

ARTIST
FP7-317859



***Advanced software-based seRvice provisioning and
migraTion of legacy Software***

Deliverable D5.2.2

Business and Technical Modernization assessment tool

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Abstract:	The ARTIST assessment tool will provide an automatic way for performing the assessment, providing as a result the initial and the desired situations for the application. This deliverable will include a design document.
Keyword List:	Maturity assessment, migration goals, prototype.
Licensing information:	MAT is licensed as proprietary but with free use without charges. The document itself is delivered as a description for the European Commission about the released software, so it is not public.

Document Description

Document Revision History

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Terms and abbreviations

EC	European Commission
MAT	Maturity Assessment Tool
TFT	Technical Feasibility Tool
BFT	Business Feasibility Tool
RTT	Reusability Trace Tool
MPT	Methodology Process Tool
GML	Goal Modelling Language
MG	Migration Goal

Executive Summary

This deliverable is accompanying the software deliverable due month 24 D5.2.2 -.Business and Technical Modernization assessment tool. The purpose of this deliverable is to provide information about the updates and new features implemented for the second version of the Maturity Assessment Tool. The main updates are related with the incorporation of best practices based on existing standards (ISO CCRA, TOSCA, ITIL, CMMI for services, ISO 27000, EFQM). This analysis has also derived in the re-structuring of the questionnaire and the results which have been re-defined after this analysis incorporating more information for the users about the different scores obtained in the questionnaire as well as other reports needed to launch other ARTIST tools such as the Methodology Process Tool, the Technical Feasibility Tool or the Reusability Trace Tool.

From the technical perspective, a new implementation of the tool has been developed enhancing the UI, incorporating the re-structured questions, adding security aspects and including new different nature results (graphical, textual and files).

The delivery and usage of the tool is also presented in this report.

1 Introduction

Maturity Assessment Tool which implements the business and technical modernization assessment is implemented in WP5 as part of modernization assessment tool suite. This tool will be realised in 3 incremental prototypes which are D.5.2.1 in M12, D.5.2.2 in M24 and D5.2.3 in M30.

One internal working deliverable was due by M18.

This document introduces the prototype delivered in M24, D5.2.2.

1.1 About this deliverable

This document is the complement to the delivered software as prototype in the specified date and deliverable name at the head of the document.

1.2 Document structure

This document describes the prototype D5.2.2 addressing the implementation and usage details of Maturity Assessment Tool. First section 2.1 introduces the functional and technical description of the prototype presenting mainly the updates and new features incorporated from the last version of the tool, and then section 2.2 provides a description of the delivery and usage of the prototype, including installation and downloading instructions.

To finalize the report, the conclusions are presented and some annexes are included. These annexes show the different reports generated by the Maturity Assessment Tool. These reports will be used both by MAT end users (i.e. End-users reports) and by other ARTIST tools (i.e. the Methodology Process Tool).

1.3 Innovation and novelties

Up to our knowledge there is no an automatic tool that provides a complete self-assessment to establish the “Cloud Compliant” level of an application and a company in terms of technology, process and business. The main innovation behind the new version of the Maturity Assessment Tool is the compilation **and incorporation of standard based best practices** such as ISO CCRA [1] and OASIS TOSCA [2] for the technical perspective, ISO CCRA [1] and EFQM [3] for the business point of view and ISO CCRA and ITIL [4] [5] [6] for the process related dimension into the tool providing an automatic, generic, standard based and holistic (covering technological, business and process aspects) maturity assessment.

2 MAT

2.1 Implementation

2.1.1 Functional description

MAT's objective is to assess the maturity of an application with respect to its migration to the cloud performing the following activities:

- Gather information about the current situation of the application willing to migrate through a set of questionnaires (including questions at technical and business level).
- Process the information (following a rule based approach).
- Provide the set of results which comprises a) The positioning of the application including initial and desired situation of the application, b) A set of High level recommendations on how to perform the migration, c) A set of migration Goals

Such an approach of assessing the maturity of an application regarding its maturity to be migrated has not been supported or documented in literature.

The existing approaches [7], do not tackle the migration under different perspectives. They face the problem addressing only specific perspectives of the migration (usually only technical ones) and don't provide tools to assess the impact of a potential migration. Existing solutions adopt a big bang approach and starts directly with the migration process or they perform specific personalize studies for a concrete migration project.

MAT provides a semi-automatic way of assessing an application (and a company) that is facing a migration project even before the actual migration starts by delivering in advance key information about how this migration will impact the company and the product both at technical and business levels.

MAT will be implemented following an incremental approach adding features in the different releases of the tool (M12, M18, M24, and M36).

This version of the prototype corresponds to the second official release. In the current version of the prototype, several updates and improvements have been made (with respect to the D5.2.1 delivered in M12):

- Improvements in the results visualization including graphical charts for the results and a specific results report that can be downloaded by the user.
- Security aspects incorporation in the logging and password.
- Creation of reports for other ARTIST tools such as the Methodology Process Tool report or the Goal Model report.
- Integration with the RTT [9]

Functionality that prototype's offer:

The delivered prototype provides the following functionalities.

- Read customer's information which is inserted via a set of questionnaires
- Acquire the assessment answers for technology, processes and business questions
- Store the answers in the data base
- Provide the punctuation reached for each of the sub-areas defined.
- Provide graphical representation of the punctuation obtained.
- Provide security aspects for user logging.

- Provide different reports:
 - End user report
 - MPT report
 - GML report
- Provide the session recovery functionality
- Provide the connection to RTT.

2.1.1.1 Fitting into overall ARTIST solution

MAT is the first activity to be performed in the first phase of ARTIST. It is the first tool that a user who is adopting the ARTIST approach should use to start a migration project. This tool will provide with a first overview of the situation of the application and the company with respect to the migration of that application to the cloud. This overview will help the user (and other tools in ARTIST) to establish the basis and the starting point of the migration to apply the most convenient improvement path.

In the ARTIST methodology, maturity assessment is the first activity to be performed. This assessment, including technical and business evaluation can be done using the MAT in the pre-migration phase proposed by the methodology (see figure 1):

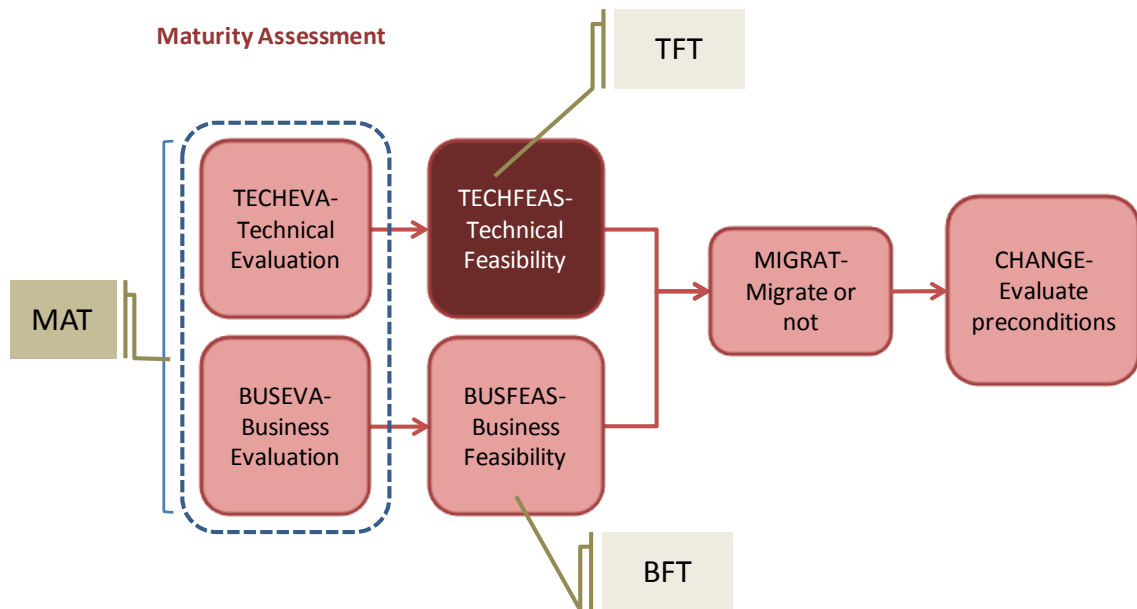


Figure 1 MAT in the context of ARTIST methodology

The MAT is part of the Modernization Assessment components package, indeed is one of the components inside this package (see figure 2).

MAT interacts with the two components of modernization assessment (BFT and TFT) (see figure 1) as well as with other tools in the ARTIST tool chain [10](see figure 2):

- Methodology Process Tool: MAT provides information needed to carry out the personalization process of the methodology (MPT report).
- Non-functional Requirements Verification Tool: MAT provides the first version of the Migration Goals extracted from the questionnaires (MG report).
- Reusability Trace Tool: MAT provides a connection through a web service to the RTT.
- Technical Feasibility Tool: MAT provides the first version of the Migration Goals extracted from the questionnaires (MG report).

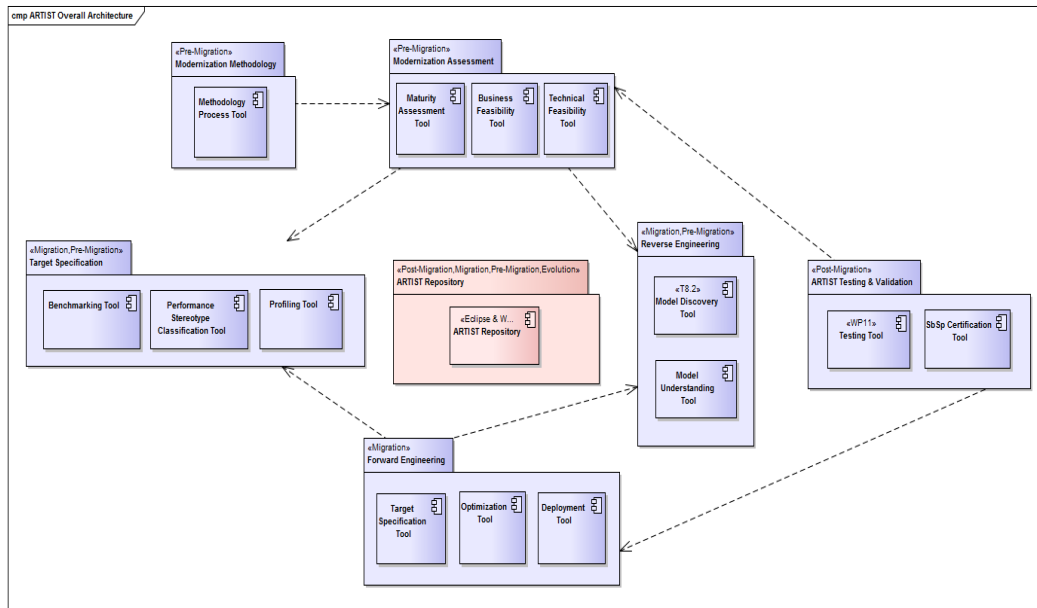


Figure 2 General ARTIST architecture

2.1.2 Technical description

This section describes the technical details of the implemented software.

