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Unit.D.2 (ISA Unit)

European Commission

REUSABILITY QUICK ASSESSMENT TOOLKIT V1.1.0

Guidelines for Solution Owners

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Document History

The following table shows the development of this document.

Version	Date	Description
1.0	June 2018	First release of the document coherently with the release of the RQAT v1.0.0
1.1	March 2019	Second release of the document coherently with the release of the RQAT v1.1.0

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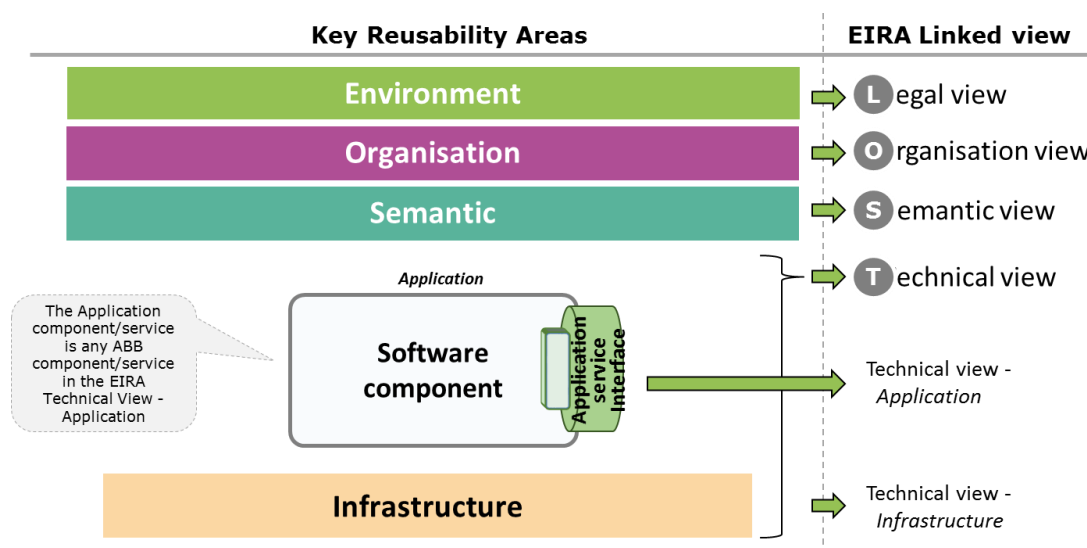
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1. INTRODUCTION

This document is intended to be a guide for the use of the Reusability Quick Assessment Toolkit (RQAT) 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 Reusability (RES) of their software solution.

The Reusability Quick Assessment Toolkit, developed in the context of the Action “Assessment of Trans-European solutions supporting EU policies” of the ISA² Programme, is based on explicitly differentiating between **Application Components** and **Application Services**. We will use the term Reusability for both Application Components and Application Services although in the literature *Service Reusability* is also referred to as *Service Consumption* or simply *Service Use*.

The Reusability Quick Assessment Toolkit is based on the following **Conceptual Model for the Reusability Quick Assessment of Application Components and Application Services**:



