



DG DIGIT
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INTEROPERABILITY QUICK ASSESSMENT TOOLKIT

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Document History

The following table shows the development of this document.

Version	Date	Description
1.0	September 2016	First release of the document coherently with the release of the IQAT v1
1.1	June 2018	Second release of the document coherently with the release of the IQAT v1.1

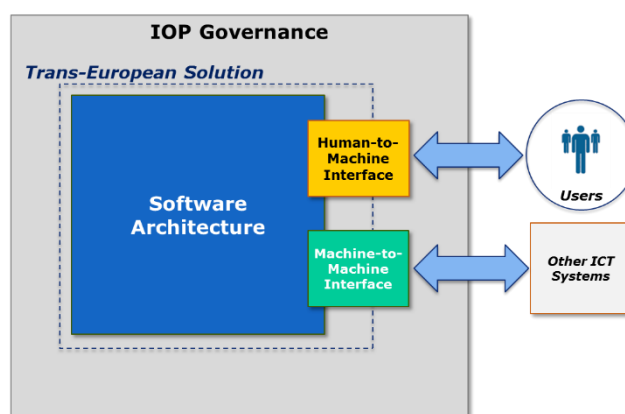
TABLE OF CONTENTS

1. INTRODUCTION	3
2. IOP QUICK ASSESSMENT METHODOLOGY	5
3. IOP QUICK ASSESSMENT TOOL.....	7
4. GUIDELINES FOR SOLUTION OWNERS	9
4.1 IOP QUICK ASSESSMENT TOOL USER GUIDELINES.....	9
4.2 IOP SCORING INTERPRETATION GUIDELINES.....	13
5. GLOSSARY	15

1. INTRODUCTION

This document is intended to be a guide for the use of the Interoperability (IOP) Quick Assessment Toolkit by the Solution Owners of any organisation (both European Commission and Public Administration / Institution at European, National and Local level) who decide to assess the Potential Interoperability¹ of their software solution.

The Interoperability Quick Assessment Toolkit, developed in the context of Action 2.1 of the Interoperability Solutions for European Public Administrations (ISA) Programme, is based on the following **Conceptual Model for the Interoperability Quick Assessment of software solutions**:

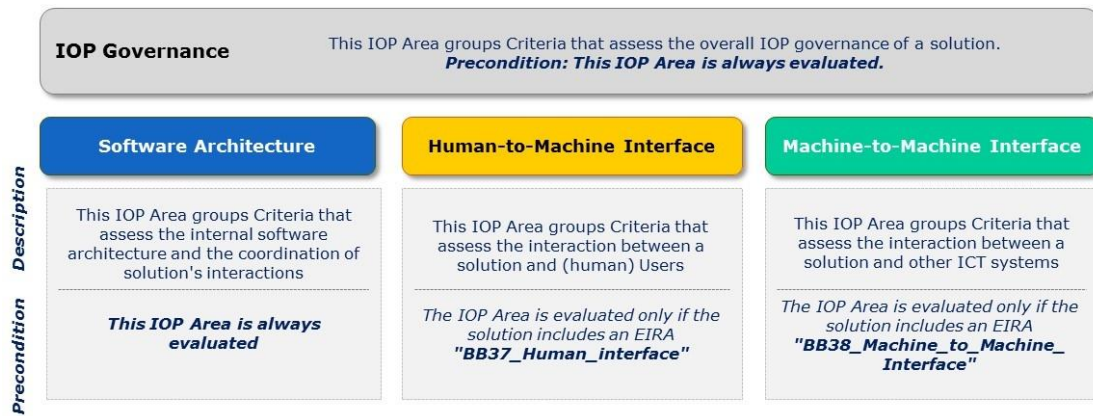


This Interoperability Conceptual Model comprises the following **four Interoperability Areas** to be assessed through the toolkit:

- **IOP Governance:** this area assesses the overall governance of Interoperability. It assesses factors relevant to actions that took place before the actual development of the system. It also includes factors relevant to the existence of policies and processes to safeguard interoperability.
- **Software Architecture:** this area assesses the maturity of the internal software architecture of a solution as well as the coordination of interactions with other software solutions, based on the EIRA model².
- **Human to Machine (H2M) Interface:** this area assesses the interaction, including semantic aspects, between a solution and its human end-users.
- **Machine to Machine (M2M) Interface:** this area assesses the interaction, including semantic aspects, between a solution and other software solutions.

