i> | Next question   |

## B.5

|                      |   |
|----------------------|---|
| <i>Name</i>          | Cross-referencing   |
| <i>Category</i>      | Enabler   |
| <i>EIF-layer</i>     | Organisational interoperability; Technical interoperability   |
| <i>Weight</i>        | 5%  |
| <i>Question type</i> | Multiple choice (1 answer possible)   |
| <i>Rationale</i>     | Promoting other related (public) services can contribute to the overall use of (digital) public services. Public services that reference towards related (public) services therefore contribute to greater interoperability.                                      |
| <i>Question</i>      | Does the public service promote the usage of its own or other (public) services through linking to/interlinking with other web sites? <ul style="list-style-type: none"><li>■ No</li><li>■ Yes, the public service is being referenced from other sites</li></ul> |



|                       |  |
|-----------------------|--|
|                       | <ul style="list-style-type: none"> <li>■ Yes, the public service is referencing to other sites offering related public services</li> <li>■ Yes, the public service is being referenced from other sites and the public service is referencing to other sites offering related public services</li> </ul> |
| <i>Examples</i>       | The service implements the organization-wide policy to link towards other public services (for example to deliver services relating to a life event). Links are typically made available via banners on the website of related public services.  |
| <i>Question logic</i> | Next question  |

## B.6

|                       |  |
|-----------------------|--|
| <i>Name</i>           | Service Catalogue  |
| <i>Category</i>       | Enabler  |
| <i>EIF-layer</i>      | Organisational interoperability; Semantic interoperability; Technical interoperability   |
| <i>Weight</i>         | 5%   |
| <i>Question type</i>  | Multiple choice (1 answer possible)  |
| <i>Rationale</i>      | Providing detailed information on the availability of the public service is an enabler for the usage by citizens, business and administrations. Note that what is meant here by service catalogue is a catalogue overarching various organizations (e.g. across several administrations or a national catalogue of public services). |
| <i>Question</i>       | <p>Is the public service that is being delivered part of a service catalogue?</p> <ul style="list-style-type: none"> <li>■ No, even though there is a Service Catalogue in place</li> <li>■ No, because there is no Service Catalogue available</li> <li>■ Yes, the public service is included in the Service Catalogue</li> </ul>   |
| <i>Examples</i>       | The public service is displayed on a government portal that holds a full repository of all public services offered to citizens, to increase the awareness and usage of the public service.   |
| <i>Question logic</i> | Next question.   |

## 1.2.2 Maturity scoring

The overall weighting of this area towards the total maturity score is 25%. Note that in the scenario Service Delivery is not applicable, the interoperability score for the public service will be calculated based on the scorings within the other interoperability areas.

|     | Ad hoc (1)  | Opportunistic (2) | Essential (3)   | Sustainable (4)   | Seamless (5)  |
|-----|---|-------------------|---|---|---|
| B.1 | No Score  |                   |   |   |   |
| B.2 | Single Device/<br>platform/<br>browser                            |                   | Multiple<br>Devices,<br>platforms,<br>browsers  |   | All common<br>available<br>devices,<br>platforms,<br>browsers   |
| B.3 | No pre-filling  |                   | Partial pre-<br>felling   |   | Full pre-filling or<br>Not Applicable   |
| B.4 | Not at all  |                   | Partly, only the<br>user interface is<br>multilingual   |   | Fully, the entire<br>service as such<br>is multilingual   |
| B.5 | No  |                   | Yes, the public<br>service is<br>referencing to<br>other sites<br>offering related<br>public services | Yes, the public<br>service is being<br>referenced from<br>other sites | Yes, the public<br>service is being<br>referenced from<br>other sites and<br>the public<br>service is<br>referencing to<br>other sites<br>offering related<br>public services |
| B.6 | No, even<br>though there is<br>a Service<br>Catalogue in<br>place |                   | No, because<br>there is no<br>Service<br>Catalogue<br>available.                                      |   | Yes, the service<br>is included in<br>the Service<br>Catalogue  |

Table 1 Scoring table: Service Delivery (B)