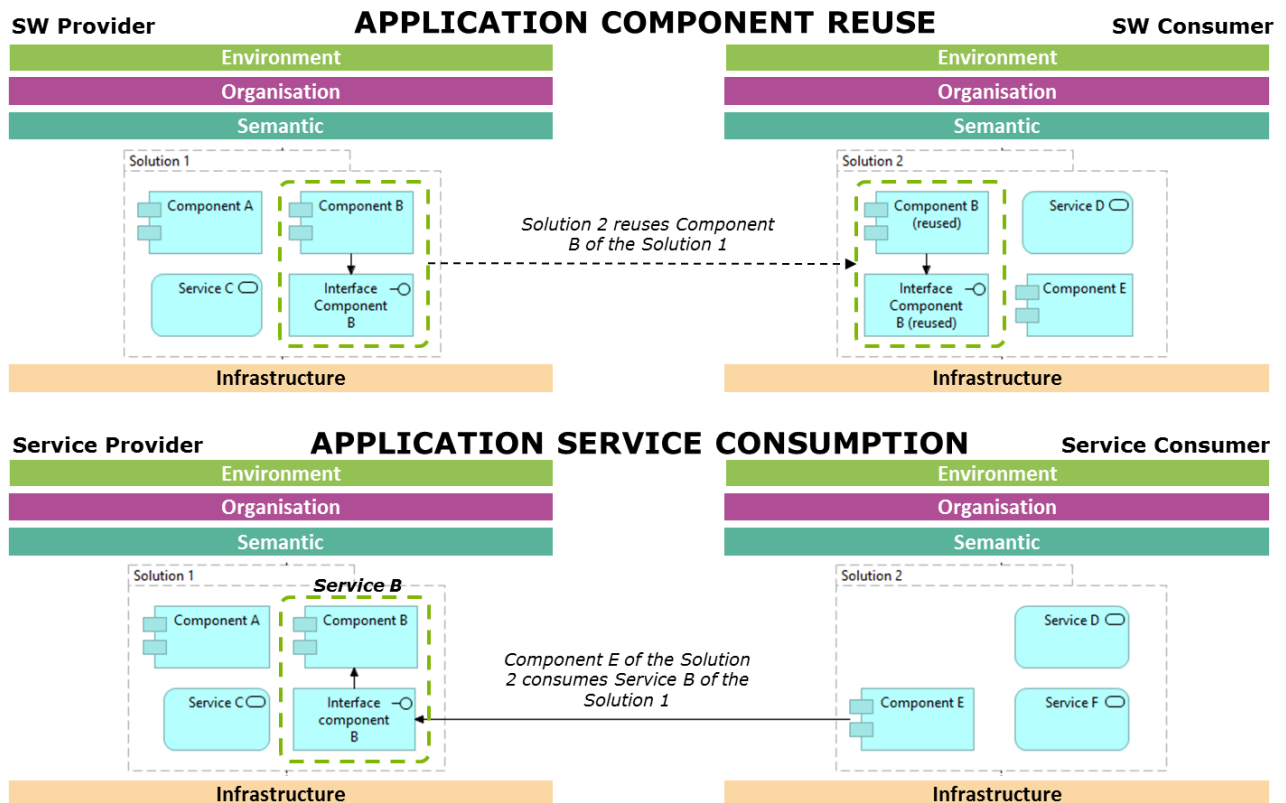
This Reusability Conceptual Model comprises the following **four Reusability Areas** to be assessed through the toolkit:

- **Environment:** this area assesses the influence on reusability of the economic, political, legal environment where the organisation providing Application component/service is operating. It is mapped to EIRA’s Legal view.
- **Organisation:** this area assesses the influence on reusability of the organisation that developed and maintains an Application component/service. It is mapped to EIRA’s Organisation view.
- **Semantic:** this area assesses the influence on reusability of the semantic aspects of an Application component/service. It is mapped to EIRA’s Semantic view.
- **Technical:** this area assesses the influence on reusability of Application component/service *in a vacuum* (Technical-Application) as well as the influence on reusability of the

infrastructure where an Application component/service is hosted when in operation (Technical-Infrastructure).

It is obvious that these areas map clearly in the relevant EIRA Linked views (Legal, Organisational, Semantic, and Technical).

As anticipated, the model is based on explicitly differentiating between Components and Services. The following picture helps to understand the difference between the reuse of a software component (e.g., the reuse of the source code) and the consumption/use of a service.



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

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

The latest release of the Reusability Quick Assessment Toolkit is available in [Joinup](#).

2. RES QUICK ASSESSMENT METHODOLOGY

The RES Quick Assessment Methodology has the aim to assess the Reusability of an Application component/service. This is expected to be followed by an Interoperability assessment using the Interoperability Quick Assessment Toolkit ([IQAT](#)) for Application components/services found to be sufficiently reusable. Actually, RQAT and IQAT were designed to be aligned thus avoiding unnecessary repetition.



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

- ✓ It spots areas for improving the RES 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 RES Maturity
 - by identifying solutions that should be improved in term of reusability
- ✓ It is applicable to any software solution (not only TES)
- ✓ It forms a first step before assessing the interoperability of an Application component/service.
- ✓ It supports end-users of the EIC in verifying the Overall RES Score of any published solution.

The RES 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 RES Quick Assessment. This may include guaranteeing the availability of different team members for a short time period.