2.1.2.1 Prototype architecture

The ARTIST Project Maturity Assessment tool is a Web application that provides questionnaires. The following image depicts the overall architecture:

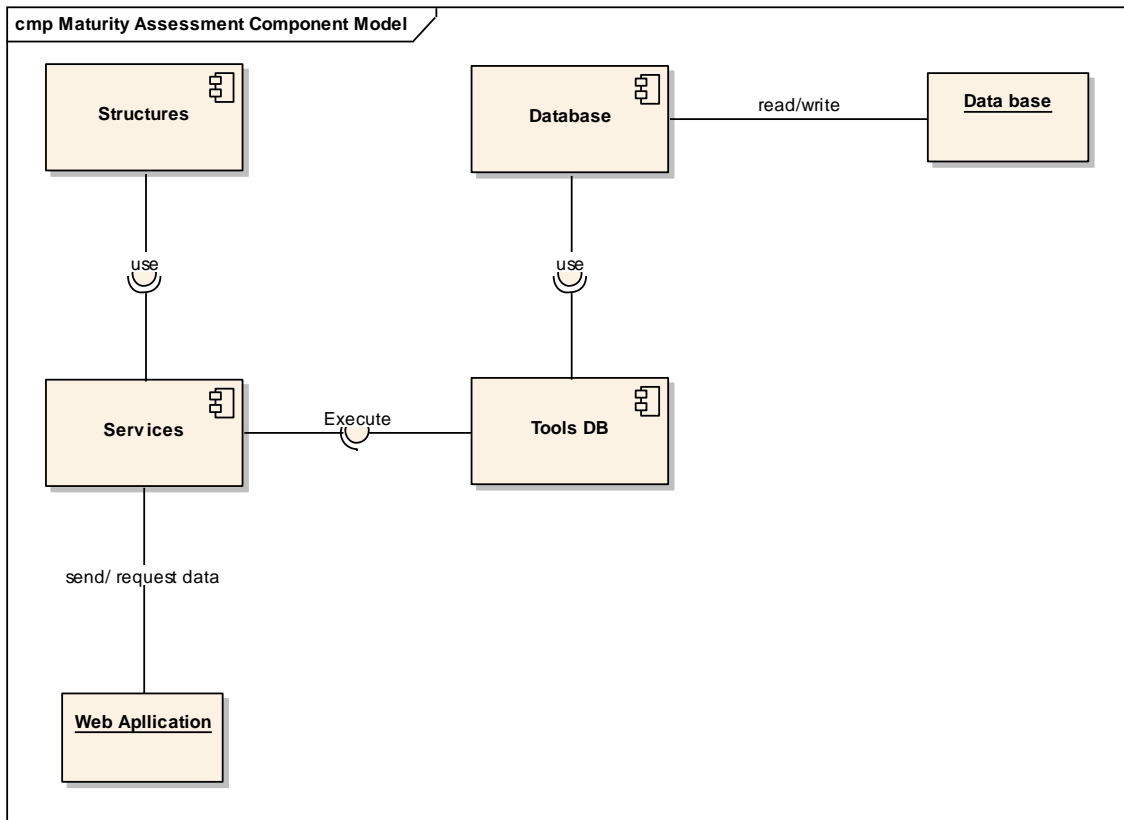


Figure 3 MAT Component diagram

2.1.2.2 Components description

MAT is composed of the following components:

- **Services:** This is the main communication component of the Maturity Assessment tool. It provides the interface between the Server and the HTML5 client.
- **Structures:** This component contains the structures of the inputs and outputs models that the MAT uses. It also has the functionality for generating the output structured formats (XML, JSON).
- **Tools DB:** In this component is where the logic of the Maturity Assessment tool is implemented. This component calculates the scores and the levels of each questionnaire based on the best practices stated by the different standards. It also provides the questions ordered by category and types.
- **Database:** This is the data access component of the Maturity Assessment tool. It provides an interface for accessing the MySQL Data Base.

Data base model

The following picture represents the data base model of the Maturity Assessment tool:

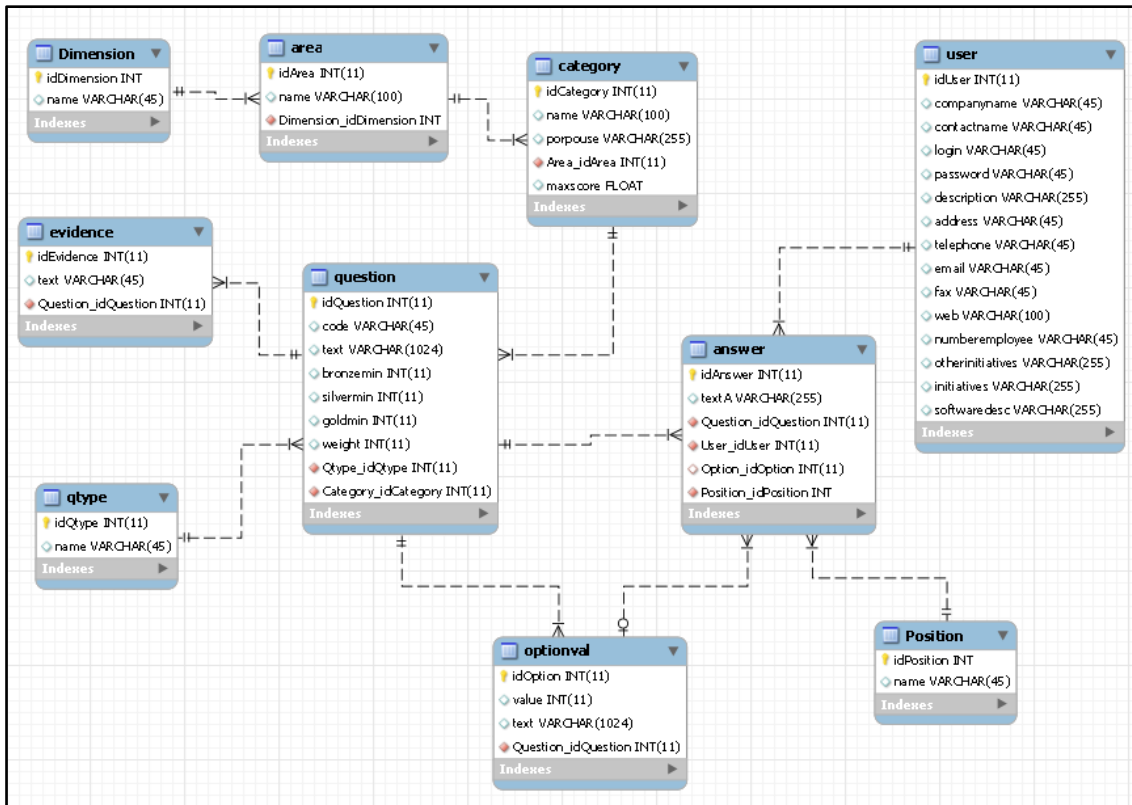


Figure 4 MAT data base model

This is a description of each table:

- Dimension: This table contains the data of the Dimensions(Business, Process, Technology)
- Area: This table contains the data of the areas of each dimension
- Category: This table contains the data of each category of the three different areas.
- User: This table contains the data of the users that will use the Maturity Assessment tool.
- Evidence: This table will contain the data of the evidences of the questions in the questionnaire.
- Question: This table contains the data of the questions of each category.
- Qtype: This table contains the question type of the questions in the Maturity Assessment tool. The types included are text or combo
- Option: This table contains the different options of each combo question.
- Answer: In this table there are stored the answers to the questionnaire of the Maturity Assessment tool.
- Position: This table contains the position of the questionnaire (Current or Future).

2.1.2.3 Technical specifications

The web application is developed in Java 5 EE. The project is deployed in a Tomcat 7 application server and the data base server is MySQL 5. The client is developed in HTML5.

The user interface is developed in HTML5. So the user needs a Web browser that supports HTML5 to access this client properly.

The following table summarizes the different technologies used:

Table 1 Components and technology

Component	Technology
Web application	Java 5 EE
Data Base	MySQL
Client/ User interface	HTML5

2.2 Delivery and usage

2.2.1 Package information

The following image depicts the package structure of the main component, the Maturity Assessment tool Web Application:

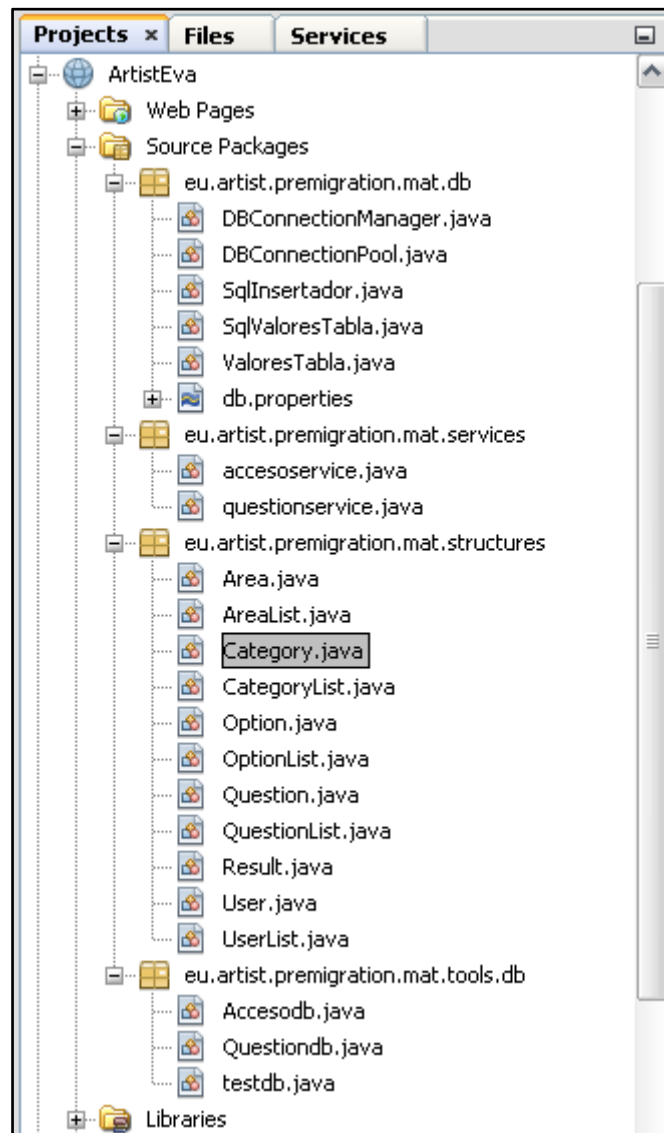


Figure 5 MAT package structure 1

- eu.artist.premigration.mat.db: Contains the classes for exploring for accessing the Database.
- eu.artist.premigration.mat.services: Contains the classes of the RESTfull web services of the Maturity Assessment tool
- eu.artist.premigration.mat.structures: Contains the classes of the structures used by the Maturity Assessment tool.
- eu.artist.premigration.mat.tools.db: Contains the classes that calculate the scores and the levels of each questionnaire. It also provides the questions ordered by category and types.
- Web pages: This folder contains the client HTML5 project.
- Libraries: This folder contains the required libraries of the web application.