## 1.3 Service Consumption (C)

### 1.3.1 Questions

| C.1                  |   |
|----------------------|---|
| <i>Name</i>          | Landscaping Service Consumption   |
| <i>Question type</i> | Multiple choice (>1 answer possible, including own-defined options)   |
| <i>Rationale</i>     | Gain insight into the services that the public service currently consumes.  |
| <i>Question</i>      | <p>Please list the services which the public service has to consume in order to work:</p> <ul style="list-style-type: none"><li>■ First, indicate for the below generic services if these are required (note that this is an indicative list)</li><li>■ Second, add specific services which are specific to the public service and required by it in order to work.</li></ul> <p><i>Important note:</i> Please list both services that are consumed from within the administration (internally<sup>1</sup>) and from a third party (externally<sup>2</sup>). Please list both manually and digitally consumed services.</p> <p><i>Generic services (indicative list – select applicable ones):</i></p> <ul style="list-style-type: none"><li>■ Authentication Service</li><li>■ eSignature Service</li><li>■ ePayment Service</li><li>■ Messaging Service</li><li>■ Audio-visual Service</li><li>■ Data Transformation Service</li><li>■ Data Validation Service</li><li>■ Machine Translation Service</li><li>■ Data Exchange Service</li><li>■ Business Analytics Service</li><li>■ Business Reporting Service</li><li>■ Forms Management Service</li></ul> |

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<sup>1</sup> The public administration providing the service is referred to in the questionnaire as the internal domain. This internal domain is only relevant for Attributes C.1 and C.2 as these attributes look both into the internal and external domain.

<sup>2</sup> Exchanges with actors who decide, implement and/or execute independently from the public administration are referred to as the external domain. The scope of Attributes C.3 onwards is solely this external domain. As from this Attribute, internal consumption is not relevant in the context of the IMM.

- Records Management Service
- Document Management Service
- Content Management Service
- Access Management Service
- Logging Service
- Audit Service
- Metadata Management Service
- Networking Service
- Hosting Service
- Storage Service
- Base registry information source

**Secondly:** Please name any relevant specific services that are required by your public service in order to function.

*Again: Please include both services that are consumed from within the administration (internally) and from a third party (externally). Please include both manually and digitally consumed services.*

- [Open Text Field]

*Examples*

See above

*Question logic*

Next question

## C.2

|                       |   |
|-----------------------|---|
| <i>Name</i>           | Manual or digitally consumption of services   |
| <i>Weight</i>         | If the answer is 'consumed manually' the entire consumed service is seen as 'Opportunistic' (maturity level 2). For digital services the maturity is calculated based on questions C.3 or C.4 to C.11.  |
| <i>Question type</i>  | Multiple choice (1 answer possible) for each selected / indicated services in question C.1  |
| <i>Rationale</i>      | Gain insight into how the service is being consumed.  |
| <i>Question</i>       | How do you currently consume the service (manually versus digitally)? <ul style="list-style-type: none"> <li>■ Consumed manually</li> <li>■ Consumed digitally</li> </ul>   |
| <i>Examples</i>       | An example of electronic consumption is the tax administration digitally fetching data from the Citizen Base Register. An example for manual consumption is filling in a paper-based form at the counter of a city council officer to request a change. |
| <i>Question logic</i> | For each externally consumed service. Next question.  |

### C.3

|                       |  |
|-----------------------|--|
| <i>Name</i>           | Reusing or producing of services   |
| <i>Category</i>       | Manifestation  |
| <i>EIF-layer</i>      | Technical interoperability   |
| <i>Weight</i>         | 0% (if the answer is 'Reuse) or 100% (if the answer is not). If the answer is 'Produce (develop) the service, while reuse is possible' the entire service is seen as 'Ad hoc' (maturity level 1). If the answer is 'Produce (develop) the service, because there is no fit-for-purpose service to reuse' this service is not taken into account for the maturity scoring.  |
| <i>Question type</i>  | Multiple choice (1 answer possible) for each selected 'digital service'  |
| <i>Rationale</i>      | Specify how the service is being consumed (reuse versus produce). Producing a service, while a service is available externally for reuse is considered less interoperable as it implies that the public service has "reinvented the wheel".  |
| <i>Question</i>       | Does the public service reuse or self-produce consumed services? (Reuse of relevant existing services vs Self Production of services)? <ul style="list-style-type: none"><li>■ Self-produce the service, while relevant services are available for reuse</li><li>■ Self-produce the service, because there is no fit-for-purpose service to reuse</li><li>■ Reuse of an existing service</li></ul>   |
| <i>Examples</i>       | <p>The public administration uses Google Translate (external services) as a translation service for her web portal (reuse)</p> <p>The identity and access management (IAM) service is developed and delivered by the administration itself while there is an institutionalized IAM-standard to use within the country of residence. This is seen as non-compliance (produce, while reuse is possible)</p> <p>The Tax administration holds valuable data within their own organization to perform fraud analysis. This type of data is not available externally (produce, no fit-for-purpose service to reuse).</p> |
| <i>Question logic</i> | For each listed consumed service. Next question.   |