¹ For “Potential Interoperability”, the system under investigation is assessed against a set of criteria that are defined for that purpose, while for “Interoperability” the aim is to test the actual interoperability between two systems that exchange data and/or information.

² EIRA v2.0.0: <https://joinup.ec.europa.eu/asset/eia/description>



The Interoperability Quick Assessment Toolkit comprises the following three components described in detail in the next chapters:

- **IOP QUICK ASSESSMENT METHODOLOGY** that describes the high-level steps to be followed by solution owners for assessing the potential IOP of a solution and the related expected benefits;
- **IOP QUICK ASSESSMENT TOOL** to be used to calculate the solution's Interoperability Score;
- **GUIDELINES FOR SOLUTION OWNERS** that guide solution owners on how to use the Excel tool and how to interpret the IOP Score results.

The latest release of the Interoperability Quick Assessment Toolkit is available [here](#).

2. IOP QUICK ASSESSMENT METHODOLOGY

The IOP Quick Assessment Methodology has the aim to assess the Potential Interoperability of a solution. It should be performed by the solution owner after the Reusability Quick Assessment³ **only if the solution is found to be reusable**, and before a full IOP Peer-to-Peer Interoperability Test of the solution through the *Interoperability Test Bed* (ITB) initiative (more information [here](#)). As for the IOP Assessment, the Reusability Assessment is made through the Reusability Quick Assessment Toolkit (RQAT – accessible [here](#)) useful to assess a system against a set of criteria that are defined for that purpose (like the IQAT) and so, as the following figure shows, is a first step to sort candidates for the Potential Interoperability Assessment:



The expected benefits of the IOP Quick Assessment Toolkit are the following:

- ✓ It spots areas for improving the IOP in a given solution
- ✓ It supports portfolio management decisions,
 - by suggesting solutions that could be published in the European Interoperability Cartography (EIC)
 - by clustering solutions with regard to IOP Maturity
 - by identifying solutions that should be improved in term of interoperability
- ✓ It is applicable to any software solution (not only TES)
- ✓ It allows to verify the compliance of the solution with EIRA
- ✓ It saves time and resources in IOP peer-to-peer tests by acting as a gateway to it. If the result of the IOP Quick Assessment is below a suggested threshold then it is recommended not to invest further efforts in a full IOP peer-to-peer test before improving IOP
- ✓ It supports end users of the EIC in verifying the Overall IOP Score of any published solution.

The IOP Quick Assessment Methodology advocates the execution of the following steps.

- 1. Prepare for assessment:** in this step, the solution owner puts together the resources needed for performing the IOP Quick Assessment. This may include guaranteeing the availability of different team members for a short time period.

³ **Reusability Quick Assessment** determines if a solution is considered as reusable. The current version of the methodology for solution Reusability Assessment foresees the implementation of the Reusability Quick Assessment Toolkit (RQAT) by the Solution Owner. The Reusability Assessment is a preliminary step to sort candidates for the interoperability assessment.

This step should include:

- **qualification for the solution:** gathering of high-level information about the solution (e.g. the solution has Human-to-Machine Interfaces; the solution exchanges data with other ICT systems through Machine-to-Machine Interfaces; etc.);
- **data gathering on the solution:** collection of the information required to perform the IOP Quick Assessment. The solution owner should check the tool in advance to identify the requested information.

Performing the IOP Quick Assessment requires **good understanding of the relevant solution** by the solution owner who performs the assessment.

The Quick Assessment Methodology is aligned with and refers to the EIRA, hence the solution owner should have a **good understanding of European Interoperability Framework (EIF) and EIRA** and its terminology in order to provide high quality and complete information.