Additionally, in this version of MAT a new web application has been included to hold the user report generation capabilities. The new web application is called matReport. The reason to maintain this package independent from the artiseva component is to avoid problems that appeared during the integration of the libraries required by the report technology within the artiseva component.

The following image depicts the package structure of the matReport component, the report generation Web Application:

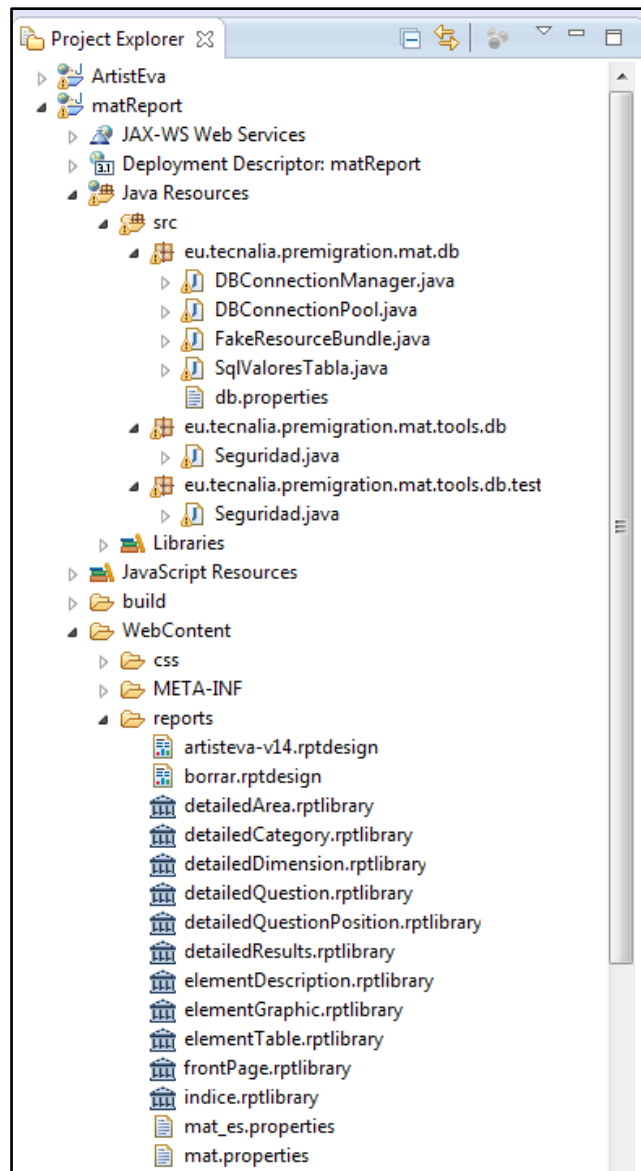


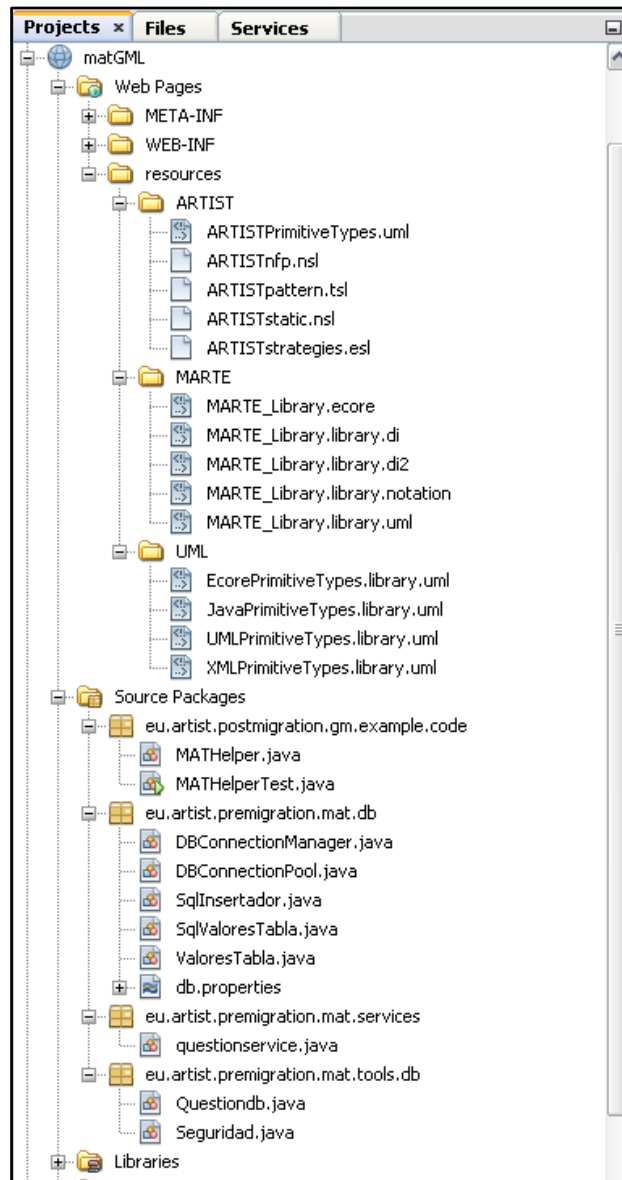
Figure 6 MAT package structure 2

- eu.artist.premigration.mat.db: Contains the classes for exploring for accessing the Database. They are reused from the artistEva component previously introduced.
- eu.artist.premigration.mat.tools.db: Contains the classes managing the security. They are reused from the artistEva component previously introduced.
- reports: here is where the report and the libraries that built it are defined.

The matReport component has been implemented over the BIRT technology [11]. BIRT is an open source component under the EPL licence. This allows its commercial usage. We have selected BIRT as the reporting facility due to its features to generate the reports in different formats.

Additionally, in this version of MAT another new web application has been included to hold the user GML files generation capabilities. The new web application is called matGML. The reason to maintain this package independent from the artisteva component is to avoid problems that appeared during the integration of the libraries required by the report technology within the artisteva component.

The following image depicts the package structure of the matGML component, the report generation Web Application:



- eu.artist.postmigration.gm.example.code: Contains the classes for generating the GML files.
- eu.artist.premigration.mat.db: Contains the classes for exploring for accessing the Database. They are reused from the artistEva component previously introduced.
- eu.artist.premigration.mat.tools.db: Contains the classes managing the security. They are reused from the artistEva component previously introduced.
- resource: Contains the configuration files of the GML files.

2.2.2 Installation instructions

Execute the artisteva.sql script in the Mysql console.

- Copy the ArtistEVA.war file into the Apache Tomcat webapp folder
- Copy the matReport.war file into the Apache Tomcat webapp folder.
- Copy the GML.war file into the Apache Tomcat webapp folder.

Configure the db.properties file inside the eu.artist.premigration.mat.db folder setting the MySQL database URL, username and password

2.2.3 Requirements

- Java 7 EE or higher
- Apache Tomcat 6 or higher
- MySQL 5 Server
- Web browser supporting HTML5 (Chrome, Firefox, etc...)

2.2.4 User Manual

Check the MAT link or install the tool locally (see installation instructions section)

<http://54.196.142.179:8080/ArtistEva/>

User/Login window:

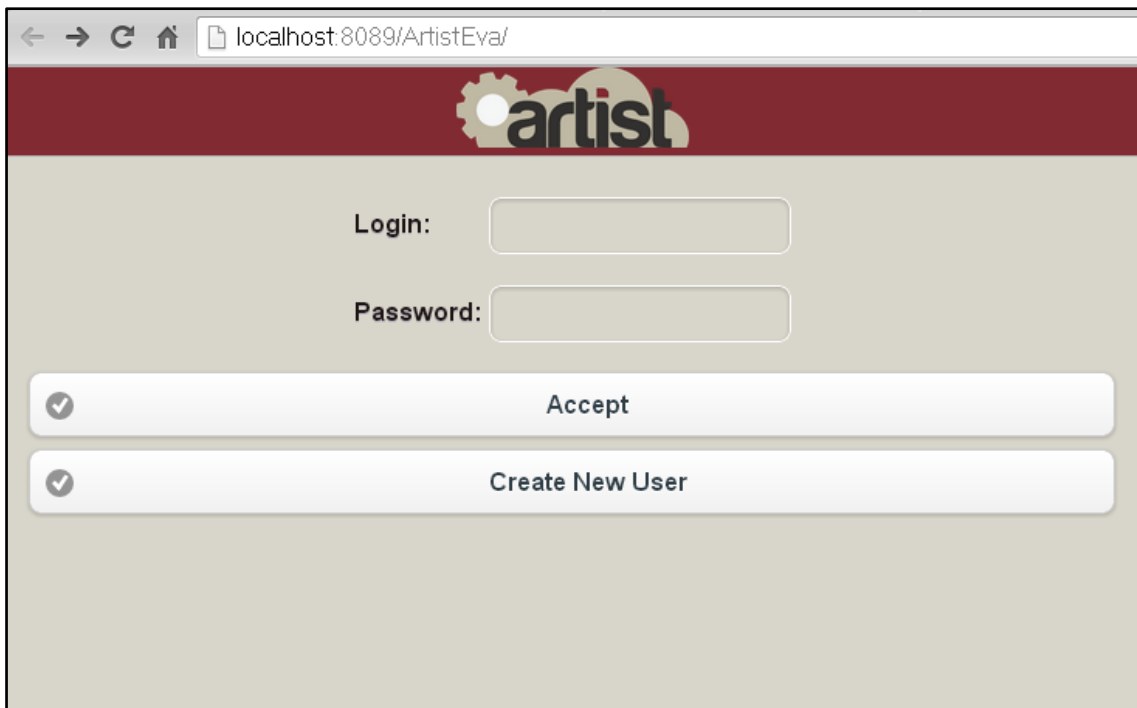


Figure 7. MAT user/login Window

In the login window the user have to insert a valid login and password combination and press the “Accept” button.

If the user has not any account he can click on the “Create New User” button to create one.

New User window:

← → ↻ 🏠 localhost:8089/ArtistEva/#newuser

artist

Identify and describe the organization, whose service delivery model will be SaaS certified, indicating the countries where it is applicable :

Company Name* :

Address :

Telephone :

Fax :

Web :

Contact Person :

Email* :

Number of Employees :

Login* :

Password* :

Re Password* :

Create User

Figure 8 MAT New user window

In this window the user has to fill in the formulary and press the “Create User” button. The fields with and (*) are mandatory.