### C.4

|                      |                                     |
|----------------------|-------------------------------------|
| <i>Name</i>          | Processing mode                     |
| <i>Category</i>      | Manifestation                       |
| <i>EIF-layer</i>     | Technical interoperability          |
| <i>Weight</i>        | 10%                                 |
| <i>Question type</i> | Multiple choice (1 answer possible) |

|                       |  |
|-----------------------|--|
| <i>Rationale</i>      | There are two types of processing modes: real-time or batch processing mode (initiated per unit of time: daily, 4 times a day, etc.).  |
| <i>Question</i>       | <p>What is the processing mode of the consumed service?</p> <ul style="list-style-type: none"> <li>■ Batch processing only whilst real-time could be an option</li> <li>■ Batch processing only due to legal, technical or other constraints</li> <li>■ Both processing modes are supported</li> <li>■ Fully real-time processing</li> </ul>           |
| <i>Examples</i>       | The social security office collects new data from a citizen's base registry every week. Citizen data is update via a batch process to ensure the correct data is in place. However, if other transaction occur during the weeks the timeframe this could lead to undesirable results. Real-time processing would prevent inconsistencies and/or fraud. |
| <i>Question logic</i> | For each externally, digitally consumed service. Next question.  |

| C.5                   |   |
|-----------------------|---|
| <i>Name</i>           | Push-pull mechanisms  |
| <i>Category</i>       | Manifestation   |
| <i>EIF-layer</i>      | Technical interoperability  |
| <i>Weight</i>         | 10%   |
| <i>Question type</i>  | Multiple choice (1 answer possible)   |
| <i>Rationale</i>      | The interaction mode depends on the specific context of the public service. Push consumption refers to the public service receiving automatic updates (e.g. of data) or triggers (for executing a process for example). Push consumption or having both mechanisms in place are considered more mature as these demonstrate that the public service seamlessly interconnects with the services it is consuming. |
| <i>Question</i>       | <p>What is the interaction mode with the consumed service?</p> <ul style="list-style-type: none"> <li>■ Pull only, whilst push could be added</li> <li>■ Pull only, due to legal, or other constraints</li> <li>■ Push only whilst pull could be added</li> <li>■ Push only due to legal or other constraints</li> <li>■ Both mechanisms (push and pull) are being used</li> </ul>                              |
| <i>Examples</i>       | The public service receives automatic updates from the base registry for income details (push interaction mode). Information is queried when required for pre-filling forms (pull interaction mode).  |
| <i>Question logic</i> | For each externally, digitally consumed service. Next question.   |

## C.6

|                       |  |
|-----------------------|--|
| <i>Name</i>           | Common protocol usage  |
| <i>Category</i>       | Manifestation  |
| <i>EIF-layer</i>      | Technical interoperability   |
| <i>Weight</i>         | 20%  |
| <i>Question type</i>  | Multiple choice (1 answer possible)  |
| <i>Rationale</i>      | Usage of existing protocol specifications implies a higher interoperability than developing a dedicated protocol.  |
| <i>Question</i>       | <p>What type of protocol specification is being used for exchanging information? The protocol specifies the dialog not the content of the messages.</p> <ul style="list-style-type: none"><li>■ Proprietary protocol specification</li><li>■ Common protocol specification</li></ul> |
| <i>Examples</i>       | A specific / unique API is considered as proprietary; the public service reuses existing SOAP (or REST) protocols (which are considered as common).  |
| <i>Question logic</i> | For each externally, digitally consumed service. Next question.  |