This step should include:

- **qualification for the solution:** gathering of high-level information about the solution (e.g. compliance with regulatory framework, existence of reusability processes etc.);
- **data gathering on the solution:** collection of the information required to perform the RES Quick Assessment. The solution owner should check the tool in advance to identify the requested information.

Performing the RES Quick Assessment requires **good understanding of the relevant solution** by the solution owner who performs the assessment but also of the relevant legal and organisational landscape.

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**.

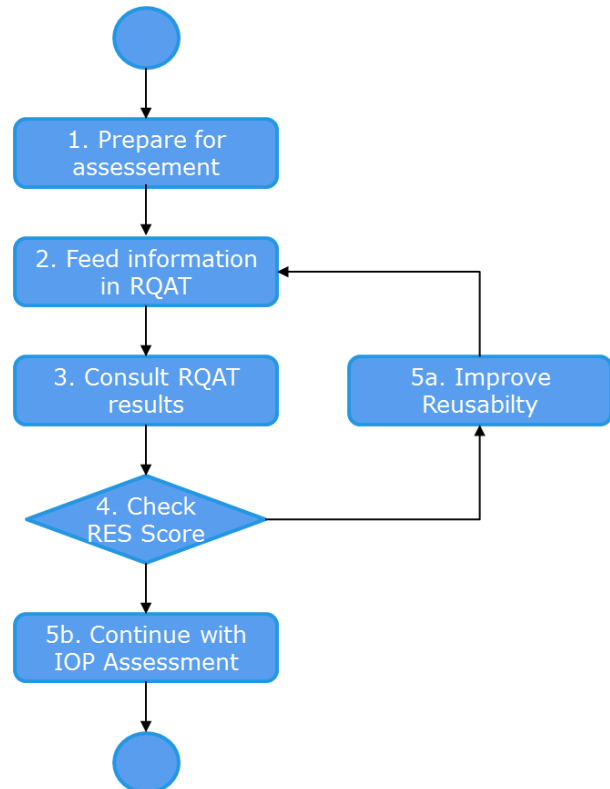
2. Feed information in RES Quick Assessment

Tool: in this step, the solution owner provides information about the solution in the RES Quick Assessment Tool. This consists of providing answers to a number of closed questions/statements 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 RES Quick Assessment Tool results:

in this step, the solution owner consults the part of the tool that provides the RES Quick Assessment scores. This enables the solution owners to better understand the potential RES pitfalls of their solutions.



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

5a. Improve Reusability: based on the calculated RES Score and RES maturity level, the solution owner can activate technical improvements aimed to increase the reusability of the Application component/service. Strictly speaking, this step is not part of the RES Quick Assessment, but is particularly important if the RES maturity level is not satisfactory. After improvements, the RES Quick Assessment of the solution can be resumed from Step 2 using the new information.

5b. Continue with IOP Assessment: solutions having a RES score above a predefined threshold should proceed with Interoperability assessment, e.g. using the Interoperability Quick Assessment Toolkit (IQAT) available [here](#). 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.

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

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

3. RES QUICK ASSESSMENT TOOL

The RES Quick Assessment Excel tool supports a short and comprehensive **questionnaire** to collect information on the solution from the solution owner, in order to automatically calculate its **Reusability Score**. The Excel tool includes one section per RES Area and one or two questions per RES Criterion with closed answers, and implements the defined Reusability Scoring Model.

Different RES Criteria exist for Application Components and Application Services due to their distinct nature.