Main Menu window:

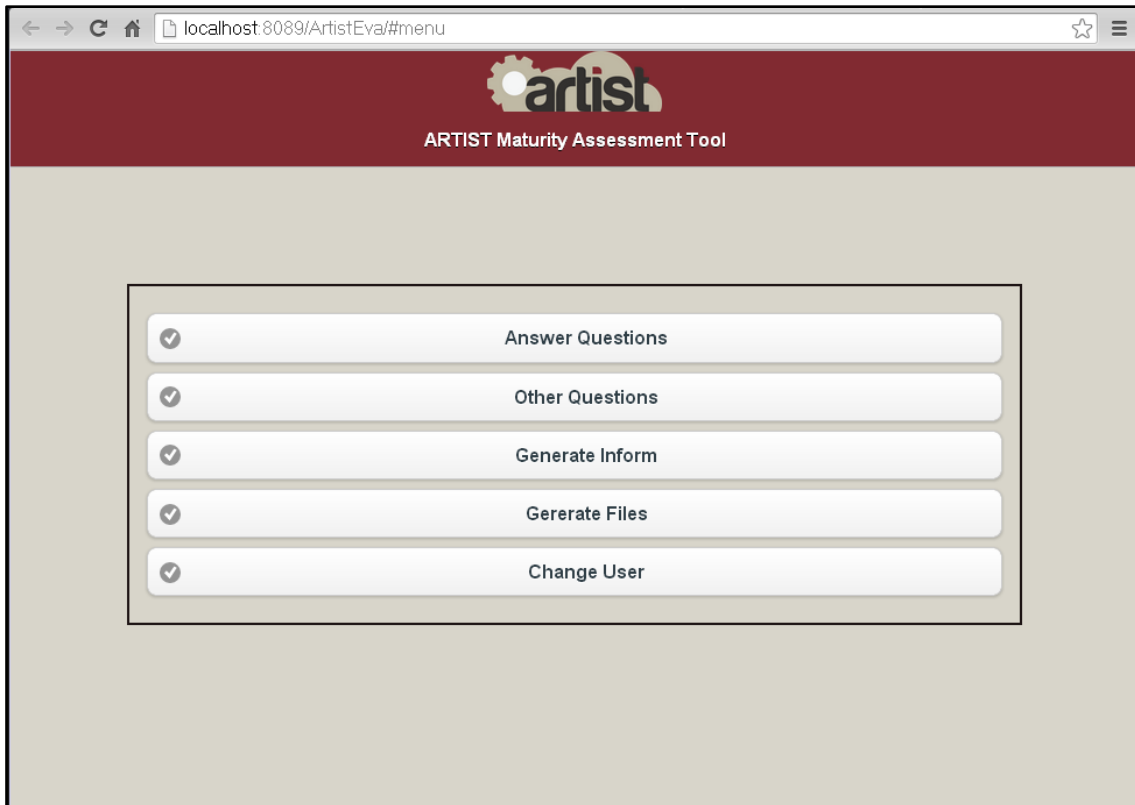


Figure 9. MAT Main menu window

In this window the user can choose between these different options:

- Answer Questions: changes to the “Answer Questions” window.
- Other Questions: changes to the “Other Questions” window.
- Generate Inform: generates the report for the assessment in pdf format.
- Generate Files: Generates the different reports for ARTIST tools.
- Change User: Change user of the tool.

Dimension/scope Selection window:

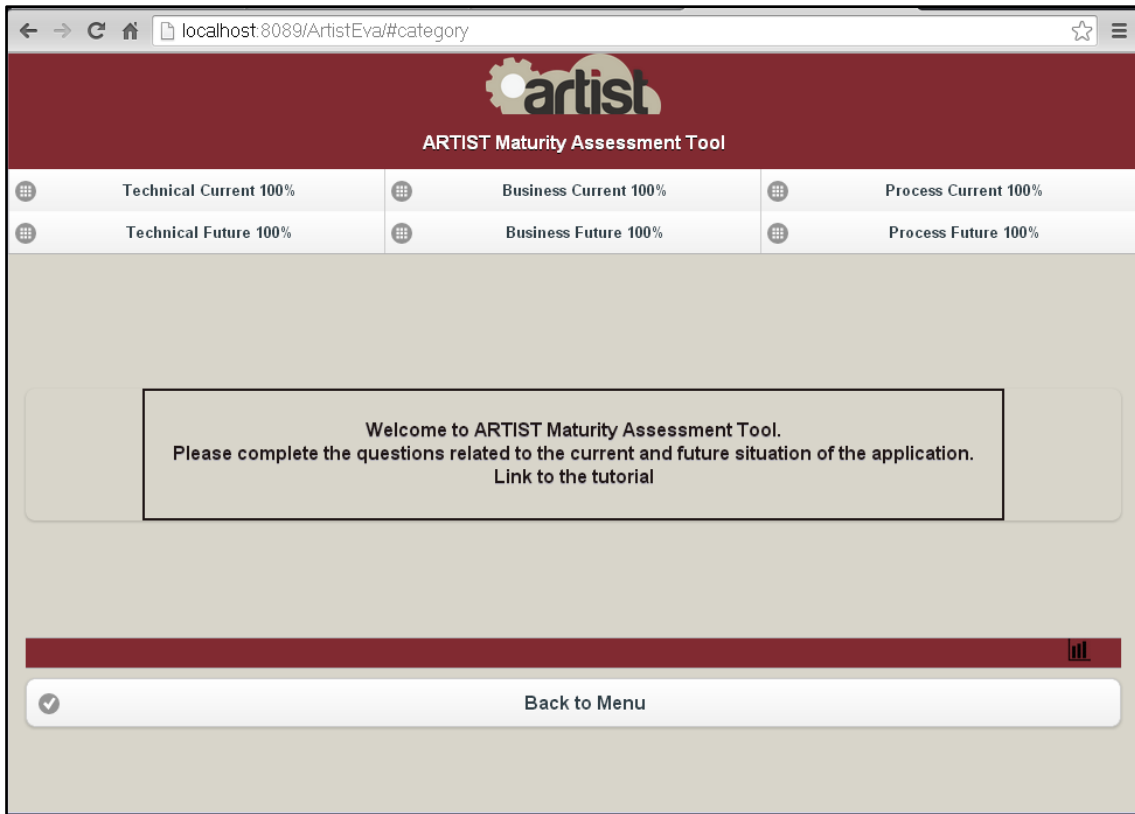


Figure 10 MAT Dimension selection window

In this window the user has to select a Dimension (Business, Process or Technology) and the scope of the questionnaire (current situation, future situation).

User can click “Back to Menu” button to change to the “Main Menu” window.

Dimension score window:

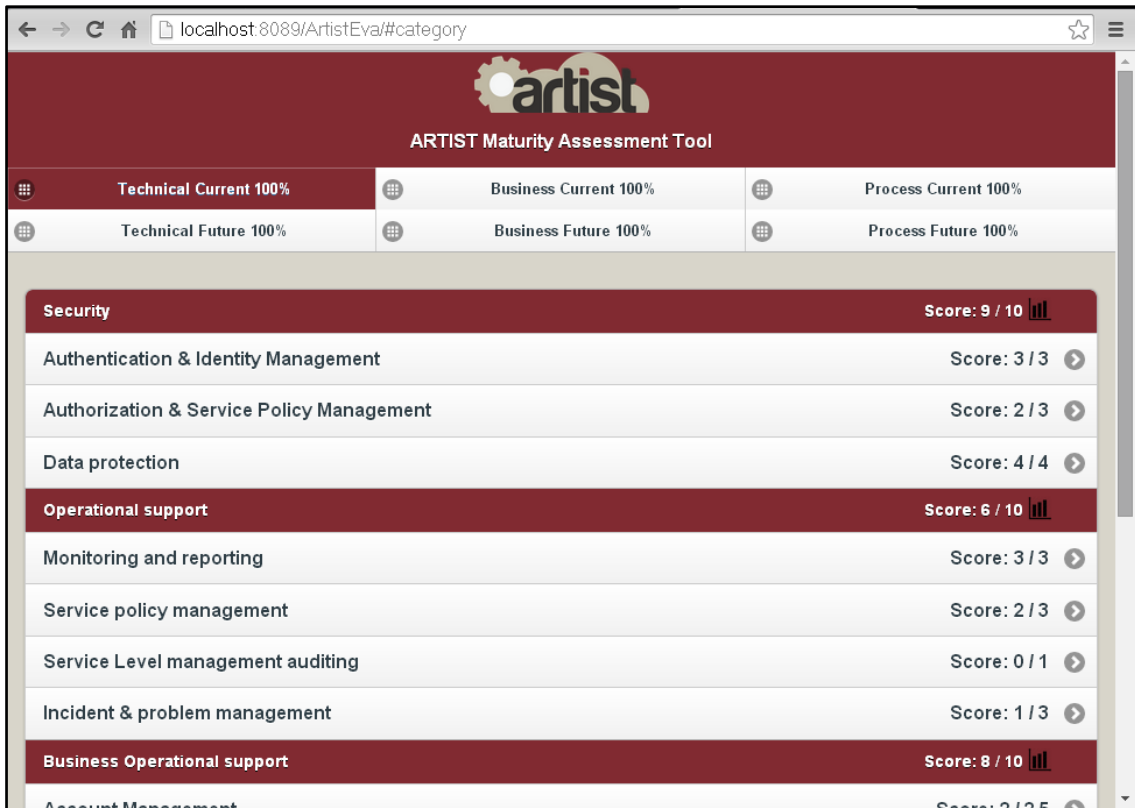


Figure 11 MAT Dimension score window

Once the dimension and the scope are selected, the category window is opened. In this window the user can view all the categories to be evaluated for a certain dimension/scope. Here the current status of the score achieved (based on the current status of the questionnaire that is the answers already provided) and the maximum score for each of the areas inside a dimension. Besides, the total score per dimension is showed.

Clicking in any area will allow the user to access the Question window.

User can click “Back to Menu” button to change to the “Main Menu” window.