## C.7

|                      |   |
|----------------------|---|
| <i>Name</i>          | Reuse of network infrastructure   |
| <i>Category</i>      | Manifestation   |
| <i>EIF-layer</i>     | Technical interoperability  |
| <i>Weight</i>        | 10%   |
| <i>Question type</i> | Multiple choice (1 answer possible)   |
| <i>Rationale</i>     | Reuse of existing network infrastructure rather than using a private network indicates higher interoperability.   |
| <i>Question</i>      | <p>Is the service consumed via an existing network infrastructure or a dedicated, private network?</p> <ul style="list-style-type: none"><li>■ The service is consumed via a new dedicate private network whilst it could leverage on an existing network infrastructure or the Internet</li><li>■ The service is consumed via a new dedicated private network due to security or other specific concerns</li><li>■ The service is consumed via an existing private network (e.g. sTesta)</li><li>■ The service is consumed using the publicly available Internet</li></ul> |
| <i>Examples</i>      | Examples comprise the reuse of existing network infrastructure within the EU such as sTesta, leverage of the Internet for accessing public services or building a new dedicated network infrastructure with the help of dedicated networking lines between administrations.   |

Question logic

For each externally, digitally consumed service. Next question.

## C.8

|                       |  |
|-----------------------|--|
| <i>Name</i>           | Semantic alignment   |
| <i>Category</i>       | Manifestation  |
| <i>EIF-layer</i>      | Semantic interoperability  |
| <i>Weight</i>         | 20%  |
| <i>Question type</i>  | Multiple choice (1 answer possible)  |
| <i>Rationale</i>      | Use of existing semantic standards and specifications (e.g. data models standards, standardised XML schemata, metadata standards, standardised reference data (e.g. code lists)) is considered more interoperable than developing proprietary standards.   |
| <i>Question</i>       | <p>To what extent are semantic standards and specifications used for data modelling of the data exchange between the public service and consumed services?</p> <ul style="list-style-type: none"><li>■ The data models have been created for the public service without using any existing semantic standards or specifications</li><li>■ Some proprietary semantic standards and specifications are used for creation of the data model</li><li>■ The whole development of the data models are based on existing (open) semantic standards and specifications</li></ul> |
| <i>Examples</i>       | Common XML-based standards are used widely in the service domain and are also used for provisioning the service; a unique data model is developed specifically for this service consumption.   |
| <i>Question logic</i> | For each externally, digitally consumed service. Next question.  |

## C.9

|                      |   |
|----------------------|---|
| <i>Name</i>          | Exception handling  |
| <i>Category</i>      | Manifestation   |
| <i>EIF-layer</i>     | Semantic interoperability   |
| <i>Weight</i>        | 10%   |
| <i>Question type</i> | Multiple choice (1 answer possible)   |
| <i>Rationale</i>     | Received information may be inconsistent with internal information. Initiated transactions may lead to an unexpected response. The way in which these exceptions are handled determine the level of interoperability. |
| <i>Question</i>      | <p>How are exceptions resolved?</p> <ul style="list-style-type: none"><li>■ Fully manually</li><li>■ Semi-automated</li></ul>   |



|                       |   |
|-----------------------|---|
|                       | <ul style="list-style-type: none"> <li>■ Fully automated</li> </ul>   |
| <i>Examples</i>       | The public service has no routines to handle exceptions automatically – all anomalies are processed manually by the back office; around 80% of the exceptions are resolved automatically – the remaining 20% are still processed manually by staff (semi-automatic); all exception are processed manually – no manual intervention is required (fully automated). |
| <i>Question logic</i> | For each externally, digitally consumed service. Next question.   |

## C.10

|                       |  |
|-----------------------|--|
| <i>Name</i>           | Certification  |
| <i>Category</i>       | Enabler  |
| <i>EIF-layer</i>      | Organisational interoperability  |
| <i>Weight</i>         | 10%  |
| <i>Question type</i>  | Multiple choice (1 answer possible)  |
| <i>Rationale</i>      | Certification is a success factor for ensuring working interconnections. A public service which applies for formal certification when available is considered more interoperable. Certification is a formal procedure to verify if a constituency meets the prerequisites to connect to a service. Certification may examine areas like: security, governance, technological and semantic interoperability and availability. |
| <i>Question</i>       | <p>Has the public service followed the certification procedure to consume the service?</p> <ul style="list-style-type: none"> <li>■ No, while a certification procedure is available</li> <li>■ No, there is no certification procedure available</li> <li>■ Yes</li> </ul>  |
| <i>Examples</i>       | No, although there is a separate test environment made available to test the interconnection with other systems, acceptance testing is not conducted for certification purposes; Yes, the public service has been certified conform to connection criteria.  |
| <i>Question logic</i> | For each externally, digitally consumed service. Next question.  |

