



DLV04.02- Analysis of interoperability challenges

Study on functional, technical and semantic interoperability requirements for the single digital gateway (SDG) implementation

23/11/2018

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Document characteristics

Property	Value
Release date	23/11/2018
Status:	Submitted for Review
Version:	6.0
Authors:	Everis
Reviewed by:	
Approved by:	

Document history

Version	Description	Date
v 1.0	Document submitted for review	19/07/2018
v 2.0	Document submitted for review	01/08/2018
v 3.0	Document submitted for review	03/09/2018
v 4.0	Document submitted for review	19/10/2018
v 5.0	Document submitted for review	15/11/2018
v 6.0	Final version	23/11/2018

1 Introduction

The present document, framed into the project "*Study on functional, technical and semantic interoperability requirements for the single digital gateway implementation*", is the second deliverable dealing with interoperability challenges, and aims at analysing situations where organisational, semantic or technical interoperability challenges may appear, and should be addressed, in the development and use of the Single Digital Gateway (SDG) IT tools¹.

The SDG will be aligned with the Regulation on the Single Digital Gateway, expected to be formally adopted on 24 October 2018. The Regulation aims at making it easier for EU citizens and businesses, who need to navigate regulatory and administrative requirements, to access the necessary information, procedures and assistance services online.

The purpose of the current document is to analyse the interoperability challenges that may appear in the development and use of the SDG IT tools. Building on the challenges identified in *DLV04.01- List of cases where interoperability challenges may occur*, the current document aims to further analyse each challenge by assessing the current and target situations and the corresponding interoperability gaps.

¹ See: DLV04.01- List of cases where interoperability challenges may occur

2 Methodology

For each of the challenges identified, a **four-step approach** has been followed; the process consisted in:

1. Identifying the current status (AS-IS situation);
2. Setting out the targeted situation expected by each envisaged SDG IT tool (TO-BE situation);
3. Assessing the existing gap between the AS-IS and TO-BE stage;
4. Providing recommendations to overcome the existing gap.

The challenges analysed include a transversal challenge – *Setting up a sound and efficient organisational model* – and two specific challenges – *Need for a common data model* and *Guarantee data exchange* –. *Annex II: Transversal challenge information matrix* and *Annex III: Specific challenges information matrix* present a more granular detail on the challenges analysed below.

2.1 AS-IS situation

In the context of the design, implementation and running of the SDG IT tools, it is crucial to understand how MSs are providing information about rights, obligations and rules, national administrative procedures, and assistance and problem solving services, both to their national and EU citizens and businesses.

Currently, MSs offer to citizens and businesses one stop shop portals; often also equipped with e-government functionalities. Each MS organises the provision of information either concentrated into one portal – e.g. the Estonian www.eesti.ee²–, or into two or three portals, topic-oriented – e.g. the Austrian www.help.gv.at³ for citizens and www.usp.gv.at⁴ for businesses–. These websites will be the main source of information that will feed most of the content of the SDG by enabling the functionalities of the different tools.

For each of the challenges identified in section 3, the AS-IS situation aims to provide an overview – based on desk research – of the current state of play of information or tools that the new SDG will benefit from or interact with.

2.2 TO-BE situation

The TO-BE describes the target scenario where the envisaged SDG IT tools run effectively and interoperability among different Service Providers is established. From a general perspective, the previous documentation delivered in the context of the current study outlines the TO-BE situation (e.g. business processes, architecture, functional and technical requirements).

In the context of the analysis of the interoperability challenges, for each challenge identified, the envisaged target situation is recalled.

² See: <https://www.eesti.ee/et/index.html>

³ See: www.help.gv.at

⁴ See: www.usp.gv.at

2.3 GAP Analysis and recommendations

The GAP analysis aims to bridge the AS-IS and TO-BE situations by identifying specific actions along with recommendations that should be considered in their implementation, in alignment with the best practices stemming from the European Interoperability Framework (EIF).

3 Analysis of challenges

This chapter includes an analysis of the interoperability challenges following the methodology introduced earlier.

3.1 Transversal challenge

3.1.1 Setting up a sound and efficient organisational model

The organisational model is the basis for the framework on how different authorities collaborate to guarantee the functioning of SDG.

3.1.1.1 AS-IS

MS already offer one or more one-stop-shop sectorial portals at national level that provide information to national and EU citizens on rights, obligations and procedures. As a result of the aforementioned sectorial nature of their underlying acts, the current provision of online information and assistance services together with online procedures for citizens and businesses remains very fragmented, leading to vertical organisational models (often presenting similarities in terms of parties cooperating – see Annex II) that do not interact with each other.

In organisational terms, one or more authorities, identified as national service providers and coordinated by a National Coordinator, manage such portals. They are organised according to needs and business processes defined at national level. In such context, and in order to guarantee that the IT tools designed for the SDG run successfully, Service Providers, that at national level administer the different websites, will have to be able to understand the business process and functioning of the SDG and then formalise the cooperation through agreements. The same organisational approach and agreements also applies to portals that exists at European level.

Next, some examples of relevant one-stop-shops offering online information, assistance service and access to procedures are briefly introduced in order to illustrate the AS-IS situation.

Your Europe portal

The purpose of “Your Europe” is to provide **information** to EU/EEA citizens and businesses on information on basic rights under EU law and how this EU law and rights are implemented in each MS. In this context, the main responsibilities of service providers at MS level are to continuously update national content as well as maintain access of working links to national government pages, and promote Your Europe at national level.

The main coordination body of this platform is the “Your Europe Editorial Board”. The mission of the Editorial Board is to coordinate the available content with MSs. As supporting activities for a successful coordination, the Editorial Board also (1) manages requests for assistance by EU/EEA citizens and businesses received through “Your Europe”; (2) organises meetings with MS and Service providers; and (3) monitors the traffic from government pages to Your Europe and promotional activity requested by members of the Editorial Board.

In the “Single Market Scoreboard” performance indicators measure the involvement of MS and compliance with their commitments⁵.

EUGO Network of Points of Single Contact

The purpose of the Points of Single Contact is to support service providers who want to offer their services in another MS. Each MS has created a PSC, based on a national website, where **information** can be found on all aspects of doing business in that country as a service provider as well as **access to online procedures**. The EUGO network was created to support the PSCs in their work and to coordinate common activities and actions.