Category Chart :

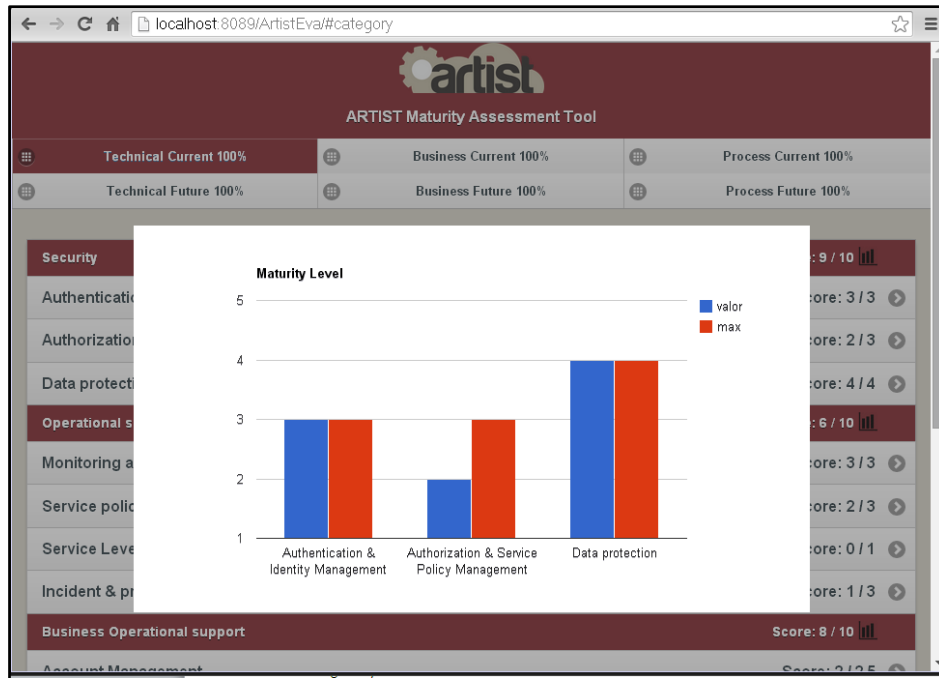




Figure 12 MAT Category Chart

If the  icon is clicked in a category the category chart is shown. Clicking again in the chart the chart is closed.

Dimension Chart :



Figure 13 MAT Dimension Chart

If the  icon is clicked in the dimension the dimension chart is shown. Clicking again in the chart the chart is closed.

Question window:

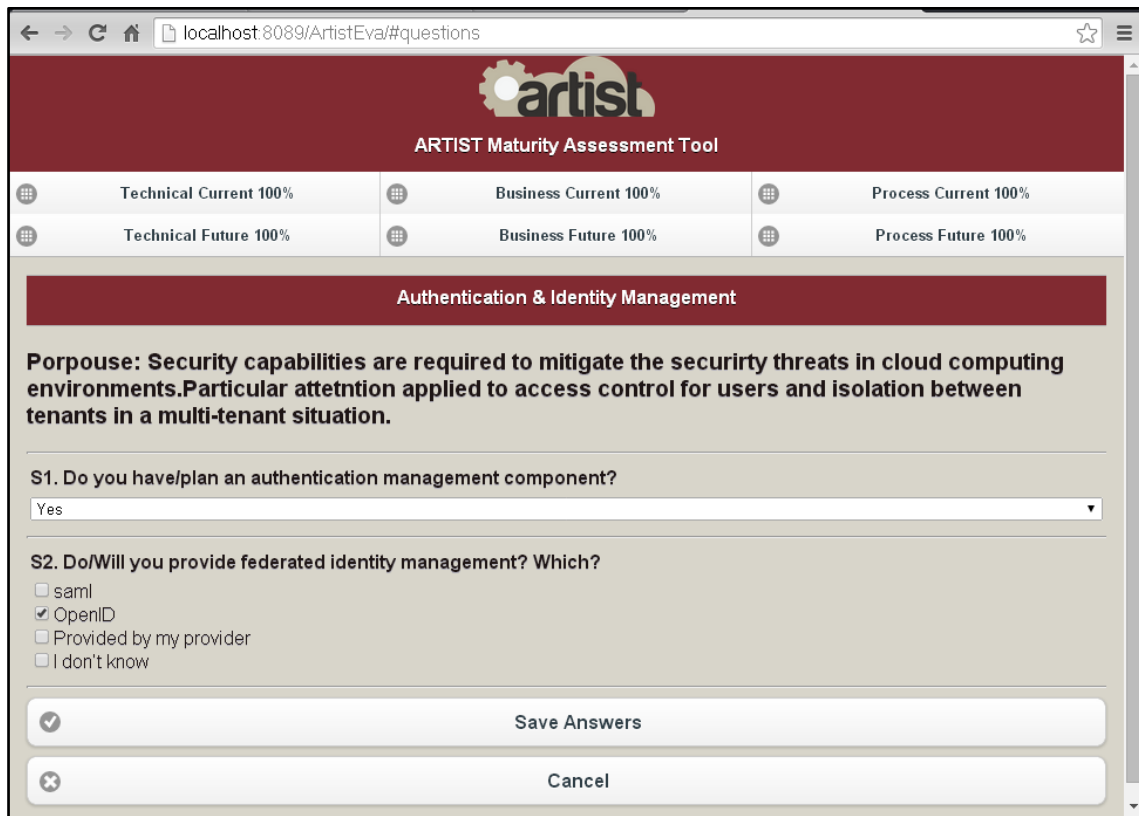


Figure 14 MAT question window

In this window the user have to fill in the formulary.

If the user clicks on the “Save Answers” button the answered questions are saved, so when the user enters the questionnaire again, the questions will be answered. If the “Cancel” button is clicked, the previous windows will appear without saving changes.

Other Questions window:

The screenshot shows a web browser window with the URL `localhost:8089/ArtistEva/#otherquestions`. The page header features the 'artist' logo and the title 'ARTIST Maturity Assessment Tool'. Below the header is a dark red bar with the text 'OTHER QUESTIONS'. The main content area contains five questions:

- OT1. The application to be migrated in which programming language was programmed?**
Dropdown menu: Java
- OT2. Have you decided where will you place your migrated application?**
Dropdown menu: Yes
- OT3. Where?**
Dropdown menu: Public Cloud
- OT4. Which provider will you use?**
Dropdown menu: Amazon
- OT5. Please check from the list the non-functional requirements most interesting for you:**
 - Security: Confidentiality
 - Performance efficiency: Resource utilization, Time behavior
 - Reliability: availability
 - Cost
 - Portability: Adaptability, installability
 - Escalability
 - Elasticity
 - Maintainability: Modularity, Modifiability

Figure 15 Other questions window

In this window the user have to fill in the other questions formulary.

If the user clicks on the “Save Answers” button the answered questions are saved, so when the user enters the questionnaire again, the questions will be answered. If the “Cancel” button is clicked, the previous windows will appear without saving changes.

User can click “Back to Menu” button to change to the “Main Menu” window.

Generate Files window:

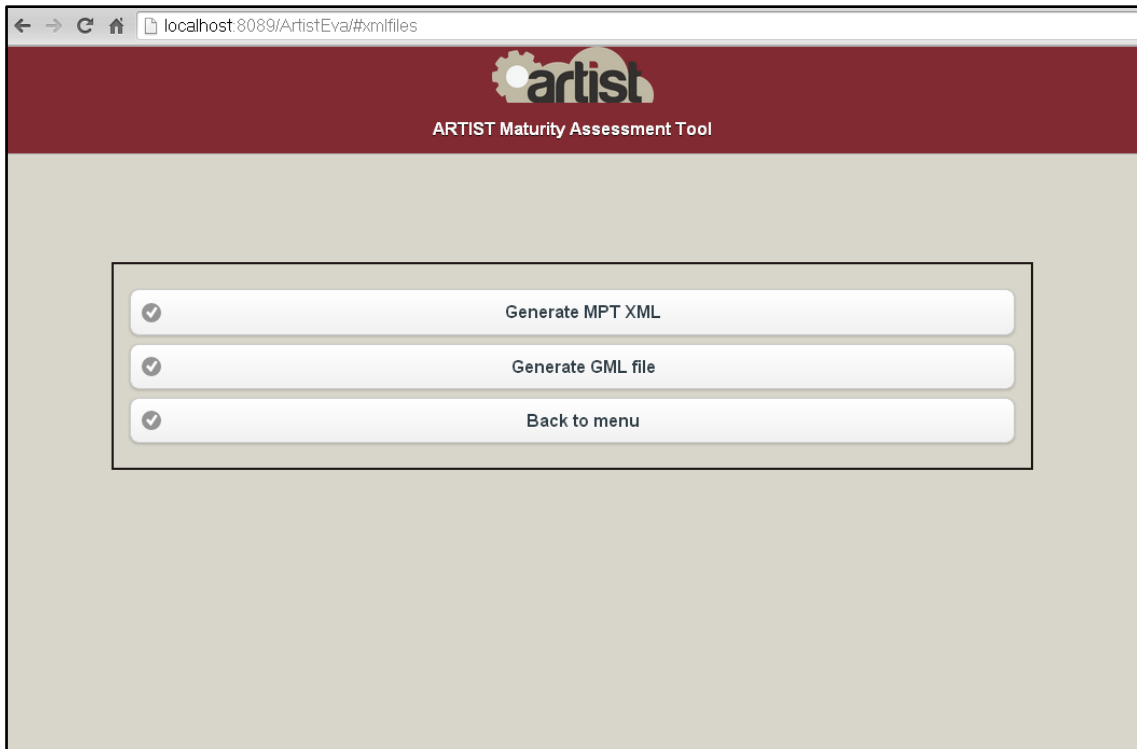


Figure 16 MAT Generate files window

In this window the user can choose between these different options:

- Generate MPT XML: generates a XML for the MPT.
- Generate GML file: generates a GML file
- User can click “Back to Menu” button to change to the “Main Menu” window.

2.2.5 Licensing information

MAT is proprietary software with free use without charges.

2.2.6 Download

Available in Github:

<https://github.com/artist-project/ARTIST-Tooling/tree/master/pre-migration/business%20and%20technical%20modernization/eu.artist.premigration.mat.m24>

3 Conclusions

This deliverable describes the implementation of D5.2.2 as the second version of the prototype of the Maturity Assessment Tool. All the information about the functional and technical description as well as the delivery and usage of the prototype is included.

This second version of the prototype incorporates several enhancements to fulfil end users' needs and requests such as the possibility to save the answers, or the provision of more fine grained information about the results obtained. This prototype has been also extended with the required mechanisms to connect with other ARTIST tools (through the different reports).

The final version of the prototype will implement new functionalities and will improve the current ones (to fulfil MAT requirements exposed in D5.1.1).

4 References

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APPENDIX A: Migration Goals Report

```
import eu.artist.^property.catalogue.static.*
import eu.artist.^property.catalogue.nonfunctional.*
import MARTE_Library.MARTE_DataTypes.*
import MARTE_Library.BasicNFP_Types.*
import ARTISTPrimitiveTypes.*

goalmodel premigration_LOB {
    // This is the Goal Model created in the pre-migration phase for LoB
    // use case. First the non functional properties to be applied in this
    //concrete use case are determined. No specific workload under which
    // the properties must hold are defined//
    workloads []
    applied-properties [
        quantitative CloudProvider {
            property CloudProvider,
            context [
                DBML_Model.eu.artist.usecases.lob
            ]
        },
        quantitative Language {
            property ProgrammingLanguage,
            context [
                DBML_Model.eu.artist.usecases.lob
            ]
        },
        qualitative Security {
            property Security,
            context[]
        },
        qualitative Reliability {
```

```
        property Reliability,
        context[]
    },
    qualitative Maintainability {
        property Maintainability,
        context[]
    },
    qualitative Cost {
        property Cost,
        context[]
    }
]

//Specification of the goals
goals[
    hardgoal LOBLanguage {
        kind required,
        priority 1,
        condition $Language == ProgrammingLanguage.C#
    },
    hardgoal LoBCloudProvider {
        kind required,
        priority 1,
        condition $CloudProvider == CloudProvider.AmazonEC2
    },
    softgoal LoBSecurity {
        kind required,
        priority 2,
        property Security,
        threshold 0.2
    },
    softgoal LoBReliability {
```

```
        kind required,  
        priority 2,  
        property Reliability,  
        threshold 0.2  
    },  
    softgoal LoBMaintanibility {  
        kind required,  
        priority 2,  
        property Maintainability,  
        threshold 0.2  
    },  
    softgoal LoBCost {  
        kind required,  
        priority 2,  
        property Cost,  
        threshold 0.2  
    }  
]  
}
```

APPENDIX B: End user Report

The end user report was added in the Month 24 release of the MAT tool. The report is generated from the main window of the artisteva. The generation is started through the Generate Inform button. The Button is activated once the questionnaire is finished.