## C.11

|                      |                                     |
|----------------------|-------------------------------------|
| <i>Name</i>          | Specification process               |
| <i>Category</i>      | Enabler                             |
| <i>EIF-layer</i>     | Organisational interoperability     |
| <i>Weight</i>        | 10%                                 |
| <i>Question type</i> | Multiple choice (1 answer possible) |

|                       |  |
|-----------------------|--|
| <i>Rationale</i>      | An open process to establish specifications is likely to yield more interoperable results.   |
| <i>Question</i>       | Has the public service been involved in establishing the specifications of the consumed functional service? <ul style="list-style-type: none"> <li>■ No, although this would have been possible</li> <li>■ No, this was not possible</li> <li>■ Yes</li> </ul> |
| <i>Examples</i>       | There is a dedicated forum which is accessible for everybody to post ideas and participate in discussions around the public service; administrations and businesses first need to be invited to join the specification process ( <i>semi-open</i> ).           |
| <i>Question logic</i> | For each externally, digitally consumed service. Next question.  |

### 1.3.2 Maturity scoring

The overall weighting of this area towards the total maturity score is 40%.

| Question                | Ad hoc   | Opportunistic   | Essential  | Sustainable                          | Seamless  |
|-------------------------|--|---|--|--------------------------------------|---|
| <b>C.1-C.2<br/>-C.3</b> | Produce (develop) the service, while reuse is possible or Manual consumption | Digital reuse:<br>Scoring outcome dependent on C.4-C.11 |  |                                      |   |
| <b>C.4</b>              |  | Batch processing while real-time could be an option     | Batch processing only due to legal, technical or other constraints | Both processing modes are supported  | Fully real-time processing  |
| <b>C.5</b>              |  | Pull only, whilst push could be added                   | Pull only, due to legal, or other constraints                      | Push only whilst pull could be added | Push only due to legal or other constraints, both mechanisms are used |
| <b>C.6</b>              |  |   | Proprietary protocol specification                                 |                                      | Common protocol specification   |

|             |  |   |  |   |   |
|-------------|--|---|--|---|---|
| <b>C.7</b>  |  | The service is consumed via a new dedicate private network whilst it could leverage on an existing network infrastructure or the Internet | The service is consumed via a new dedicated private network due to security or other specific concerns | The service is consumed via an existing private network (e.g. sTesta) | The service is consumed using the publicly available Internet   |
| <b>C.8</b>  |  | All data models were created for the service without using any existing semantic standards  | Some proprietary semantic standards are used   |   | The whole development of the data model is based on open non-proprietary standards and specifications |
| <b>C.9</b>  |  | Fully manually  | Semi-automated   |   | Fully automated   |
| <b>C.10</b> |  | No, while a certification procedure is available  | No, there is no certification procedure available  |   | Yes, certification  |
| <b>C.11</b> |  | No, although this would have been possible  | No, this was not possible  |   | Yes   |

**Table 2** Scoring table: Service consumption (C)

## 1.4 Service Management (D)

### 1.4.1 Questions

These questions apply only if service consumption has been identified in section C.

| D.1                   |   |
|-----------------------|---|
| <i>Name</i>           | Cost-Benefit Analysis   |
| <i>Category</i>       | Enabler   |
| <i>EIF-layer</i>      | Organisational interoperability   |
| <i>Weight</i>         | 10%   |
| <i>Question type</i>  | Elementary attribute  |
| <i>Rationale</i>      | While designing the public service, a cost-benefit analysis should be made to get a deep insight into the benefits and cost reduction possibilities of a highly interoperable public service compared to proprietary development.   |
| <i>Question</i>       | <p>Has the public service been evaluated in terms of its cost and benefits before deciding on whether/how it should be implemented (e.g. through conducting an ex ante Business Case)?</p> <ul style="list-style-type: none"> <li>■ No, cost and benefits of the public service are not identified</li> <li>■ Yes, cost and benefits of the public service were detailed based on a common business case approach (e.g. cost-benefit analysis, total cost of ownership calculation)</li> <li>■ Yes, cost and benefits of the public service were detailed based on a common business case approach. In addition multiple scenarios (e.g. proprietary solution versus reuse) were compared with each other to better understand the cost and benefits of increased interoperability</li> </ul> |
| <i>Examples</i>       | No, the public service has not been evaluated in terms of its cost and benefits. Yes, the public service has made an inventory of all cost categories but did not detail the impact of interoperability.  |
| <i>Question logic</i> | Next question   |