It is also required that the solution owner provides consistent, complete and accurate information. Therefore it is strongly recommended that the solution owner **compiles all the information requested**.

2. Feed information in IOP Quick Assessment Tool:

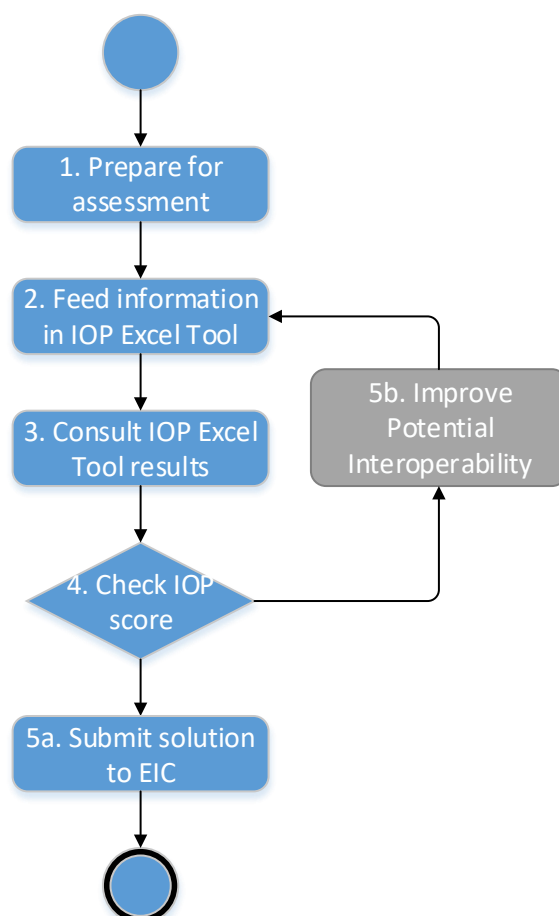
in this step, the solution owner provides information about the solution in the IOP Quick Assessment Tool. This consists of providing answers to a number of closed questions about the solution in an interactive Microsoft Excel file. This step is expected to last no more than one hour.

The solution owner can feed the information incrementally in the Excel tool saving the file locally on his workstation anytime.

3. Consult IOP Quick Assessment Tool results: in this step, the solution owner consults the part of the tool that provides the IOP Quick Assessment scores. This enables the solution owners to better understand the potential IOP pitfalls of their solutions.

4. Check IOP score: here, the IOP score and maturity level of the solution is examined by the solution owner.

5a. Submit Solution to EIC: solutions having an IOP score above a predefined threshold are candidate for inclusion in the European Interoperability Cartography (EIC) published in Joinup.



5b. Improve Potential Interoperability: based on the calculated IOP Score and IOP maturity level, the solution owner can activate technical improvements aimed to increase the potential IOP of the solution. Strictly speaking, this step is not part of the IOP Quick Assessment, but is particularly important if the IOP maturity level is not satisfactory. After improvements, the IOP Quick Assessment of the solution can be resumed from Step 2 using the new information.

Specific guidelines for the use of the Excel tool and for the interpretation of the resulting IOP score and maturity level are given in chapter “*Guidelines for Solution Owners*”.

The next chapter describes in detail the Interoperability Quick Assessment Excel tool.

3. IOP QUICK ASSESSMENT TOOL

The IOP Quick Assessment Excel tool (available [here](#)) supports a short and comprehensive **questionnaire** to collect information on the solution from the solution owner, in order to automatically calculate its **Potential Interoperability Score**. The Excel tool includes one section per IOP Area and one question per IOP Criterion with closed answers, and implements the defined Interoperability Scoring Model.

The tool is implemented in **Microsoft Excel** without macros in order to be easily used by any solution owner and consists of three **front-end worksheets** and **two back-end worksheets**:

- **Front-end:** the worksheets “Cover”, “IOP Quick Assessment Tool” and “IOP Final Scores” are visible to the solution owner and **only the cells to be filled-in are unlocked**.
- **Back-end:** the worksheets “IOP Parameters Dashboard” and “IOP Calculation Dashboard” are not visible to the solution owner. They are only for ISA internal use and for easy maintenance and sustainability of the tool. In fact, all the IOP parameters (weights, thresholds, etc.) are fully configurable.