In order to stimulate smooth cooperation between the national authorities providing information on the different webpages that are part of the PSC, some MSs have established fixed structures for cooperation, such as working groups and regular meetings. In other MSs operating an effective PSC is problematic due to lack of cooperation between different government organisations and layers.⁶

According to the Services Directive, “where several authorities at regional or local level are competent, one of them may assume the role of point of single contact and coordinator. Points of single contact may be set up not only by administrative authorities but also by chambers of commerce or crafts, or by the professional organisations or private bodies to which a Member State decides to entrust that function”.

Other relevant information, assistance and problem solving services

Different contact points and problem solving services have been established on the basis of EU acts to help citizens and businesses to exercise their rights in the Single Market, namely:

Product Contact Points and Construction Product Contact Points were established with the objective to provide access product-specific technical rules, the National Assistance Centres for Professional Qualifications have the responsibility to assist professionals moving cross-border and the Health Contact Points settled with the aim of providing EU citizens equal access to quality healthcare helping citizens find out more about their patient rights and options.

Additionally, the European Commission provides an online platform, Online Dispute Resolution (ODR), to help resolve disputes with online customers to avoid the need to recur to the court. Another platform provided by European Commission is EURES (the European job mobility portal), and it helps jobseekers to move abroad by finding a job in Europe by providing a personalised service delivered through the EURES advisers, the EURES Job day’s events and the EURES helpdesk which consists of direct and personalized guidance with recruitment and labour mobility across Member States. In line with this, in 2016, the European Parliament and the Council have adopted a new EU Regulation⁷ to turn the EURES network into a more pro-active instrument, dealing more thoroughly with the cross-border job placement process by providing information and advice and performing job matching between job-seekers and available vacancies.

⁵See: http://ec.europa.eu/internal_market/scoreboard/performance_by_governance_tool/youreurope/index_en.htm

⁶ “The Performance of the Points of Single Contact – an assessment against the PSC Charter”. Eurochambres; Capgemini Consulting. 17 July 2017. <https://publications.europa.eu/en/publication-detail/-/publication/c6af2712-8423-4c50-be26-faa4d099ce8b>

⁷See: <https://publications.europa.eu/en/publication-detail/-/publication/a311abfd-0857-11e6-b713-01aa75ed71a1/language-en>

3.1.1.2 TO-BE

The current provision of online information and assistance services together with online procedures for citizens and businesses stills fragmented contributing for discrepancies in the availability of online information and procedures.

The target situation involves the (1) identification of existing/new parties and that (2) adequate organisational arrangements are put in place.

Next, a brief introduction to all the parties that will need to cooperate is provided as a summary (see Annex II for extended information).

- **EC & National coordinators;**
- **EC coordinating units & EC service providers;**
- **National coordinators & national service providers** (competent authorities);
- **SDG coordination group & governance structures of EU wide assistance and problem solving services** – where, among others best practices at national level and technical developments allowing further digitalisation in this regard should be discussed regularly in the gateway coordination group.; and
- **EC & users of the gateway.**

The parties involved need to align their business processes to enable the delivery of the services required by the SDG. Periodic or ad-hoc bilateral group meetings can occur to reach and maintain cooperation agreements between the participating parties at national and at commission level (e.g. by means of memorandum of understanding (MoUs) or Service Level Agreements (SLAs)), after having clarified and formalised the organisational relationships for establishing and operating SDG services.

Finally, interoperability agreements (concrete and binding documents which set out the precise obligations of two parties cooperating across an “interface” to achieve interoperability) have been formalised. The interoperability agreements could define a common approach for the structure of information and contents and about the specifications on how to send and make the data accessible and available through SDG. As stated in the proposal for Regulation regarding the different roles for the stakeholders involves throughout its different articles, a “gateway coordination group” is established.

3.1.1.3 GAP Analysis and recommendations

The actions and recommendations hereby proposed will have an impact on all the SDG IT tools.

Action	Recommendation
Identify representatives for the organisational model.	<ul style="list-style-type: none"> • Chart a sufficiently dimensioned governance structure that involves the right people • Definition of a coordination group to monitor that all the requirements of the SDG regulation is being met

Action	Recommendation
<p>Definition and communication of the governance structures, including roles & responsibilities, main processes and coordination activities (“what”).</p>	<ul style="list-style-type: none"> • Ensure alignment with the regulatory framework: proposal for Regulation on the digital single gateway. • Inform about SDG policies and strategies • Definition about which services should be provided and how • Ensure interoperability and coordination over time when operating and delivering SDG services by putting in place the necessary governance structure. • The organisational model should be defined and implemented at the earliest stages of the development of SDG at the latest. It is paramount to make sure that each member of the governance structure duly applies the model. If the model is not being applied as expected consider involving in its improvement those members that are not applying the model. • Definition of the quality levels and audit activities to guarantee that defined quality levels are covered.
<p>Implementation of the governance structures defined above (“how”).</p>	<ul style="list-style-type: none"> • Periodic or ad-hoc Bilateral / group meetings with EC coordinating units and EC service providers • Periodic or ad-hoc Bilateral / group meetings with the Commission and National coordinators. <ul style="list-style-type: none"> ○ Kick off meeting (Q1 2019) ○ First meeting focusing on the IT Questions (Q2 2019) ○ 6 times per year (can have different configurations) ○ Work on the basis of an annual work programme • Bilateral / group meetings with national coordinators and National Service Providers when necessary. • Invite a representative from each assistance services network to participate in the coordination group meetings. • For each assistance services network, plan at least one discussion session for a next meeting of the network.

Action	Recommendation
	<ul style="list-style-type: none"> • <i>Ad hoc</i> sessions with end users (e.g. working groups, seminars, workshops, webinars). <ul style="list-style-type: none"> ○ To get feedback on IT tools before their development. ○ As of Q3 2020 regarding service quality.
<p>Define interoperability agreements in the form of formal arrangements for cooperation and complementary arrangements (e.g. memoranda of understanding (MoUs), service level agreements (SLAs)).</p>	<ul style="list-style-type: none"> • Practical cooperation arrangements • Ensure that these agreements touch upon all EIF layers. • Formalise practical cooperation agreements minimising the usage of jargon to maximise understanding of terms and conditions.