| D.2                  |   |
|----------------------|---|
| <i>Name</i>          | Service Provisioning  |
| <i>Category</i>      | Manifestation   |
| <i>EIF-layer</i>     | Organisational interoperability; Technical interoperability |
| <i>Weight</i>        | 25%   |
| <i>Question type</i> | Elementary attribute  |

|                       |   |
|-----------------------|---|
| <i>Rationale</i>      | Public services that provide digital services for reuse towards other administrations and/or business contribute proactively towards a higher interoperability in the public domain.  |
| <i>Question</i>       | Does your public service provide services towards the external environment for reuse? <ul style="list-style-type: none"> <li>■ The public service makes no services available towards the external environment, while this would be possible</li> <li>■ The public service makes no services available towards the external environment due to constraints</li> <li>■ The public service makes some services available towards the external environment</li> <li>■ The public service makes available all services towards the external environment.</li> </ul> |
| <i>Examples</i>       | The public service offers a currency conversion service to external users.  |
| <i>Question logic</i> | Next question   |

### D.3

|                       |  |
|-----------------------|--|
| <i>Name</i>           | Procurement criteria   |
| <i>Category</i>       | Enabler  |
| <i>EIF-layer</i>      | Organisational interoperability; Technical interoperability  |
| <i>Weight</i>         | 5%   |
| <i>Question type</i>  | Elementary attribute   |
| <i>Rationale</i>      | A strong focus on certain procurement criteria can contribute to a high interoperability by avoiding common pitfalls and ensuring that services are only procured and/or developed when not available from other administrations or businesses.      |
| <i>Question</i>       | Has standardization been a procurement criterion when procuring the service's components? <ul style="list-style-type: none"> <li>■ No</li> <li>■ Yes, however not enforced sufficiently</li> <li>■ Yes, and enforced to ensure compliance</li> </ul> |
| <i>Examples</i>       | There is no set of specific procurement criteria. Yes, procurement criteria have been detailed but not been enforced.  |
| <i>Question logic</i> | Next question  |

### D.4

|                  |   |
|------------------|---|
| <i>Name</i>      | Central point of control                                    |
| <i>Category</i>  | Manifestation   |
| <i>EIF-layer</i> | Organisational interoperability; Technical interoperability |

|                       |   |
|-----------------------|---|
| <i>Weight</i>         | 10%   |
| <i>Question type</i>  | Elementary attribute  |
| <i>Rationale</i>      | A central point of control facilitates the choreography of external services and provides a single source of intelligence regarding the status of individual cases.   |
| <i>Question</i>       | <p>Does the public service feature a central point of control for choreography of externally consumed and provided services? The central point of control keeps track of all related information regarding the status of the individual cases currently active within the public service.</p> <ul style="list-style-type: none"> <li>■ No</li> <li>■ No, this is decentralized or not considered relevant</li> <li>■ Yes</li> </ul> |
| <i>Examples</i>       | All external transactions are coordinated with the help of a central point of control – status information is always centrally available; there is no central point of control in place to monitor the status of a public transaction – this is a decentralized process and information is to be provided on request.   |
| <i>Question logic</i> | Next question   |

## D.5

|                      |  |
|----------------------|--|
| <i>Name</i>          | Level of automation of the choreography  |
| <i>Category</i>      | Manifestation  |
| <i>EIF-layer</i>     | Technical interoperability   |
| <i>Weight</i>        | 10%  |
| <i>Question type</i> | Elementary attribute   |
| <i>Rationale</i>     | Automation of the choreography facilitates a rapid and seamless interaction between the public service and the consumed and provisioned services.  |
| <i>Question</i>      | <p>To what extent is the choreography automated?</p> <ul style="list-style-type: none"> <li>■ Fully manual (<i>all transactions are handled manually</i>) choreography</li> <li>■ Semi-automated (<i>a part of the service choreography relies on manual interference</i>)</li> <li>■ Fully automated (<i>no manual interference is required</i>) choreography</li> </ul>                              |
| <i>Examples</i>      | Service choreography is manual or semi-automated when the required orchestration requires (some) manual interaction. A public service is considered fully automated when all required service transactions are tracked automatically and no manual interference is required. Note that this question does not address the topic of exception handling. The service choreography can be fully automated |

(applying to all transactions) but still manual intervention can be required for certain exceptions or errors (this is discussed under the topic exception handling).