The front-end worksheets are outlined below.

“Cover” worksheet

This is the cover worksheet containing only introductory information.



The Solution Owner can start the IOP Quick Assessment of a solution by clicking on the button “Start”.

“IOP Quick Assessment Tool” worksheet

This is the worksheet that contains the questionnaire to be fulfilled by the solution owner, with questions and possible **closed answers** for each IOP criterion.

Interoperability Quick Assessment Tool	
Fill the questionnaire to quickly assess the Interoperability level of your solution.	
Navigation <div> IOP Governance Software Architecture H2M Interface M2M Interface </div>	Quick Guidelines <ul style="list-style-type: none"> - Click on any area of the IOP Assessment Conceptual Model to jump to the questionnaire section of the IOP Area - To select the answer click the ✓ option from the drop-down list; To unselect click the "blank" option (or press "canc" on the keyboard) - Click on the "I More Info" cells to show additional information
Please, fill in the requested information about your solution.	
All the answers required. Solution official name Solution Provider Solution Owner Informant (who provided the info for the IOP Assessment) Date of the Interoperability Assessment	Answer

“IOP Final Scores” worksheet

While the assessment responses are completed by the solution owner, the “IOP Final Scores” worksheet **calculates automatically the solution IOP Assessment score**.

This worksheet summarises the IOP score for each IOP Area and the overall Interoperability score of the solution (including a graphical radar chart), including the resulting IOP maturity level.

IOP Final Scores				
TES official name				
Solution Provider				
Solution Owner				
Informant				
Date of the Interoperability Assessment				
	Weight	Sub-total	IOP Area score	Maturity Level
IOP GOVERNANCE	33,3	27,0	81,1%	This IOP Area has been assessed to have Very Good Interoperability. This solution performed very well in the IOP Area and is thus considered as having small room for further improvement to become excellent in this IOP Area.
SOFTWARE ARCHITECTURE	44,4	40,3	90,8%	This IOP Area has been assessed to have Excellent Interoperability. This solution performed excellently in the IOP Area and is thus considered as having excellent potential interoperability in this IOP Area.
HUMAN-TO-MACHINE INTERFACE (IOP Area not applicable)	0,0	0,0	0,0%	IOP Area not applicable
MACHINE-TO-MACHINE INTERFACE	22,2	22,2	100,0%	This IOP Area has been assessed to have Excellent Interoperability. This solution performed excellently in the IOP Area and is thus considered as having excellent potential interoperability in this IOP Area.
SOLUTION TOTAL IOP SCORE	89,6%			
<p>This solution has been assessed to have Very Good Interoperability. This solution performed very well in the relevant criteria and is thus considered as having small room for further improvement to become excellent.</p>				

4. GUIDELINES FOR SOLUTION OWNERS

This chapter provides useful guidelines on how to use the IOP Quick Assessment Excel tool and how to interpret the IOP Score results.

4.1 IOP QUICK ASSESSMENT TOOL USER GUIDELINES

Step 1 – Download the IOP Quick Assessment Excel Tool

In order to perform the IOP Quick Assessment, the solution owner is expected to download the IOP Quick Assessment Excel Tool from the following [link](#). Then, the solution owner can open the Excel file.

Step 2 – Start the IOP Quick Assessment

When opening the Excel file, the solution owner will see the Cover worksheet, which contains some general information.



This worksheet offers the solution owner the possibility to gather any additional information on the Tool by clicking on the **“Send an email”** button. Additional information on the tool can also be obtained by sending an email directly to the TES Project Officer Raul Abril at Raul-Mario.ABRIL-JIMENEZ@ec.europa.eu.

The Solution Owner can start the IOP Quick Assessment of a solution by clicking on the button “Start”. This will open the next worksheet.