3.2 Specific challenges

The following chapter describes in detail the as-is and to be situations as the gap analysis and recommendations for the semantic and technical challenges. *5.3 Annex III: Specific challenges information matrix* presents a summarised table with more detailed information for the challenges described and identified in this chapter.

3.2.1 Need for a common data model

For most of the IT tools the need for a common data model that favours data integration/aggregation stemming from disparate data sources is paramount to facilitate search and comparison of information rooted in Service Providers.

3.2.1.1 AS-IS

Currently each Service Provider is using different data models for the information that SDG will require to enable the functioning of the different IT tools. For a better understanding, an overview of the current state of play for each IT Tool is provided below, following an analysis on national/Union level portals.

3.2.1.1.1 Search facility

In general no evidence has been found after analysing the web pages with regard to the usage of metadata models that may help to structure the information made available by the different Service Providers. The usage of commonly metadata models (such as Core Public Services Vocabulary (CPSV)⁸, a common data model for describing key business events and public services) would help to improve the findability of information and the search experience provided by the search facility/common assistance finder.

3.2.1.1.2 Feedback on quality

To assess the information required to provide feedback on quality, when available, feedback tools have been identified and assessed for the portals analysed (see Annex IV).

The analysis shows that 22 portals have a feedback tool on quality, while 27 portals do not.

⁸ See: <https://joinup.ec.europa.eu/solution/core-public-service-vocabulary-application-profile>

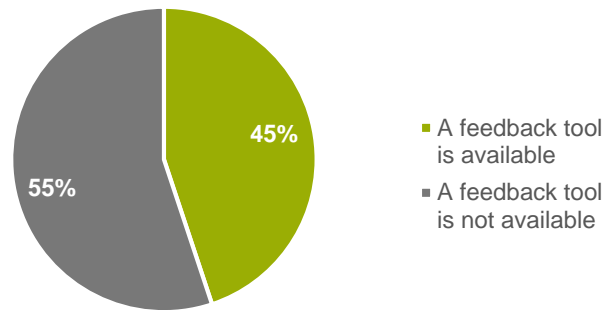


Figure 1: Percentage of portals having a feedback tool on the total of portals analysed

These feedback tools were grouped into three categories:

- **Rating scales;** the feedback tools belonging to this category are the rating scales available at the bottom of the information pages or in the homepages of the portals, that allow the user to rate from 1 to 5 the page or portal respectively according to his/her level of satisfaction. Rating scales are a type of quantitative feedback;
- **Free text with open-ended questions;** the feedback tools belonging to this category can be text boxes at the bottom of the information pages or a link allowing the user to send directly an email to express his/her feedback on the portal. Free text feedback is qualitative feedback;
- **Yes or No question** about the helpfulness/usefulness of the information page visited. Yes or no questions are a type of quantitative feedback.

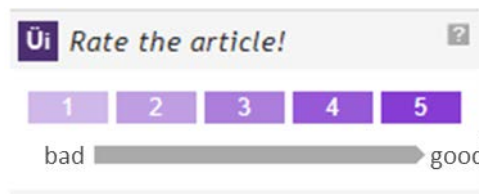


Figure 2: Example of rating scale feedback⁹

● DID YOU FIND THIS PAGE HELPFUL? GIVE US YOUR FEEDBACK.

Figure 3: Example of free text feedback¹⁰

⁹ Hungarian citizens and business portal www.magyarorszag.hu

¹⁰ Croatian business portal www.psc.hr

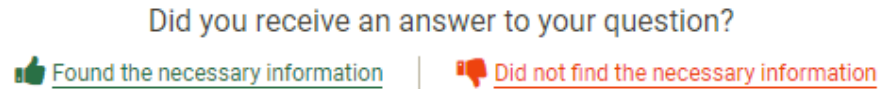


Figure 4: Example of Yes or No feedback¹¹

The findings on the types of tools used are the following:

- **5 portals** present a rating scales feedback tool. Four of these five portals have rating scales combined with a free text tool;
- **16 portals** have a free text feedback tool with an open-ended question, for instance “Suggestions for improvements” or “What information is missing?”. Seven of these 16 portals have a free text tool combined with another type of feedback tool;
- **8 portals** provide a Yes or No question on the helpfulness/usefulness of the page visited (either as stand-alone tool or in combination with other types of feedback tool). Three of these eight portals have a Yes or No question combined with a free text tool;
- **7 portals** have two of these feedback types combined (for example a yes or no question about the helpfulness of the page visited together with a free text feedback box in which it is possible to describe what the problem encountered was). In all cases, one of the two feedback tools offered a free text option.

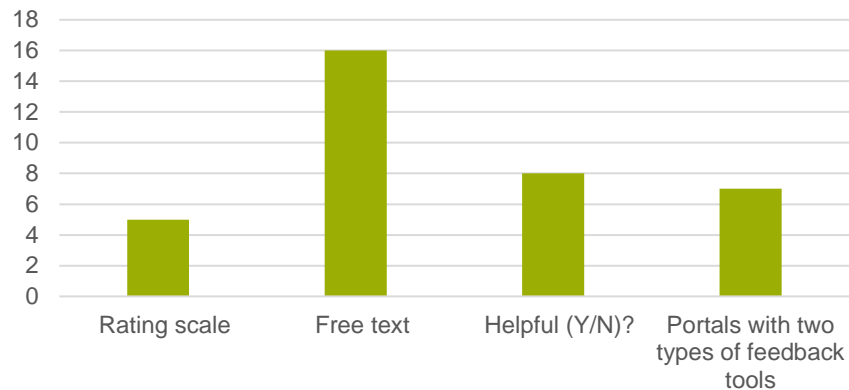


Figure 5: Distribution of feedback tool categories

Below are provided two examples of portals having two types of feedback combined. In the case of the seven portals equipped with two types of feedback tools, free text is in all cases one of the two mechanisms present, and it is used to allow the user to input their comments or complaints freely.