*Question logic*

Next question

## D.6

|                       |  |
|-----------------------|--|
| <i>Name</i>           | Status information   |
| <i>Category</i>       | Manifestation  |
| <i>EIF-layer</i>      | Semantic interoperability; Technical interoperability  |
| <i>Weight</i>         | 5%   |
| <i>Question type</i>  | Elementary attribute   |
| <i>Rationale</i>      | Sending status information indicates that the service is seamlessly interacting with other services.   |
| <i>Question</i>       | Does the public service share status information on the cases handled with external services? <ul style="list-style-type: none"><li>■ No status information shared</li><li>■ Yes, with some services</li><li>■ Yes, systematically with all services</li></ul> |
| <i>Examples</i>       | The service sends up-to-date information on the status of individual cases handled through to the service owners with which it has either a consumption or provisioning relationship.  |
| <i>Question logic</i> | Next question  |

## D.7

|                      |  |
|----------------------|--|
| <i>Name</i>          | Business process definitions and rules   |
| <i>Category</i>      | Enabler  |
| <i>EIF-layer</i>     | Organisational interoperability  |
| <i>Weight</i>        | 5%   |
| <i>Question type</i> | Elementary attribute   |
| <i>Rationale</i>     | Business process definitions and rules are the basis for day-to-day collaboration, providing actionable directives that govern the service's interactions with the other services.   |
| <i>Question</i>      | Does the service establish business process definitions (to describe the source and target processes of the exchange) and/or business process control rules (e.g. rules for process control, validation, quality control, tracking and tracing) jointly with the orchestrated services? <ul style="list-style-type: none"><li>■ No, processes are not modelled</li><li>■ No, even though processes are modelled</li><li>■ Yes, in some cases</li></ul> |

|                       |  |
|-----------------------|--|
|                       | <ul style="list-style-type: none"> <li>■ Yes, systematically with all services</li> </ul>  |
| <i>Examples</i>       | The collaboration business rules describe and regulate how the interoperation should take place and how the communication between service owners is established by e.g. harmonizing workflow definitions and procedures around responsibility & liability, communication and usage monitoring. |
| <i>Question logic</i> | Next question  |

## D.8

|                       |   |
|-----------------------|---|
| <i>Name</i>           | Business Process Management standards   |
| <i>Category</i>       | Manifestation   |
| <i>EIF-layer</i>      | Organisational interoperability   |
| <i>Weight</i>         | 5%  |
| <i>Question type</i>  | Elementary attribute  |
| <i>Rationale</i>      | Business Process Management standards are (open) standards and specifications used to model and execute business processes, ideally in an interoperable manner.   |
| <i>Question</i>       | <p>To what extent are Business Process Management (BPM) standards applied to the orchestration of the public service?</p> <ul style="list-style-type: none"> <li>■ Business processes are not modelled at all</li> <li>■ Business processes are modelled and executed on a proprietary basis</li> <li>■ Business processes are modelled and executed using BPM standards</li> </ul> |
| <i>Examples</i>       | Examples of prominent standards are Business Process Modelling Notation (BPMN) 2.0, Web Services Business Process Execution Language (WS-BPEL) 2.0 and XML Process Definition Language (XPDL) 2.1.  |
| <i>Question logic</i> | Next question   |

## D.9

|                      |  |
|----------------------|--|
| <i>Name</i>          | Architectural Framework  |
| <i>Category</i>      | Enabler  |
| <i>EIF-layer</i>     | Organisational interoperability, Technical interoperability  |
| <i>Weight</i>        | 5%   |
| <i>Question type</i> | Elementary attribute   |
| <i>Rationale</i>     | Using existing, common architectural frameworks ensures that the administration is leveraging best practices, avoids pitfalls and designs a public service that is interoperable with other public services and/or public service domains. |



|                       |   |
|-----------------------|---|
| <i>Question</i>       | Has the public service considered an architecture framework in its design (EU, national level, international (open) standard)? <ul style="list-style-type: none"> <li>■ No, although relevant frameworks are available</li> <li>■ No, there are no relevant frameworks available to consider</li> <li>■ Yes, one or multiple architecture frameworks are used</li> <li>■ Yes, one or multiple architecture frameworks are used and the compliance is ensured by independent audits</li> </ul> |
| <i>Examples</i>       | The public services is aligned with a set of frameworks on the European-level such as EIRA (European Interoperability Reference Architecture) or at a national level (such as NORA in The Netherlands).   |
| <i>Question logic</i> | Next question   |