Step 3 – Fill-in the questionnaire in the “IOP Quick Assessment Tool” worksheet

This worksheet contains the questionnaire to be answered by the solution owner, with questions and possible **closed answers** for each IOP criterion.

The solution owner must first enter the **official name of the solution**, the **Solution Provider**, **his/her name**, the **Informant** (which is who provided the information for the IOP Assessment) and the **date of the Interoperability Assessment** in the initial fields. Then, the solution owner can start answering the questions.



Fixed at the top of the worksheet there is a **“navigation tab”** that allows the solution owner to easily navigate through the four IOP areas to be assessed (IOP Governance, Software Architecture, Human-to-Machine Interface, Machine-to-Machine Interface).

The navigation is possible by clicking on each IOP Area box on the tab.

Each question of the assessment can be easily answered through **clicking the “✓” symbol from the drop-down list** associated to each response option. It can be unchecked by clicking again on the cell and choosing the “blank” option or pressing the “del/canc” button on the keyboard.

Excel embedded and seamless “data validation rules” help the solution owner avoiding incorrect answering. In this example, when an option is ticked, the others are disabled.

Some questions and response options has a “! More Info” cell that gives further information about the context of the question, usually referencing EIRA terminology.

Each IOP Area is intended to be filled-in starting from the first question and proceeding sequentially to the last.

As Human to Machine Interface and Machine to Machine Interface can be not applicable, the tool automatically turns off the related questions and response options as soon as it is aware of their inapplicability. More specifically:

- In “Human-to-Machine Interface” IOP Area, the answer “*Not applicable, the solution doesn't have Human Interfaces*” given to the criterion “*User-Centricity: Multi-Channel Delivery*” suggests the H2M area is not applicable. As a result, all H2M questions are disabled when this response option is selected.
- In “Machine-to-Machine Interface” IOP Area, the answer “*Not applicable, exchanging information and data in not relevant for this solution*” given to the criterion “Data Exchange”

suggests the M2M area is not applicable. As a result, all M2M questions are disabled when this response option is selected.

The IOP Quick Assessment distinguishes between the following four types of questions:

- **Matrix questions:** this type of question has multiple items (rows) to be answered, where each of them has four possible response options. For each item, a single response option must be selected.

Example of matrix question for the criterion G1: Interoperability by design (IOP Governance)

G1 Interoperability by Design		Considered and applied	Considered and partially applied	Not considered	Considered and found to be not relevant
For each statement, please indicate whether the statement was considered during the design or procurement phase of a TES solution.					
<u>Several answers possible.</u>					
1	When designing TES, preference was given to open interoperability specifications, taking due account to the coverage of functional needs, maturity, market support and innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	When designing TES, the effectiveness and efficiency of different solutions as well as different technological options considering user-needs, proportionality and balance between costs and benefits were evaluated	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	When designing TES, legislations were screened with a view to identifying interoperability barriers. When preparing legislation for the establishment of a European public service, coherence with relevant legislation was achieved, a "digital compatibility check" was made and data protection requirements were met	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- **Single answer questions:** the question must be answered by selecting only one response option.
- **Multiple answer questions:** this type of question allows multiple selections of response options. All the applicable answers must be selected.

If the solution owner does not answer a question, the IOP Assessment Tool automatically assigns the score 0% to the relevant criterion.

View IOP Score >

After answering all questions, the solution owner should click the button "View IOP Score" at the end of the worksheet, in order to visualise the IOP Score and maturity level of the

solution.

Step 3 – Consult results in “IOP Final Scores” worksheet

While the assessment responses are completed by the solution owner, the “IOP Final Scores” worksheet **automatically calculates the solution IOP Assessment Score**. It summarises the IOP Score for each IOP Area, the overall solution Interoperability Score (accompanying data with a graphical radar chart to visualise results), and the interpretation of each score.