¹¹ Estonian citizens and business portal www.eesti.ee

Was this information useful? Yes No

Comments

submit

Figure 6: Example of Yes or No question and free text feedback¹²

*** Rate the main sections of the Portal (from 1 to 5)**

Search of procedures	What you should know ...
<input type="text"/>	<input type="text"/>
Process @ In a click	Aids and incentives
<input type="text"/>	<input type="text"/>
Assistance associations	Glossary of terms
<input type="text"/>	<input type="text"/>

*** Rate the Portal according to these criteria (from 1 to 5)**

Portal Utility

Accessibility

Suggestions

Figure 7: Example of rating scales and free text feedback¹³

From the analysis it is visible how less than half of the portals analysed have a feedback tool and, when such tool is present, the free text is by far the preferred system to gather the user's suggestions, comments and complaints, and it is used either as stand-alone tool or in combination with a rating scale or a yes/no question to allow the user to give detailed and more constructive comments on the feedback.

The free text type of feedback allows authorities to gather more insightful comments, however, being a qualitative feedback, it is harder to aggregate into statistical data and compare with other user feedback received that have a more quantitative nature. The analysis of free text feedback is more complex in cross-border scenarios, due to language differences.

¹² Austrian citizens portal www.help.gv.at

¹³ Spanish EUGO portal www.eugo.es

In the case of the rating scales feedback, the most detailed questionnaire is the one of the Spanish *www.eugo.es* portal (Figure 7), which combines multiple rating scales on different sections and features of the portal with an additional free text feedback tool, whereas the four other rating scale feedback tools are singular rating scales to answer the following questions:

- “What do you think of this site?”¹⁴
- “Rate this page”¹⁵

These two questions result in different types of information: in the first case the feedback is gathered on the portal in general (also the case in the Spanish *www.eugo.es* portal), whereas in the second case the feedback it is gathered on a specific information page, allowing the authorities to know which pages result unsatisfactory to the users and therefore require the inclusion of additional information or links to services.

The Yes or No type of feedback on the usefulness of the page visited allows the authorities to collect the impressions of the users on the pages they visited, and to spot which information pages need to provide more details. In three portals having a Yes or No feedback tool, this was accompanied by a free text tool (see Figure 6 as an example), allowing the respondents to indicate what information they were looking for instead.

To complete the information gathered through the desk research, an empirical research was also performed and included a short survey sent to the “owners” of the national PSCs. The purpose of the survey was to understand the basics on how information on the users’ feedback on quality of the portal is stored.

The questions of the survey were the following:

1. Is the information collected on the quality of the portal stored in a database?
2. What kind of information do you store?
3. Do you produce any sort of statistical report with that information? If yes, what KPIs you report?

The survey was sent to 10 MSs (Portugal, Spain, Belgium, France, Greece, Luxemburg, Finland, Bulgaria, Estonia, and Malta), five of which provided an answer. The following paragraphs summarize the portal owners’ answers to the survey.

In Estonia, the information gathered on the quality of the portal *www.eesti.ee*¹⁶ is stored in a database. Specifically, the information stored is: web traffic analytics, NPS score, self-service score (i.e. “did you find the content or service you needed?”), and the suggestions / complaints / comments submitted by the users of the portal. The KPIs used to measure and monitor the quality of the portal are: traffic volume, number of page logins, most popular content, content quality ratings, task completion assessment, NPS score for different sections, services and languages, and page speed and uptime.

In Finland, there is not a database collecting feedback on the quality of the portal *www.suomi.fi*¹⁷: and only the qualitative feedback received (i.e. the “free text” feedback) is retrieved and read by the content management teams. This information is not stored and there are no reports produced with it, but in the future, the portal owners plan to implement a centralised feedback mechanism.

¹⁴ Danish business portal www.indberet.virk.dk

¹⁵ Hungarian citizens and business portal www.magyarorszag.hu, Maltese citizens and business portal www.gov.mt, and Portuguese citizens and business portal www.portaldocidadao.pt

¹⁶ See: www.eesti.ee

¹⁷ See: www.suomi.fi

In Luxemburg, feedback on the quality of the portal www.guichet.public.lu¹⁸ is stored in a database. The information stored are the answers to all the questions asked in the various satisfaction surveys, therefore the information stored differs depending on the correspondent type of survey. The tool produces statistical reports automatically, and again the KPIs differ depending on the survey type to which they correspond.

In Greece, the www.ermis.gov.gr¹⁹ portal has an internal database accessible only to authorised personnel, where information on the feedback on quality received by the platform users is stored. The information stored is: date of the feedback, subject, issue, user name and surname. This information is stored to allow the authorised personnel to respond to doubts and requests of the platform users. No statistical reports are produced with this information.

The Belgian portals www.belgium.be²⁰ and www.business.belgium.be²¹ do not have a proper feedback mechanism, therefore do not store any information or data on it. However there is a complaint form for users on the website www.belgium.be. Complaints are addressed directly to the organisation in question according to the theme of the complaint. It does not exist a centralised complaint management system, nor a central database to store information on the complaints received.

In conclusion, most of the PSCs surveyed do not create reports on the feedback on the quality of the portal submitted by users. However, some data on the feedback received is stored, to facilitate monitoring of the perceived quality of the portal and of complaints and suggestions received by users. Data on the feedback on quality of the portal is not shared by the PSCs with the EU.

Assistance services

For the Online Dispute Resolution an EU Survey is offered at the end of the assistance (once the complaint is closed) with information about:

- Whether and how the dispute has been settled (on the platform and outside the platform);
- Ease of use of the website and forms;
- Usefulness of the information;
- Feedback on experience with the alternative dispute resolution bodies and the national contact points;
- Feedback on the machine translation tool;
- Whether the user would use the website again;

Based on the answers gathered from the EC managers for the Product Contact Points for Construction and National Assistance Service for professional Qualifications, no information is collected from the national assistance centres related with the feedback on quality.

3.2.1.1.3 Assistance services cases

For three of the assistance services listed in Annex III of the SDG regulation, an empirical research has been conducted through a questionnaire followed by an interview. The purpose of the interviews was to gather further insights on whether and how the information of the assistance services national contact points is stored and reported with the EC managers of the assistance services. The interviewees were the EC managers of the following assistance services: Online Dispute Resolution (ODR), Product Contact Points for Construction (PCPC), and National Assistance Service for Professional Qualifications. The assistance services whose EC manager

¹⁸ See: www.guichet.public.lu

¹⁹ See: www.ermis.gov.gr

²⁰ See: www.belgium.be

²¹ See: www.business.belgium.be

was contacted without success was: Product Contact Points (PCP), Health Contact Points, and EURES. The PSCs were contacted with a survey on their approach to store and process feedback on quality.