## D.10

|                       |   |
|-----------------------|---|
| <i>Name</i>           | Architectural flexibility   |
| <i>Category</i>       | Enabler   |
| <i>EIF-layer</i>      | Technical interoperability  |
| <i>Weight</i>         | 10%   |
| <i>Question type</i>  | Elementary attribute  |
| <i>Rationale</i>      | Architectural flexibility enables greater interoperability by e.g. building functionalities as software components which can be reused for different purposes and loosely coupling services with operating systems and other technologies that underlie them.   |
| <i>Question</i>       | Has the service's architecture been designed in a way that it is flexible for future upgrades and/or interconnections with other services? <ul style="list-style-type: none"> <li>■ No, the architecture cannot be considered flexible</li> <li>■ The architecture allows for some flexibility</li> <li>■ Yes, the architecture is highly flexible</li> </ul> |
| <i>Examples</i>       | Highly configurable solutions typically incorporate a modular design approach (e.g. Service-Oriented-Architecture SOA) to enable flexibility and interoperability of services across multiple public administrations.   |
| <i>Question logic</i> | Next question   |

## D.11

|                  |   |
|------------------|---|
| <i>Name</i>      | Specification process                                   |
| <i>Category</i>  | Enabler   |
| <i>EIF-layer</i> | Legal interoperability; Organisational interoperability |

|                       |   |
|-----------------------|---|
| <i>Weight</i>         | 10%   |
| <i>Question type</i>  | Elementary attribute  |
| <i>Rationale</i>      | Providing an open process to establish specifications is likely to yield more interoperable results.  |
| <i>Question</i>       | <p>Has the public service established an (open) specification process in which administrations and businesses can participate?</p> <ul style="list-style-type: none"><li>■ No, the specification process is closed</li><li>■ Yes, participation upon invitation</li><li>■ Yes, open participation</li></ul> |
| <i>Examples</i>       | There is a dedicated forum which is accessible for everybody to post ideas and participate in discussions around the public service (fully open); administrations and businesses first need to be invited to join the specification process (semi-open).  |
| <i>Question logic</i> | Next question   |

## 1.4.2 Maturity scoring

The overall weighting of this area towards the total maturity score is 35%.

|      | Ad hoc (1)  | Opportunistic (2)                      | Essential (3)   | Sustainable (4)   | Seamless (5)  |
|------|---|--|---|---|---|
| D.1  | No, cost and benefits of the public service are not identified  |  | Yes, cost and benefits of the public service were detailed based on a common business case approach (e.g. cost-benefit analysis, total cost of ownership calculation) |   | Yes, cost and benefits of the public service were detailed based on a common business case approach. In addition multiple scenarios were compared |
| D.2  | The public service makes no services available towards the external environment, while this would be possible |  | The public service makes no services available towards the external environment due to constraints  | The public service makes some services available towards the external environment | The public service makes available all services towards the external environment  |
| D.3  | No  |  | Yes, however not enforced sufficiently  |   | Yes, and enforced to ensure compliance  |
| D.4  | No  |  | No, this is decentralized or not considered relevant  |   | Yes   |
| D.5  | Fully manual (all transactions are handled manually) choreography   |  | Semi-automated (a part of the service choreography relies on manual interference) choreography  |   | Fully automated (no manual interference is required) choreography   |
| D.6  | No status information shared  |  | Yes, with some services   |   | Yes, systematically with all services   |
| D.7  | No, processes are not modelled  | No, even though processes are modelled | Yes, in some cases  |   | Yes, systematically with all services   |
| D.8  | Business processes are not modelled at all  |  | Business processes are modelled and executed on a proprietary basis   |   | Business processes are modelled and executed using BPM standards  |
| D.9  | No, although relevant frameworks are available  |  | No, there are no relevant frameworks available to consider  | Yes, one or multiple architecture frameworks are used                             | Yes, one or multiple architecture frameworks are used - independent audits  |
| D.10 | No, the architecture cannot be considered flexible  |  | The architecture allows for some flexibility  |   | Yes, the architecture is highly flexible  |
| D.11 | No, the specification process is closed   |  |   | Yes, participation upon invitation  | Yes, open participation   |

**Table 3 Scoring table: Service Management (D)**