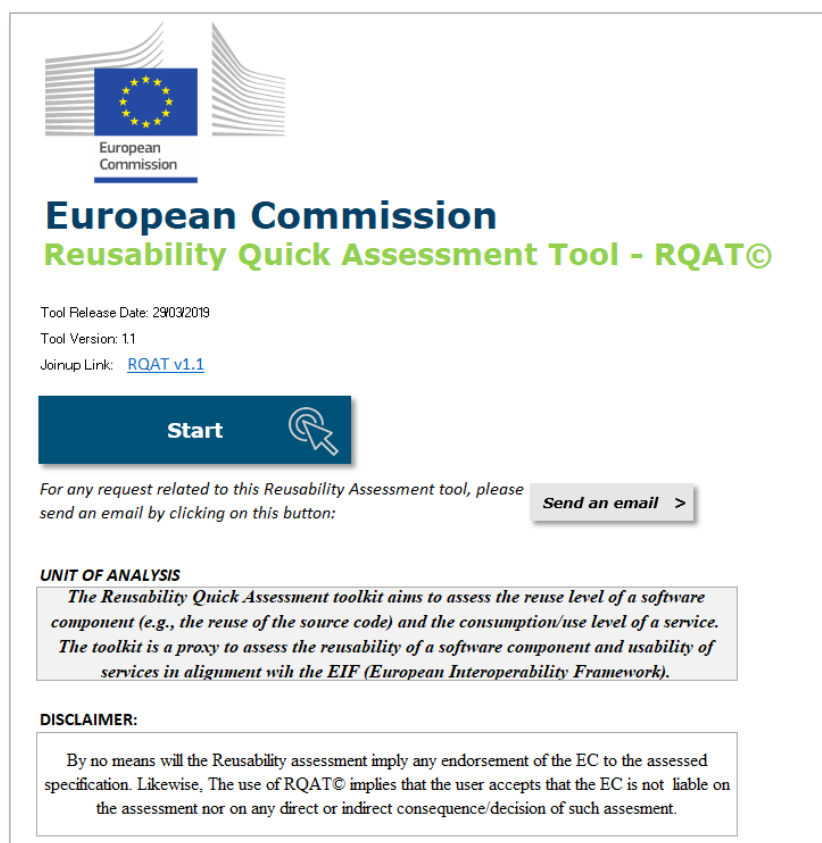
The tool is implemented in **Microsoft Excel** without macros in order to be easily used by any solution owner and consists of three **front-end worksheets** and **two back-end worksheets**:

- **Front-end:** the worksheets “Cover”, “Registration”, “RQAT - component”, “RQAT - service” and “RES Final Scores” are visible to the solution owner and **only the cells to be filled-in are unlocked**.
- **Back-end:** the worksheets “RES Parameters Dashboard” and “RES 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 RES 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 screenshot shows the cover worksheet of the European Commission Reusability Quick Assessment Tool - RQAT©. At the top, there is the European Commission logo. Below it, the title "European Commission Reusability Quick Assessment Tool - RQAT©" is displayed. The release date is 29/03/2019, and the tool version is 1.1. A link to the joinup page is provided. A large blue "Start" button with a cursor icon is prominent. Below the button, there is a text prompt to send an email and a "Send an email" button. The "UNIT OF ANALYSIS" section describes the tool's purpose in assessing software reuse and service consumption. A "DISCLAIMER" section at the bottom states that the assessment does not imply endorsement by the EC.

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Reusability Quick Assessment Tool - RQAT©

Tool Release Date: 29/03/2019
Tool Version: 1.1
Joinup Link: [RQAT v1.1](#)

Start

For any request related to this Reusability Assessment tool, please send an email by clicking on this button: [Send an email >](#)

UNIT OF ANALYSIS

The Reusability Quick Assessment toolkit aims to assess the reuse level of a software component (e.g., the reuse of the source code) and the consumption/use level of a service. The toolkit is a proxy to assess the reusability of a software component and usability of services in alignment with the EIF (European Interoperability Framework).

DISCLAIMER:

By no means will the Reusability assessment imply any endorsement of the EC to the assessed specification. Likewise, The use of RQAT© implies that the user accepts that the EC is not liable on the assessment nor on any direct or indirect consequence/decision of such assessment.

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

“Registration” worksheet

This is the worksheet where solution owners can register their solution to be assessed with RQAT:

Reusability Quick Assessment Tool - module for registration

1. Please, fill in the requested information about your solution.

All the answers required

Question	Answer
Solution official name	
Solution Provider	
Solution Owner	
Informant <i>(who provided the info for the Assessment)</i>	
Date of the Reusability Assessment	

2. Please, in order to start the Reusability assessment, choose the Reuse scenario that better fit your solution:

Reuse scenarios

- 1**

I would like to assess the Reusability of the source code of a whole IT system
(e.g. a different instance of an IT system could be customised, deployed and reused in a context other than its original, intended or main purpose)

Start the reusability assessment
- 2**

I would like to assess the Reusability of the source code of an application component
(e.g. an application component / solution building block can be reused in other IT systems)

Please specify the name of the **application component to be assessed:**

Start the reusability assessment
- 3**

I would like to assess the Reusability of an application service
(e.g. an application service can be consumed by other organisations and/or other application services)

Please specify the name of the **application service to be assessed:**

Start the reusability assessment

Selecting one of the four reuse scenarios, the RQAT will guide the solution owners to the “RQAT – service” or to the “RQAT – component” worksheet.