Of these, only the ODR service has a centralised EU portal in addition to the national contact points, whereas in the other two services there are only national contact points, and no website or helpdesk at EU level.

Online Dispute Resolution (ODR)

The ODR portal is accessible by consumers throughout the EU that want to present a complaint on their online consumer problem outside of a court of justice. The national contact points advise the consumers in their ODR process at EU level and to assist them in their own language. The national contact points do not have a website providing information to the consumers, they function as helpdesk that the consumer can contact if further assistance is necessary. The EC team responsible for the ODR portal collects information on the national contact points' activities and the usage of their assistance services, the information is collected through a report submitted by each national contact point every two years. The report includes data on the amount and topic of the requests received, the kind of information the consumers asked for, and the stakeholders involved in each request. For the information collected online by the ODR portal's, it is stored in a centralised database and statistics are available²² in the portal about the number of complaints per country, percentage of national and cross-border complaints and on the sectors to which most complaints are addressed. These statistics are updated live on the base of every new request received in the portal.

Product Contact Points for Construction (PCPC)

The PCPCs are national portals established by all MSs to provide information on national rules on products to be used in buildings, they respond to requests from the industry sector about whether a company's product is regulated by the Construction Products Regulation (CPR)²³ and if there are national requirements in the national building code that the company has to comply with. The EC team overseeing the work of the PCPCs organises meetings to ensure appropriate coordination and exchange of best practices, but it does not collect information on the national activities and does not require the PCPCs to submit reports periodically.

National Assistance Service for Professional Qualifications

These national assistance centres provide information on the recognition of professional qualifications in every EU country and guide professionals through the administrative formalities. The EC team overseeing the work of the national assistance centres does not collect information on the centres' activity and usage of services and does not require them to report periodically.

3.2.1.1.4 Feedback on obstacles

Currently, none of the portals aim to gather feedback on obstacles since this functionality falls within the remit of one of the target SDG's IT tools, thus enabling users to signal obstacles to their internal market rights.

²² See: <https://ec.europa.eu/consumers/odr/main/index.cfm?event=main.statistics.show>

²³ Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products. See: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32011R0305>

Nonetheless, information on cases from assistance and problem services about the subject matter of requests and responses will need to be put into perspective with information on obstacles.

Assistance services interact with the public at national, regional and local levels to respond to requests for information or assistance and they heavily differs from one to another in terms of the information collected. Based on the information collected, most of the underlying data models are dependent on the business nature and in most cases collected and stored by the National organisations responsible to provide the assistance to citizens and businesses. Data on the cases themselves can be similar one to another in some of the information provided by the requester (e.g. identifier of the request, subject, case register date, date of resolution, etc.), which will potentially simplify the definition of a common data model aimed at aggregating data stemming from cases and from different assistance services.

3.2.1.1.5 Statistics of use

The online questionnaire targeting PSCs, launched between June 2016 and July 2016, where 21 countries including Norway and Island provided responses, revealed that most of the countries were running analytics software to collect information about the website's users. Particularly, software usage was distributed as follows:

Software	Country
Google Analytics	BE, CY, CZ, DE (2 PSC), EE, EL, ES, FR, IE, IT, LT, NL, PL, RO, ES, SE, IS, NO
Piwik	AT, DE (2 PSC)
Netminers	DK
Wysistat	LUX
Webalizer, WEg Log Expert	AT
Anderes	DE (3 PSC)

Table 1 – Software used by countries

This information is quite valuable since *Google Analytics* and *Piwik* encompass the vast majority of the Service Providers and thus heavily influence the characteristics of the common data model that will be required to centralise and compare statistics on SDG.

There is no evidence how Member States are using the information collected by the analytics software and what kind of KPIs are monitored. Nevertheless, in the answers to the survey conducted to get information on how the users' feedback on quality was stored at National level, Estonia shared that the traffic volume, most popular content, page speed and uptime are monitored and analysed in order to monitor and measure the quality of the portal.

3.2.1.2 TO-BE

For the search facility and assistance services, the user will be guided towards relevant links to the information, procedures and assistance services. A commonly agreed data model will ideally exist to ensure that the precise format and meaning of exchanged data and information is

preserved and understood between MSs and the SDG. Links description to the information and procedures are enriched when used a common vocabularies for expressing metadata.

When it comes to user statistics, to improve the overall findability, navigation and quality of the gateway, an alignment of categories of data is settled for the measurement of collected data related with user behaviour through the gateway.

Users will be able to qualify and/or quantify the quality and coverage of the services provided through the SDG. The quality of the services will be gathered at the gateway or at National level through, a common user feedback tool or through a tool existent at National level. To guarantee the compatibility between the diversity of the existing user feedback tools, an agreement is in place related to a common set of questions. A more accurate analysis on the data currently gathered and stored by MS would be paramount to define the data model of SDG for the feedback on quality tool, maximising compatibility and comparability.

To get insights on the areas in which further policy developments might be need, feedback on single market obstacles will also be collected through a common user feedback tool or by other chosen third party tool, an alignment on vocabulary to collect such feedback will be achieved.

3.2.1.3 GAP Analysis and recommendations

The actions and recommendations hereby proposed will have an impact on all the SDG IT tools.

Action	Recommendation
<p>Definition of commonly agreed upon data models, by ensuring that the precise format and meaning of exchanged data and information is preserved and understood throughout exchanges between parties.</p>	<ul style="list-style-type: none"> • Further analysis on existing data models at MS level to outline data model for the envisaged SDG tools is required. • Set out agreements on reference data, in the form of taxonomies, controlled vocabularies, thesauri, code lists and reusable data structures/models. • Alignment with ongoing ISA² actions to favour standardisation, such as Core Vocabularies i.e. simplified, reusable and extensible data models. • Use of common vocabularies for expressing metadata • Use of a common vocabularies for expressing the categories of obstacles used by the feedback tool • In case of existing vocabularies at service provider level, consider mapping towards commonly agreed upon vocabularies for SDG • Ensure that information published required by the Search Facility / Common assistance service is accompanied by high quality, machine-readable metadata in non-proprietary formats.
<p>Define and implement an information management strategy to maximise alignment on the data models and information exchanged</p>	<ul style="list-style-type: none"> • Guarantee a strong sponsorship at the highest possible level • Define interoperability requirements with the existing systems • Ensure data compatibility from all sources.