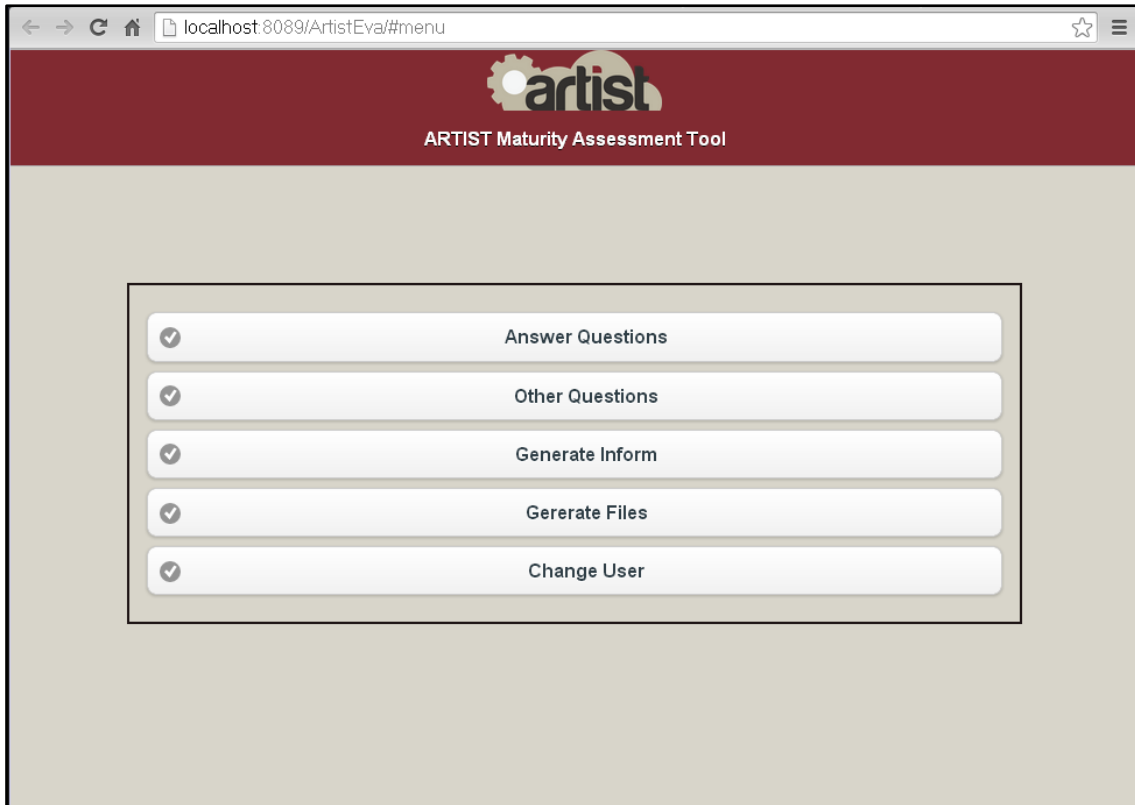


Figure 17. MAT Main menu window

The report generation includes the same security mechanism used in the artisteva component. Therefore only users properly logged into the MAT will be able to generate the report. The report is generated for the user that has requested it. It is not possible to generate the report of another user.

The Report is organised in five main sections.

- Assessment information
- General summary
- Technical
- Business
- Process

1.1 Assessment info

The assessment info includes information about the organisation and the user that has generated the report. Additionally it includes the questionnaire identifier and the assessment identifier. Finally, it also includes information about the coverage of the report.

1- Assessment Information

In this section we include information about the assessment and the company under assessment.

1.1 - Business Information

Business Name: Tecnalia
Description:
Web:

1.2 - Application Information

Description:
Initiatives:
Other Initiatives:

1.3 - Contact Information

Name: zurik corera
Address:
Phone:
Fax:
eMail:

1.4 - Assessment Information

Date: 15 Sep 2014 09:03
Report Date: 15 Sep 2014 09:03
MAT version: 3708426792-2884195453-2666617603-6579889-1716051332-4281480822
Assessment Ref.: 888927357
Current Stn. Coverage %: 15.94
Future Stn. Coverage %: 2.90

Figure 18 Assessment information

The questionnaire and the assessment identifier are *cyclic redundancy* check (CRC) codes that helps to identify the assessment database version and the answer of the user.

1.2 General Summary

The general summary shows the comparison between the current and the future situation with respect to the assessment model. In the report we use percentual values where 100% represent the most desirable situation and 0% the less desirable.

The description of the general summary as well as the description of any other level (Dimension, Area or Category) has a graphical and a tabular representation of the comparison between the current and the future situation.

2 - General Summary

The following graphic (Figure 2) represents the expected evolution between the current and the future situation based on the answers provided in the questionnaire. The values are represented percentually. Where the 0% value represents the worse situation and 100% the most desirable situation.

The figure shows the evolution of the dimensions between the current situation and the future situation.

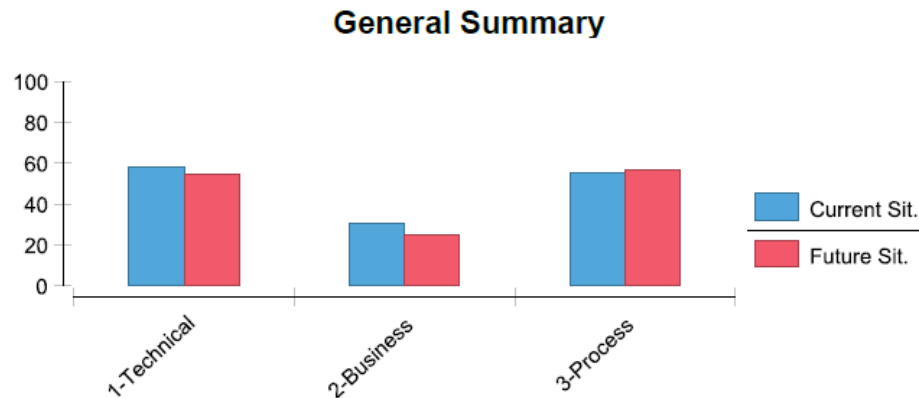


Figure 2 - General Summary

The following table (Table 2) represents percentually and in a table form the expected evolution from the current situation to the future one. This table is the textual representation of the previous graphic (Figure 2).

Table 2 - General Summary

Acronym	Title	Current Situation %	Future Situation %
1-Technical	Technical	57.89	54.61
2-Business	Business	30.28	24.65
3-Process	Process	55.22	56.85

Figure 19. General summary

1.3 Concrete dimension details

Following the General Summary the dimensions of the model are described in detail. For each level the current and the future situation are compared. This is done at dimension, area and category level. Finally, for the categories an enumeration of the questions and the provided and adequate response is provided.

Current Situation

Id: 20

Question: Do you have a component / API for receiving the charges/invoices of your platform provider?

Answer: Yes

Correct Ans: Yes

Future Situation

Id: 20

Question: Do you have a component / API for receiving the charges/invoices of your platform provider?

Answer: Yes

Correct Ans: Yes

Figure 20. Question Detail

APPENDIX C: MPT Report

<AnswerList>
<Answers>
<answer>Yes</answer>
<code>O1</code>
<question>
Do you have a monitoring component to monitor the usage of the your SaaS applications by the consumers?</question>
</Answers>
<Answers>
<answer>Yes</answer>
<code>BO3</code>
<question>Do you have a billing component?</question>
</Answers>
<Answers>
<answer>Private Cloud</answer>
<code>OT3</code>
<question>Where?</question>
</Answers>
<Answers>
<answer> Simultaneous users -Time, -Transaction (DB queries, storage, ...), -Feature (modules, functionality) </answer>
<code>P1</code>
<question>Which pricing model do you have?</question>
</Answers>
<Answers>
<answer> Select and purchase of cloud service (s) from one or more cloud service providers </answer>
</answer>
<code>BS1</code>
<question>Do you plan to...</question>
</Answers>
<Answers>
<answer> Request of audit reports on the service(s) and the service provider(s), both before a purchase is completed and also periodically once the service is in use </answer>
<code>BS1</code>
<question>Do you plan to...</question>
</Answers>
<Answers>
<answer> Handling both financial and technical aspects of the services </answer>
<code>BS2</code>
<question>Does the management of your business plan involve</question>
</Answers>
<Answers>
<answer>Management of contracts and SLAs</answer>
<code>BS2</code>
<question>Does the management of your business plan involve</question>
</Answers>
<Answers>

<answer> The receipt of payments from the cloud provider and their accounting </answer>

<code>FM1</code>

<question> Does your financial processing management involve...</question>

</Answers>

<Answers>

<answer>

The financial relationships with providers are not managed in a systematic way </answer>

<code>FM1</code>

<question> Does your financial processing management involve...</question>

</Answers>

<Answers>

<answer>Entitlements</answer>

<code>AM1</code>

<question>

Does your account management procedure provide capabilities for managing cloud service customer relationships, including </question>

</Answers>

<Answers>

<answer>Cloud service customer data</answer>

<code>AM1</code>

<question> Does your account management procedure provide capabilities for managing cloud service customer relationships, including</question>

</Answers>

<Answers>

<answer> Plus a set of capabilities for the management of the content of the catalogue which are available to staff of the cloud service provider </answer>

<code>PC1</code>

<question> Do you have a Product catalogue that provides capabilities for cloud service customers </question>

</Answers>

<Answers>

<answer>There is no product/service catalogue</answer>

<code>PC1</code>

<question> Do you have a Product catalogue that provides capabilities for cloud service customers </question>

</Answers>

<Answers>

<answer> There is a defined process to measure customer satisfaction, but its implementation is not systematic </answer>

<code>CR3</code>

<question>Is customer satisfaction measured in any way?</question>

</Answers>

<Answers>

<answer>Yes</answer>

<code>FP1</code>

<question> Is it defined how and when the use of the services should be metering?</question>