“RQAT – component” and “RQAT – service” worksheets

These are the two worksheets that contains the questionnaire to be fulfilled by the solution owner for the case of application component and application service. Both worksheets present a similar structure with different statements / questions and related possible **closed answers** for each RES criterion.

Reusability Quick Assessment Tool - module for "Application Component"

Fill the questionnaire to quickly assess the Reusability level of your solution.

Quick Guidelines

- Click on any area of the Reusability Assessment Conceptual Model to jump to the selected questionnaire section
- To select the answer click the ✓ option from the drop-down list; To unselect click the "blank" option
- Click on the "I More Info" cells to show additional information

Environment
Organisation
Semantic
Software component
Infrastructure
Application "Component"

ENVIRONMENT

E1 Actual reuse of Software

Q.1 Please indicate whether the software has been already reused Answer

Only one answer

1 Yes, it has been already reused ☐

2 No, but reuse is planned ☐

3 No ☐

E2 Legal and other constraints

Q.2 Please indicate whether there are legal or other constraints to prevent the reuse of the software (e.g. compliance with domain-specific legal requirements, handling of data etc.) Answer

Only one answer

1 Yes and they cannot be overcome ☐

2 Yes but they can be overcome albeit with significant effort ☐

3 Yes but they can be overcome with minor effort ☐

4 No, there are not any constraints ☐

"RES Final Scores" worksheet

While the assessment responses are completed by the solution owner, the "RES Final Scores" worksheet **calculates automatically the RES Assessment score**.

This worksheet summarises the RES score for each RES Area and the overall Reusability score of the Application Component/Service (including a graphical radar chart), including the resulting RES maturity level.

RQAT Final Scores - module "Application Service"

Solution official name

Solution Provider

Solution Owner

Informant

Date of the Reusability Assessment

	Weight	Sub-total	Reusability key Area score	Maturity Level
Environment	20,0	15,0	75,0%	This Reusability key Area has been assessed to have Very Good Reusability. This solution performed very well in the Reusability key Area and is thus considered as having small room for further improvement to become.
Organisation	35,0	30,0	85,7%	This Reusability key Area has been assessed to have Very Good Reusability. This solution performed very well in the Reusability key Area and is thus considered as having small room for further improvement to become.
Semantic	5,0	3,0	60,0%	This Reusability key Area has been assessed to have Fair Reusability. This solution performed fairly in the Reusability key Area This solution has significant room for further improvement.
Technical - Application	27,0	20,0	74,1%	This Reusability key Area has been assessed to have Fair Reusability. This solution performed fairly in the Reusability key Area This solution has significant room for further improvement.
Technical - Infrastructure	13,0	13,0	100,0%	This Reusability key Area has been assessed to have Excellent Reusability. This solution performed excellently in the Reusability key Area and is thus considered as having excellent potential Reusability in this key
SOLUTION TOTAL REUSABILITY SCORE		81,0%		
This solution has been assessed to have Very Good Reusability.				

Graphical Radar Chart:

4. GUIDELINES FOR SOLUTION OWNERS

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

4.1 RES QUICK ASSESSMENT TOOL USER GUIDELINES

Step 1 – Download the RES Quick Assessment Excel Tool

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

Step 2 – Start the RES 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 RES Quick Assessment of a solution by clicking on the button “Start”. This will open the next worksheet.

Step 3 – Register the solution in the “Registration” worksheet

This is the worksheet where solution owners have to:

1. **insert some register information** related to the solution to be assessed with the RQAT (official name of the solution, the Solution Provider, his/her name, the Informant - i.e. who provided the information for the RES Assessment, and the date of the Reusability Assessment);
2. **choose the reuse scenario** that better fit the assessment purpose (guidelines and examples are described directly in the RQAT and in the screenshot below).