3.2.2 Guarantee data exchange

SDG relies on information rooted in different Service Providers. This information is key for the different IT tools to function. Therefore the disposal of appropriated technical means that guarantee the availability and access to this information needs to be ensured.

3.2.2.1 AS-IS

Service Providers currently control their own data and provided it according to their own data models and specifications. Since the SDG is not yet in place there has been no need until now for specific interfaces to enable the exchange of such data following an agreed data model.

3.2.2.1.1 Search facility

Within the context of the search facility, previous studies²⁴ have shown that most of the sites do not present blocking issues that would prevent their inclusion in the Single Digital Gateway. Nonetheless, in some cases (e.g. Bulgaria – psc.egov.bg) crawling the content of the websites can be really difficult. The underlying fact is that some websites are entirely dynamically generated based upon user selections/user action in a series of elements (e.g. drop-down selection menus etc.) This makes the site very difficult for a machine to read and process. Resolving this issue would require the administrators of the national portal to either perform adaptations to their IT infrastructure or to provide the SDG with an alternative method for accessing and indexing the content.

The first challenge – *Setting up a sound and efficient organisational model* –, through its organisational actions will touch upon such issues and agree upon the steps to perform in such cases.

Same applies with information rooted in the **Taxes in Europe Database (TEDB)**, the European Commission's online information and search tool covering the most significant taxes in terms of revenue (both direct and indirect taxes) in the different Member States. TEDB allows the end user to access to tax information by performing a search filling specific parameters.

3.2.2.1.2 Feedback on quality

As a result of the research conducted (see Annex IV), no evidence was found on the availability of existent interfaces (API) in the current tools for exposing data collected at MS level for feedback on quality. Nonetheless, as shown in section 3.2.1.1.3, ODR delegates the collection on feedback on quality to EU Survey that provides a web service and an export functionality.

3.2.2.1.3 Assistance services cases

For three of the assistance services listed in Annex III of the SDG regulation, an empirical research has been conducted through a questionnaire followed by an interview. The purpose of the interviews was to gather further insights on whether and how the information of the assistance services national contact points is stored and reported with the EC managers of the assistance services. The interviewees were the EC managers of the following assistance services: Online Dispute Resolution (ODR), Product Contact Points for Construction (PCPC), and National Assistance Service for Professional Qualifications. As a result of the desk research and conducted interviews there is no clear evidence of the existence and availability of technical interfaces (APIs) to expose data collected at MS level for the assistance services.

²⁴ See: Study on the business and technical feasibility for the development of a search tool and a dynamic user interface for the EU Single Digital Gateway

3.2.2.1.4 Feedback on obstacles

As mentioned before, none of the portals aim to gather feedback on obstacles since this functionality falls within the remit of one of the target SDG's IT tools.

3.2.2.1.5 Statistics of use

Most of the Service Providers, as introduced in section 3.2, are using either *Google Analytics* or *Piwik*. These tools already provide out-of-the-box interfaces (APIs²⁵) to collect, configure, and analyse the data stored in their respective platforms. Therefore, interfaces for this purposes are already provided, which facilitates integration.

TO-BE

All technical means are in place to guarantee that SDG has access to data required in the different IT modules.

For the search facility and the common assistance finder it implies that this information will be publicly made available and technical standards for automated collection from Member States catalogues of services are in place. The catalogues of services of MSs, will be collected by means of http links and hence, it is not expected to create ad-hoc interfaces to guarantee access: http links are accessibly by anyone, either by using a browser (human interface) or by automatically scrapping the content using specific crawlers (machine interface).

It is not the case for data on statistics, problem and assistance services or feedback on quality, where ad-hoc interfaces need to be built to successfully guarantee exchange of information (e.g. APIs). Technical standards for automated collection from all the different tools needs to be defined and agreed.

The definition of interoperability requirements within the different systems and the availability of information will be part of the interoperability agreements, which will out the precise obligations of the two parties cooperating across an "interface" to achieve interoperability.

3.2.2.2 GAP Analysis and recommendations

The actions and recommendations hereby proposed will have an impact on all the SDG IT tools.

The actions and recommendations hereby proposed will have an impact on all the SDG IT tools. Action	Recommendation
Formalise technical specifications for the interfaces that enable linking systems and data exchange aligned with information requirements / data models	<ul style="list-style-type: none"> • Technical standards for automated collection of data • Use open specifications, where available, to ensure technical interoperability.
Guarantee availability-related conditions by means of Service Level Agreement (SLA)	<ul style="list-style-type: none"> • Formalise requirements following best practice stemming from international standards such as ISO/IEC 25010:2011

²⁵ <https://developers.google.com/analytics/> and <https://developer.matomo.org/api-reference>

The actions and recommendations hereby proposed will have an impact on all the SDG IT tools. Action	Recommendation
	<ul style="list-style-type: none"> • Define interoperability requirements with the existing systems.
<p>Implementation of interfaces to favour data exchange</p>	<ul style="list-style-type: none"> • Technical standards for automated collection from all different tools need to be defined • Use open specifications, where available, to ensure technical interoperability • Enforce the privacy and personal data protection regulation

4 Conclusions and next steps

Throughout this document, the different interoperability challenges have been assessed by identifying the interoperability gaps and providing the most salient actions (and recommendations) to tackle with regard to the implementation of the Single Digital Gateway.

The current study, framed into ISA² action 2017.05 “*Common architecture for the Single Digital Gateway*”, will be continued in the next phases of the action, which aim to reach the following milestones: (1) identify existing tools, building blocks and development needs; and (2) asses options for implementation and estimation of costs.