</Answers>

<Answers>

<answer>Yes</answer>

<code>FP2</code>

<question>

Are defined the pricing schedules (when, which discounts...) in the contract with the customer?</question>

</Answers>

<Answers>

<answer>Yes</answer>

<code>FP3</code>

<question>The billing process is an automatic or non-automatic process that has into account the metering of the use of the services and the rating according to the contract with the customer?</question>

</Answers>

<Answers>

<answer>Yes</answer>

<code>FP4</code>

<question>Is there a monitoring with the account manager in order to check that the payments from the customer are according to the invoices </question>

</Answers>

<Answers>

<answer>Yes</answer>

<code>SLA1</code>

<question> Is there a service level agreement (SLA-Service Level Agreement) that defines the services provided, as agreed between the service provider and the client?</question>

</Answers>

<Answers>

<answer>Yes</answer>

<code>SLA3</code>

<question>If the service provided depends, to some extent, on external suppliers, do you have an underpinning agreement?</question>

</Answers>

<Answers>

<answer>Yes</answer>

<code>SLA4</code>

<question>

Do you periodically review the SLA definitions/conditions and the underpinning agreement?</question>

</Answers>

<Answers>

<answer>Service levels are monitored but not in a systematic way </answer>

<code>SLA5</code>

<question> During the service provisioning do you regularly review the service levels committed?</question>

</Answers>

<Answers>

<answer>No control or review the levels of service provided </answer>

<code>SLA5</code>

<question> During the service provisioning do you regularly review the service levels committed?</question>

</Answers>

<Answers>

<answer>There is a mechanism for informing of the problem and the actions to carried out

</answer>

<code>SLA6</code>
<question> Is there a mechanism in place to communicate the non-compliance with the SLA?</question>
</Answers>
<Answers>
<answer>Yes</answer>
<code>CP1</code>
<question>Do you have formalized the agreement with the cloud provider in any way</question>
</Answers>
<Answers>
<answer>Yes</answer>
<code>CP2</code>
<question> Do you monitor in a systematic way the fulfilment of the conditions and characteristics defined by the agreement?</question>
</Answers>
<Answers>
<answer>There is no agreement or it is not monitored</answer>
<code>CP3</code>
<question> Do you report to the cloud provider the non-fulfilment in order to assure the correct operation of cloud service?</question>
</Answers>
<Answers>
<answer>Yes</answer>
<code>DP1</code>
<question>Do you have defined a development process for this kind of applications?</question>
</Answers>
<Answers>
<answer>No</answer>
<code>DP2</code>
<question>If yes, is the process you have defined an agile process?</question>
</Answers>
<Answers>
<answer>Yes</answer>
<code>DP4</code>
<question>Do you have a defined procedure where update mechanisms and frequency are defined? (once a year, every 6 months, persons/roles who update ...) </question>
</Answers>
<Answers>
<answer>No</answer>
<code>DP6</code>
<question>Do you have a maintenance process?</question>
</Answers>
<Answers>
<answer>Define new roles (i.e Service delivery management)</answer>
<code>RA1</code>
<question> Select in the following list those activities you have done in order to adapt the roles of you organization to be cloud compliant </question>
</Answers>
<Answers>

<answer> Define the responsibilities for the new and existing ones </answer>
<code>RA1</code>
<question> Select in the following list those activities you have done in order to adapt the roles of you organization to be cloud compliant </question>
</Answers>
<Answers>
<answer> To the affected people their new activities and responsibilities </answer>
<code>RA2</code>
<question>Have you communicated the changes about roles?</question>
</Answers>
<Answers>
<answer>Prepare a training plan</answer>
<code>RA3</code>
<question> Which of the following actions do you carry out for training the affected people?</question>
</Answers>
<Answers>
<answer>
Train those people who are going to be assigned to the new or modified roles.</answer>
<code>RA3</code>
<question>Which of the following actions do you carry out for training the affected people?</question>
</Answers>
<Answers>
<answer>Yes</answer>
<code>OT6</code>
<question>Do you know the performance profile of the application ?</question>
</Answers>
<Answers>
<answer>Yes</answer>
<code>OT7</code>
<question>Does your application interoperate with any external tool?</question>
</Answers>
<Answers>
<answer>Yes</answer>
<code>OT8</code>
<question>Are unit tests of the legacy application available?</question>
</Answers>
<Answers>
<answer>Yes</answer>
<code>CR41</code>
<question>Do you have a mechanism to record and solve the incidences?</question>
</Answers>
</AnswerList>

APPENDIX C: RTT Report

Generated json file:

```
{"programinglanguaje":"Java","sameestorage":"Yes","storage":"Relationa  
l  
Database","sameframework":"No","samestorageproduct":"Yes","storageprod  
uct":"MySQL","procedures
```

APPENDIX D: New questionnaire structure

CONSOLIDATED VERSION OF THE QUESTIONNAIRE FOR M24

Assumptions:

- All the questions will be referred to initial and future situations.
- Questions are categorized into dimensions, areas, sub-areas and other aspects.
- Some questions don't affect the final score; they "only" serve to infer MG. These are grouped into other aspects.
- Each area has a maximum punctuation. Each sub-area has a maximum punctuation.
- The session storage functionality is included.
- Punctuation will be given by sub-area.

Questionnaire structure:

- Dimensions:
 - Technical: Areas
 - Security: Sub-areas:
 - **Authentication & Identity Management**
 - **Authorization & Service Policy Management**
 - **Data protection**
 - Operational support: Sub-areas:
 - **Monitoring and reporting**
 - **Service policy management**
 - **Service Level management auditing**
 - **Incident & problem management**
 - Business Operational support: Sub-areas:
 - **Business operational support components**
 - **Account Management**
 - **Subscription Management**
 - **Billing: Metering and rating, and generation of invoices**
 - **Accounts: Provider control**
 - *Architectural and programming aspects of the application:* Sub-areas:
 - **Architecture**
 - **Multi tenancy level & elasticity**
 - *Other aspects:* Sub-areas
 - **Target platform**
 - **Non-functional properties /requirements**
 - Business: Areas
 - *Pricing patterns:* Sub-areas
 - **Pricing patterns**
 - *Business strategy:* Sub-areas
 - **Creation of the business plan for the new service offerings**
 - **Management of the business plan**

- *Customer relationship : Sub-areas*
 - **Customer relationship**
- *Financial management : Sub-areas*
 - **Provider accountability**
 - **Own accountability**
- *Account management: Sub-areas*
 - **Account management**
- *Product catalogue: Sub-areas*
 - **Product catalogue**
- *Regulatory: Sub-areas*
 - **Regulatory**
- Process: Areas
 - *Customer relations process /problem resolution process: Sub-areas*
 - **Customer interaction**
 - **Incidence management and resolution**
 - *Financial management process: Sub-areas*
 - **Metering and rating the use of the services**
 - **Billing**
 - *SLA Management: Sub-areas*
 - **SLA definition**
 - **Auditing & reporting**
 - *Cloud Provider Management: Sub-areas*
 - **Requirements and agreement**
 - **Auditing & reporting**
 - *Development process*
 - **Development process**
 - **Update & maintenance process**
 - *Roles Alignment process*
 - **Definition and adaptation of new roles**
 - **Communication & training**

TECHNICAL Dimension: Maximum score 40.

- *Security (10/40)*
 - **Authentication & Identity Management (Maximum 3/10)**
 - S1-Do you have/plan an authentication management component?
 - Yes (+2)
 - S2-Do/Will you provide federated identity management? Which?
 - “saml” (+1)
 - OpenID (+1)
 - Provided by my provider
 - I don’t know?
 - No (0)

- **Authorization & Service Policy Management (Maximum 3/10)**
 - S3-Do you control/manage the authorization of users to access specific capabilities/functionalities/data?
 - Yes (+2)
 - S4-How?
 - Free text
 - No (+0)

 - **Data protection (Maximum 4/10)**
 - S5-Have/will you catalogued the data of your application? (+3)
 - No (Recommendation: Identify its sensitivity to the risk the business of its leakage, loss or corruption) (ISO 2700x on how to identify the sensitivity of data)
 - Yes
 - S6-Do you have sensitive data?
 - Yes
 - No
 - S7-Do you use any data encryption for your sensitive data?
 - Yes (+1)
 - S8-Which?
 - Own encryption component based on (include technology):
 - Free text
 - I rely/ will rely on the cloud service provider
-
- *Operational support requirements : (10/40)*
 - **Monitoring and reporting (3/10)**
 - O1-Do you have a monitoring component to monitor the usage of the your SaaS applications by the consumers? (1/3)
 - No
 - Yes
 - O2-Is it aligned with your pricing model? (2/3)
 - No
 - Yes

 - **Service policy management: Provides capabilities to define, store, and retrieve policies that apply to cloud services. (3/10)**
 - O3-Do you define different policies applying different services and customers? (2/10)
 - No
 - Yes (+2)
 - O4-Which ones?
 - General (+0,25),

- technical (+0,25),
 - business (+0,25),
 - security (+0,25)
 - **Service Level management auditing**
 - O5-Do you have a component (in your application) for auditing & logging? (1/10)
 - No
 - Yes (+1)
 - I will rely on my cloud provider (+0,5)
 - **Incident & problem management: It provides capabilities for the capture of incident or problem reports. (3/10)**
 - O6-Do you have a component for capturing the incidents or problems? (2/10)
 - No
 - I will rely on my cloud provider (+0,5)
 - Yes (+1)
 - O7-At which level:
 - Application level. How (+0,5)
 - Network level. How (+0,25)
 - Others (+0.25)
- *Business operational support components : (10/40)*
 - **Account Management:** contracts, subscriptions, service pricing (discounts), Customer data. (2,5/10)
 - BO1-Do you have /will you have a component for managing your cloud service customer relationships/account management?
 - Yes (2.5)
 - No
 - I will rely on my target platform (1)
 - **Subscription Management:** Recording of new, or changed subscription information (1,5/10)
 - BO2-Do you have/will you have a subscription management component?
 - **Billing: Metering and rating, and generation of invoices.(4/10)**
 - BO3-Do you/ will have a billing component?
 - Yes (2)
 - BO4-Which functionality/s does it support?
 - Metering of the use of the service (+0,5)
 - Rating of the use of the service(+0,5)
 - Generation of invoices(+0,5)
 - Transmission of invoices to the customer(+0,5)
 - No
 - **Accounts: Provider control (2/10)**

- BO5-Do you have a component / API for receiving the charges/invoices of your platform provider?
 - Yes (2)
 - No

Architectural and programming aspects of the application: (10/40)