European Commission - ISA Unit
Reusability Quick Assessment Tool

1. Please, fill in the requested information about your solution.

All the answers required	Answer
Solution official name	<input type="text"/>
Solution Provider	<input type="text"/>
Solution Owner	<input type="text"/>
Informant <i>(who provided the info for the Assessment)</i>	<input type="text"/>
Date of the Reusability Assessment	<input type="text"/>

2. Please, in order to start the Reusability assessment, choose the Reuse scenario that better fit your solution:

Reuse scenarios

1

I would like to assess the Reusability of the source code of a whole IT system
(e.g. a different instance of an IT system could be customised, deployed and reused in a context other than its original, intended or main purpose)

Start the reusability assessment

2

I would like to assess the Reusability of the source code of an application component
(e.g. an application component / solution building block can be reused in other IT systems)

Please specify the name of the **application component to be assessed:**

Start the reusability assessment

3

I would like to assess the Reusability of an application service
(e.g. an application service can be consumed by other organisations and/or other application services)

Please specify the name of the **application service to be assessed:**

Start the reusability assessment

The solution owner can select the following scenarios:

1. If the Solution Owner selects reuse scenarios 1, the RQAT will guide the user to the “RQAT – component” worksheet to assess the source code of the whole IT system;
2. If the Solution Owner selects reuse scenarios 2, the RQAT will guide the user to the “RQAT – component” worksheet to assess a specific application component / solution building block;

- If the Solution Owner selects reuse scenarios 3, the RQAT will guide the user to the “RQAT – service” worksheet to assess a specific application service.

Step 4 – Fill-in the questionnaire in the “RQAT – component/service” worksheet

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

Fixed at the top of the worksheet there is a “**navigation tab**” that allows the solution owner to easily navigate through the four RES areas to be assessed (Environment, Organisation, Semantic, and Technical).

Reusability Quick Assessment Tool - module for "Application Component"

Fill the questionnaire to quickly assess the Reusability level of your solution.

Quick Guidelines

- Click on any area of the Reusability Assessment Conceptual Model to jump to the selected questionnaire section
- To select the answer click the ✓ option from the drop-down list; To unselect click the "blank" option
- Click on the "! More Info" cells to show additional information

Environment
Organisation
Semantic
Software component
Infrastructure
Application "Component"

ENVIRONMENT

E1	Actual reuse of Software	Answer
Q.1	Please indicate whether the software has been already reused	
1	Yes, it has been already reused	<input type="checkbox"/>
2	No, but reuse is planned	<input type="checkbox"/>
3	No	<input type="checkbox"/>
E2	Legal and other constraints	

The navigation is possible by clicking on each RES 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.

The questions can be answered in any order. As some Criteria can be not applicable the score will not consider the following criteria (more on scoring are provided in the next section):

- Case “Application Component” - in Criteria S1, S2 and TI2 of the Application components assessment, an answer “*Not applicable*” is possible.
- Case “Application Service” - in Criteria S2 and TI3 of the Application services assessment, an answer “*Not applicable*” is possible.

The RES Quick Assessment distinguishes between the following two types of questions:

- **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 RES Assessment Tool automatically assigns the score 0% to the relevant criterion.

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

When you have answered to all the statements, check the Reusability score of your solution just clicking in the below button

Check RES score!

Step 5 – Consult results in “RES Final Scores” worksheet

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



4.2 RES SCORING INTERPRETATION GUIDELINES

It is important to remember that the RES scoring model follows a **simple linear weighted model**. As a result, the score of each RES Criterion is always between 0% and 100%, the score of each RES Area is always between 0% and 100%, and the Total RES Score is always between 0% and 100%.

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

- **Excellent Reusability (90% to 100%):** this stage includes solutions that, on average, performed excellently in the relevant criteria and are thus considered as having excellent reusability;
- **Very Good Reusability (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 Reusability (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 Reusability (0% to 49.9%):** this stage includes solutions that, on average, performed poor in the relevant criteria. The potential reusability 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 Reusability”** (or above) should be considered as **candidate for performing Interoperability Assessment**.

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 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.
Reusability (RES) Quick Assessment	The Reusability (RES) Quick Assessment determines Application component/service RES by applying the proposed quick assessment methodology.
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.