5 Annexes

5.1 Annex I: Terms and acronyms

5.1.1 Glossary

Term	Description
Assistance Service	EU-level or national-level services aimed at informing effectively EU citizens and businesses about their rights and the rules that apply to them within the single market, or at supporting users in addressing problems they may encounter when trying to handle administrative procedures.
EU Services	EU Services are the information and assistance services provided at EU-level and following EU mandates. Links to EU services websites will also feed the SDG links repository. Examples of EU services are EURES ²⁶ or the Online Disputes Resolution ²⁷ provided by DG JUST.
National Services	National Services are the information and assistance services provided at national level by the MS. Links to the different national Services websites will mainly feed the SDG links repository.
Procedure	A procedure is a sequence of actions that must be taken by users to satisfy the requirements or obtain from a competent authority a decision in order to be able to exercise their rights.
Service	The means of delivering value to customers by facilitating the achievement of the outcomes that the customers want, without the need for them to have ownership of specific costs and risks.

5.1.2 Acronyms and abbreviations

Term	Description
EC	European Commission
API	Application Programming Interface

²⁶ <https://ec.europa.eu/eures/public/en/homepage>

²⁷ <https://ec.europa.eu/consumers/odr/main/index.cfm?event=main.home2.show&lng=EN>

Term	Description
EIF	European Interoperability Framework
EU	European Union
MoUs	Memorandum of Understanding
MS	EU Member States
SDG	Single Digital Gateway
SLA	Service Level Agreement
PSC	Points of Single Contact
Regulation	Regulation of the European Parliament and of the Council on establishing a single digital gateway to provide information, procedures, assistance and problem solving services and amending Regulation (EU) No 1024/2012
SM	Single Market

5.2 Annex II: Transversal challenge information matrix

Who <i>(which parties need to cooperate)</i>	Where/how <i>(through which formal /informal instruments and arrangements is the cooperation established)</i>	What <i>(the substance of their cooperation)</i>	When <i>(deadline and frequency)</i>
EC & National SDG coordinators	<ul style="list-style-type: none"> • SDG Regulation • Implementing acts • SDG Coordination group (incl. its rules of procedure) • Annual work programme 	<ul style="list-style-type: none"> • All requirements of the SDG regulation 	<ul style="list-style-type: none"> • Kick off meeting in Q1 2019 • First meeting of the coordination group focusing on IT questions in Q2 2019 [incl. <i>presenting the EC studies on gateway IT tools and getting feedback from the coordination group on them before the development of the tools</i>] • 6x per year (in 3 different configurations)
EC coordinating units & EC service providers	<ul style="list-style-type: none"> • SLAs/MoUs [to be detailed] • Bilateral / group meetings on an <i>ad hoc</i> basis 	<ul style="list-style-type: none"> • Which services to be provided and how • Technical requirements • Quality levels and how to ensure them • Practical cooperation arrangements • Inform about SDG policies and strategies 	<ul style="list-style-type: none"> • Q4 2018 • ad hoc, tbd

Who <i>(which parties need to cooperate)</i>	Where/how <i>(through which formal /informal instruments and arrangements is the cooperation established)</i>	What <i>(the substance of their cooperation)</i>	When <i>(deadline and frequency)</i>
National coordinators & national service providers (competent authorities)	<ul style="list-style-type: none"> • SLAs/MoUs [to be detailed] • Service provider coordination group or bilateral meetings if and when necessary 	<ul style="list-style-type: none"> • Which services to be provided and how • Technical requirements • Quality levels and how to ensure them • Practical cooperation arrangements • Inform about SDG policies and strategies 	<ul style="list-style-type: none"> • Q4 2018 • Ad hoc, tbd
SDG coordination group & governance structures of EU wide assistance and problem solving services	<ul style="list-style-type: none"> • Invite a representative from each assistance services network to participate in the coordination group meetings • For each assistance services network, plan at least one discussion session for a next meeting of the network • Bilateral / group meetings between EC colleagues responsible for the SDG and EC colleagues responsible for the 	<ul style="list-style-type: none"> • Technical requirements • Quality levels and how to ensure them • Practical cooperation arrangements • Inform about SDG policies and strategies 	<ul style="list-style-type: none"> • As of Q1 2019

Who <i>(which parties need to cooperate)</i>	Where/how <i>(through which formal /informal instruments and arrangements is the cooperation established)</i>	What <i>(the substance of their cooperation)</i>	When <i>(deadline and frequency)</i>
	respective assistance services, on an <i>ad hoc</i> basis		
EC & users of the gateway	<ul style="list-style-type: none"> • <i>Ad hoc</i> working groups / seminars / workshops with end users • User feedback tools 	<ul style="list-style-type: none"> • Testing service design • Improving service quality and coverage 	<ul style="list-style-type: none"> • On an ad hoc basis to get feedback on IT tools before their development • As of Q3 2020 regarding service quality

5.3 Annex III: Specific challenges information matrix

IT Tool	Architectural components	Actors <i>(by whom /how are the data provided)</i>	Objective	Interoperability issues	Regulation reference
Search facility	<ul style="list-style-type: none"> Search facility Repository for links Dashboard 	<ul style="list-style-type: none"> EC, national coordinators, service providers 	To guide users towards relevant information and procedures	<ul style="list-style-type: none"> Common data model Technical standards for automated collection from Member States catalogues of services 	Art.18 and 19 Implementing act
User feedback on the services quality of the gateway	<ul style="list-style-type: none"> Dashboard User interface Machine-to-machine interface Database 	<ul style="list-style-type: none"> Users through common user feedback tool Users through national user feedback tools 	To measure user satisfaction with the quality and coverage of the services provided through the SDG in order to improve those services	<ul style="list-style-type: none"> To ensure compatibility between a variety of user feedback tools, an alignment of the 'questions to be asked' is needed Technical standards for automated collection from all different tools need to be defined 	Art.25 Implementing act
Common assistance finder	<ul style="list-style-type: none"> Common assistance service finder Repository for links Dashboard 	<ul style="list-style-type: none"> EC, national coordinators, service providers 	To guide users towards relevant assistance services	<ul style="list-style-type: none"> Common data model Technical standards for automated collection from Member States catalogues of services 	Art.19 Implementing act
User feedback on single market obstacles	<ul style="list-style-type: none"> User interface(s) for providing input and for transparency on problems flagged 	<ul style="list-style-type: none"> Users through common user feedback tool Intermediaries Data on cases handled by assistance and problem solving services 	To get insights on the areas in which further policy developments might be needed	<ul style="list-style-type: none"> Aligning / mapping categories of obstacles/problems/queries used by the feedback tool, the assistance services and all data sources for this purpose Technical standards for automated collection to ensure data compatibility 	Art.26: user feedback tool on single market obstacles Art. 20: data about assistance services