IOP Final Scores				
TES official name				
Solution Provider				
Solution Owner				
Informant				
Date of the Interoperability Assessment				
	Weight	Sub-total	IOP Area score	Maturity Level
IOP GOVERNANCE	33,33	27,05	81,1%	This IOP Area has been assessed to have Very Good Interoperability. This solution performed very well in the IOP Area and is thus considered as having small room for further improvement to become excellent in this IOP Area.
SOFTWARE ARCHITECTURE	44,44	40,37	90,8%	This IOP Area has been assessed to have Excellent Interoperability. This solution performed excellently in the IOP Area and is thus considered as having excellent potential interoperability in this IOP Area.
HUMAN-TO-MACHINE INTERFACE	0,00	0,00	0,0%	IOP Area not applicable
(IOP Area not applicable)				
MACHINE-TO-MACHINE INTERFACE	22,22	22,22	100,0%	This IOP Area has been assessed to have Excellent Interoperability. This solution performed excellently in the IOP Area and is thus considered as having excellent potential interoperability in this IOP Area.
SOLUTION TOTAL IOP SCORE		89,6%		
<p>This solution has been assessed to have Very Good Interoperability. This solution performed very well in the relevant criteria and is thus considered as having small room for further improvement to become excellent.</p>				

4.2 IOP SCORING INTERPRETATION GUIDELINES

It is important to remember that the IOP scoring model follows a **simple linear weighted model** where all weights are re-calculated in the case of not applicable criteria or areas. As a result, the score of each IOP Criterion is always between 0% and 100%, the score of each IOP Area is always between 0% and 100%, and the Total IOP Score is always between 0% and 100%.

The **maturity level of the solution** is provided based on a **four stage model** to indicate the **Interoperability maturity of a specific solution**. The stages are:

- **Excellent Potential Interoperability (90% to 100%):** this stage includes solutions that, on average, performed excellently in the relevant criteria and are thus considered as having excellent potential interoperability;
- **Very Good Potential Interoperability (75% to 89.9%):** this stage includes solutions that, on average, performed very well in the relevant criteria. These solutions have small room for further improvement to become excellent;
- **Fair Potential Interoperability (50% to 74.9%):** this stage includes solutions that, on average, performed fairly in the relevant criteria. These solutions have significant room for further improvement;

- **Poor Potential Interoperability (0% to 49.9%):** this stage includes solutions that, on average, performed poor in the relevant criteria. The potential interoperability of these solutions is considered as having substantial room for improvement.

Based on these four stages, it is suggested that every solution **assessed as having “Very Good Interoperability”** (or above) should be considered as **candidate for inclusion in the European Interoperability Cartography (EIC)**.

5. GLOSSARY

The following Table provides a glossary of the most common terms and acronyms used throughout this document.

TERM (ACRONYM)	DEFINITION
European Interoperability cartography (EIC)	The European Interoperability cartography (EIC) is based on EIRA; it documents European interoperability services and tools and intends to facilitate reuse.
European Interoperability Framework (EIF)	The EIF provides guidance for the provision of European Public Services and a common set of core concepts for the design and update of national interoperability frameworks (NIFs), policies, strategies, guidelines and action plans that promote interoperability.
European Interoperability Reference Architecture (EIRA)	The European Interoperability Reference Architecture (EIRA) is a reference architecture for designing and describing digital public services across borders and sectors. The EIRA is aligned with the European Interoperability Framework (EIF) and complies with the context given in the European Interoperability Strategy (EIS). A common EIRA facilitates interoperability between public administrations and the reuse of solutions when developing European Public Services at the various levels of the administration.
Interoperability	“Interoperability” means the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems.
Interoperability (IOP) Quick Assessment	The Interoperability (IOP) Quick Assessment determines solution potential IOP by applying the proposed quick assessment methodology.
Reusability	The degree to which IT solutions, information and data are used in contexts other than its original, intended or main purpose.
Reusability Assessment	The Reusability Assessment determines if a solution is considered as reusable. The current version of the methodology for solution Reusability Assessment includes seven reusability criteria. The main objective of these reusability criteria is to identify a number of solutions which could be reused in the framework of other projects and EU initiatives.
Trans European Solution (TES)	An operational Interoperable European Solution developed by the European Commission or other bodies (in some cases co-funded by Member States) in support to the implementation and advancement of EU policies.