IT Tool	Architectural components	Actors <i>(by whom /how are the data provided)</i>	Objective	Interoperability issues	Regulation reference
	<ul style="list-style-type: none"> • Machine-to-machine interface • Database • Dashboard 			(incl. aggregation) from all sources	
User statistics	<ul style="list-style-type: none"> • Dashboard • Machine-to-machine interface • Database 	<ul style="list-style-type: none"> • EC and national service providers through web analytics tool(s) 	To measure actual user behaviour in order to improve the overall navigation of the gateway and findability of the services, as well as to help with priority settings in order to improve the quality of the included services	<ul style="list-style-type: none"> • Define interoperability requirements with the existing systems • Alignment of categories of data to be collected • Technical standards for automated collection to ensure data compatibility (incl. data aggregation) from all sources. • Data comparability, analytics systems define differently common data categories, like Visits, Unique Users/Visits, etc. 	Art.24 Implementing act

5.4 Annex IV: List of portals analysed

49 national portals that provide information and assistance services to foreign citizens and businesses have been analysed. The table below provides the list of the portals analysed per each MS, together with information on the scope of each portal, and on the feedback tool(s) present.

The scope of the portal refers to the target audience of the portal: citizens, businesses, a combination of both citizens and businesses, and finally national portals belonging to the EUGO network of PSCs. The scope gives also insights on what kind of information is offered and how it is organised, while the feedback tool analysis is important to understand the AS-IS situation of the portals' data models with regards to the feedback on quality of the services.

MS	Portals	Scope	Presence of a feedback tool	Type of feedback gathered
Austria	www.help.gv.at	Citizens	Yes	Helpful (Y/N)?; Free text
	www.usp.gv.at	Business	Yes	Helpful (Y/N)?; Free text
	www.eap.gv.at/	EUGO	No	<i>Not applicable</i>
Belgium	www.belgium.be/	Citizens and business	No	<i>Not applicable</i>
	www.business.belgium.be/	EUGO	No	<i>Not applicable</i>
Bulgaria	www.egov.bg/	Citizens and business	Yes	Free text
Croatia	www.gov.hr/	Citizens	Yes	Free text
	www.psc.hr/	Business	Yes	Free text
Cyprus	www.cyprus.gov.cy	Citizens	No	<i>Not applicable</i>
	www.businessincyprus.gov.cy/	Business	No	<i>Not applicable</i>
Czech Republic	www.portal.gov.cz	Citizens	No	<i>Not applicable</i>
	www.businessinfo.cz	Business	No	<i>Not applicable</i>
Denmark	www.borger.dk	Citizens	No	<i>Not applicable</i>
	www.indberet.virk.dk/	Business	Yes	Rating scale; Free text
	www.danishbusinessauthority.dk	EUGO	No	<i>Not applicable</i>
Estonia	www.eesti.ee/	Citizens and business	Yes	Helpful (Y/N)?
Finland	www.suomi.fi	Citizens and business	Yes	Free text
France	www.service-public.fr/	Citizens and business	Yes	Free text
	www.guichet-entreprises.fr/	EUGO	No	<i>Not applicable</i>
Germany	www.existenzgruender.de	Citizens	No	<i>Not applicable</i>
	www.gtai.de	Business	No	<i>Not applicable</i>
	www.bmwi-wegweiser.de/	EUGO	No	<i>Not applicable</i>
Greece	www.ermis.gov.gr/portal/page/portal/ermis/	Citizens and business	Yes	Free text
	www.eu-go.gr	EUGO	No	<i>Not applicable</i>
Hungary	www.magyarorszag.hu/	Citizens and business	Yes	Rating scale

MS	Portals	Scope	Presence of a feedback tool	Type of feedback gathered
Ireland	www.citizensinformation.ie/en/	Citizens	No	<i>Not applicable</i>
	www.businessregulation.ie/	Business	No	<i>Not applicable</i>
	www.pointofsinglecontact.ie/	EUGO	Yes	Helpful (Y/N)?
Italy	www.impresainungiorno.gov.it	Business	No	<i>Not applicable</i>
Latvia	www.latvija.lv/	Citizens and business	No	<i>Not applicable</i>
Lithuania	www.epaslaugos.lt/portal/	Citizens and business	No	<i>Not applicable</i>
	www.verslovartai.lt/	EUGO	No	<i>Not applicable</i>
Luxembourg	www.guichet.public.lu	Citizens and business	Yes	Free text
Malta	www.gov.mt	Citizens and business	Yes	Rating scale; Free text
	www.businessfirst.com.mt/	EUGO	Yes	Free text
Netherlands	www.government.nl/	Citizens	No	<i>Not applicable</i>
	www.business.gov.nl/	Business	Yes	Helpful (Y/N)?
Poland	www.obywatel.gov.pl	Citizens	No	<i>Not applicable</i>
	www.biznes.gov.pl	EUGO	No	<i>Not applicable</i>
Portugal	www.portaldocidadao.pt/	Citizens and business	Yes	Rating scale; Free text
Romania	www.edirect.e-guvernare.ro/	Citizens and business	No	<i>Not applicable</i>
Slovakia	www.slovensko.sk/	Citizens and business	No	<i>Not applicable</i>
Slovenia	www.evem.gov.si	Business	No	<i>Not applicable</i>
	www.eugo.gov.si/	EUGO	No	<i>Not applicable</i>
Spain	www.administracion.gob.es/	Citizens and business	Yes	Free text
	www.eugo.es/	EUGO	Yes	Rating scale; Free text
Sweden	www.migrationsverket.se	Citizens	Yes	Helpful (Y/N)?
	www.verksamhet.se/	Business	Yes	Helpful (Y/N)?
United Kingdom	www.gov.uk/	Citizens and business	Yes	Helpful (Y/N)?; Free text