- **Application Language**
 - OT1-The application to be migrated in which programming language was programmed?
 - Java
 - C#
- **Architecture (5/10)**
 - AP1-Is/will your application a (2/10)
 - Traditional client-server with a thick client (0)
 - Client Server with a thin client (2-3 tier architecture) (0.5)
 - Client server with a thin client (2-3 tier architecture with no usage or hardly usage of web services) (1)
 - Client-server with a thin client and usage of a SOA (1)
 - Multi instance (each customer has its own unique instance of the capability. It is the collection of customer of instance that makes it utility or Cloud-like in its provision) (1.5)
 - Multi-tenant (a single instance of some capability is shared by many customers) (2)
 - AP2-Is your application modeled? (3/10)
 - Yes (1,5)
 - AP3-Have you identified the following parts/components?
 - Logical set of component services that the application is based of: +0,5
 - Database: DBMS, OS, server tier.
 - Web application: Web application, web server, OS, Server, tier
 - Required artifacts (actual scripts, files, software packages, etc) to deploy and install the application:+0,5
 - File artifact, script artifact, archive artifact, package artifact
 - Relationships that are able to describe the relationship types between the application nodes.(connects to, depends on, hosted on...) +0,5
 - No
- **Multi tenancy level & elasticity (5/10)**

- AP4-What is your current level of multi-tenancy? (Note: 1 is the highest) (3/10)
 - Shared middleware with a single application instance (1)



- Shared middleware with multiple application instances and shared address spaces (1.5)



- Shared middleware with multiple application instances and separate address spaces (2)



- Virtualization with tenant specific virtual images (or Virtualization with a Mediation Layer) (2.5)



-
- Multiple instances on separate hardware (ASP) (3)



-
-

- AP5-Shall your future application a) have a component / self-made means to ensure its elasticity or b) be controlled by your chosen cloud provider? (2/10)
 - self-made means to ensure its elasticity: (+1)
 - Horizontal scaling
 - Auto-scaling
 - External Configuration Store
 - Runtime reconfiguration pattern
 - Circuit Breaker pattern
 - Pipes & filters
 - Database elasticity (+1)
 - Database sharding
 - Command and Query Responsibility Segregation
 - Event Sourcing Pattern
 - Index table pattern
 - Materialized view
 - Controlled by your chosen cloud provider (0,5)

Other aspects:

- **Target platform**
 - OT2-Have you decided where you will place your migrated application?

- No
- Yes
 - OT3-Where?
 - Public Cloud
 - OT4-Which? GAE/AMAZON
 - Private Cloud
 - Hybrid
- **Non-functional properties /requirements**
 - OT5-Please check from the list the non-functional requirements most interesting for you:
 - SecurityPerformance efficiency:
 - Reliability
 - Cost
 - PortabilityScalability
 - Elasticity
 - Maintainability:
 - Usability: Compatibility
- **Information for MPT**
 - OT6-Do you know the performance profile of the application ?
 - Yes
 - No
 - OT7-Does your application interoperate with any external tool?
 - Yes
 - No
 - OT8-Are unit tests of the legacy application available?
 - Yes
 - No
- **Information for RTT**
 - OT9. Do you have same storage technology on source and destination?
 - Yes
 - No
 - OT10. Technology on source:
 - Relational Database
 - NoSQL Database
 - OT11. Do you have same framework for data storage on source an destination?
 - Yes
 - No

- OT12. Technology on source:
 - JPA
 - Objectify
- OT13. Do you have same product for data storage on source and destination?
 - Yes
 - No

- OT14. Product on source:
 - Oracle
 - MySQL
 - Microsoft SQL Server
 - PostgreSQL
 - DB2
 - Other

- OT15. Stored procedures are being used?
 - Yes
 - No

- OT16. Data storage specific functions are being used?
 - Yes
 - No

BUSINESS DIMENSION: Maximum score 35

- *Pricing patterns: (5/35)*
 - **Pricing patterns**
 - P1-Which pricing model do you have?
 - Licenses / Perpetual (0)
 - Flat rate (fixed price) (+1)
 - Number of total users (+2)
 - Pay as you go: (+3)
 - Simultaneous users
 - Time
 - Transaction (DB queries, storage, ...)
 - Feature (modules, functionality)
 - Fixed monthly fee + variable fee (3.5)
 - Peak Load (more expensive at certain hours of the day because the infrastructure is at its peak) (4)
 - Tiered model (each feature has a different price) (4)
 - Freemium (5)
 - Capacity-based: Customers are given a free version up to a capacity, usage, or number of users threshold
 - Feature-based: Customers are allowed to use a free version of the product which has certain key features locked until the customer converts to a paid customer.
 - Time-based: This is a typical free trial that expires after a fixed period.
 - Use-case: This is a less common model in which customers can use the offering for free provided they fall under certain specified categories (i.e. non-commercial use, educational, non-profit, etc.).
 - Feature - Limited (an initial set of functionalities are offered for a price and if the customer would like to have more, they have different prices)(4.5)
 - Various pricing models depending on the customer (5)
 - **Creation of the business plan for the new service offerings (3.5/5)**
 - BS1-Do you plan to...
 - create a business plan for the use of cloud services (0.5)
 - select and purchase of cloud service (s) from one or more cloud service providers(0.5)
 - track the use of the services and deal with accounting and financial management(0.5)

- request of audit reports on the service(s) and the service provider(s), both before a purchase is completed and also periodically once the service is in use; (0.5)
- handle billing/invoices received from the cloud service provider for the use made of cloud services; (0.5)
- ensure that billing matches the actual usage of cloud services made by the consumer;
- make payments to the cloud service provider; (0.5)
- keep accounts in relation to the use of cloud services. (0.5)
- **Management of the business plan (1.5/5)**
 - BS2-Does the management of your business plan involve:
 - the offering of one or more cloud services to customers, (0.25)
 - handling both financial and technical aspects of the services, (0.25)
 - target customer set, (0.25)
 - management of contracts and SLAs, (0.25)
 - channels to market, sales targets, (0.25)
 - track the sales and service usage against the plan to ensure that financial targets are achieved for the cloud service provider. (0.25)
- *Customer relationship (4)*
 - **Customer relationship**
 - CR1-Does your customer relationships management involve...
 - the definition of the service offering; (0.5)
 - the creation and maintenance content of a product catalogue; (0.5)
 - the service marketing and customer acquisition; (0.5)
 - providing the point of contact for the customer for all business matters; (0.5)
 - discussing and resolving concerns or problems raised by the customer; (0.5)
 - processing change requests (e.g. entitlement changes); (0.5)
 - handling billing updates or challenges; (0.5)
 - providing a channel for any requirements change requests from the customer. (0.5)
- *Financial management (5)*
 - **Provider accountability (2/5)**
 - FM1-Does your financial processing management involve...(2/5)
 - the management of the cloud provider's invoice for charges relating to the use of cloud services,(+1)
 - the receipt of payments from the cloud provider and their accounting,(+1)

- **Own accountability (3/5)**
 - FM2-Does your financial processing management involve...(3/5)
 - the generation of the billing information or invoice to the cloud service customers relating to the use of cloud services, (+1)
 - the transmission of the billing information or invoice to the cloud service customer(+1)
 - the receipt of the payments by the customer(+1)
- *Account management (6)*
 - **Account management**
 - AM-Does your account management procedure provide capabilities for managing cloud service customer relationships, including:
 - management of contracts; (+1)
 - subscriptions to cloud services; (+1)
 - entitlements; (+1)
 - service pricing, which may involve customer-specific terms such as discounts; (+1)
 - cloud service customer data; (+1)
 - and fulfilling the requirements for availability and security due to the importance and the sensitivity of the data related to customer accounts(+1)
- *Product catalogue (5)*
 - **Product catalogue**
 - PC1-Do you have a Product catalogue that provides capabilities for cloud service customers:
 - to browse a list of available service offerings which they can purchase, (+3)
 - plus a set of capabilities for the management of the content of the catalogue which are available to staff of the cloud service provider. (+2)

N.B. Product catalogue entries consist of technical information about each of the service offerings (capabilities provided by the service, interface definitions for the service including available service operations, security information), plus related business information such as pricing or rating.
- *Regulatory (5)*
 - **Regulatory**
 - R1-Is your service compliant with regulatory frameworks such as:
 - National data protection laws (free text) (+1.5)
 - EC data protection laws (free text) (+1.5)
 - regulations on security (free text) (+1)

- other (free text) (+1)

PROCESS DIMENSION: Maximum score 45

- *Customer relations process /problem resolution process (10/45)*
 - **Customer interaction (3/10) (Monitor customer request CCRA)**
 - CR1-Do you have a mechanism to communicate with the user? (1)
 - Yes
 - CR2-This Point of contact with the user is: (multiple selection) (1)
 - Real time communication +0.25
 - By email +0.25
 - Helpdesk support +0.25
 - Webportals +0.25
 - No (+0)
 - CR3-Is customer satisfaction measured in some way? (2)
 - There is a defined process to measure customer satisfaction, but its implementation is not systematic +1
 - The customer satisfaction is analyzed, solutions if required are provided and communicate to the customer +2
 - Customer satisfaction is not measured +0
 - **Incidence management and resolution (4/10) (perform initial problem analysis CCRA)**
 - CR41-Do you have a mechanism to record and solve the incidences?
 - Yes (2)
 - CR4-The incident log includes the following fields: (Multiple selection) (2)
 - Incidence categorization (often broken down into between two and four levels of sub-categories) (+ 0.2)
 - Incidence urgency & impact (+ 0.2)
 - Incidence prioritization(+ 0.2)
 - Identification of user(+ 0.2)
 - Description of symptoms(+ 0.2)
 - Incidence status (active, waiting, closed, etc.) (+ 0.2)
 - Support group/person to which the incidence is allocated(+ 0.2)
 - Related problem/Known Error(+ 0.2)
 - Activities undertaken to resolve the incidence(+ 0.2)
 - Resolution date and time (+ 0.2)
 - NONE (+0)
 - No (+0)
 - CR5-This mechanism includes an escalation process? (2)

- Yes
 - CR6-When the incidence should be escalated?
(Multiple selection)
 - Escalation levels are defined and known (+0.5)
 - Escalation process is related to the incident impact & urgency (+1)
 - The resolution is propagated to all people involved (+0.5)
- No (+0)

- *Financial management process (5/45)*
 - **Metering and rating the use of the services (2)**
 - FP1-Is it defined how and when the use of the services should be metering?
 - Yes (+1)
 - No (+0)
 - FP2-Are defined the pricing schedules (when, which discounts...) in the contract with the customer?
 - Yes (+1)
 - No (+0)
 - **Billing (3)**
 - FP3-The billing process is an automatic or non-automatic process that has into account the metering of the use of the services and the rating according to the contract with the customer?
 - Yes (+2)
 - No (+0)
 - FP4-Is there a monitoring with the account manager in order to check that the payments from the customer are according to the invoices
 - Yes (+1)
 - No (+0)

- *SLA Management (10/45)*
 - **SLA definition(6)**
 - SLA1-Is there a service level agreement (SLA-Service Level Agreement) that defines the services provided, as agreed between the service provider and the client? (1)
 - Yes (+1)
 - No (+0)
 - SLA2-Which of the following aspects are covered in your SLAs? (multiple choice each selection +0.2) (3)

- Conditions under which the service is considered to be unavailable
- Availability targets
- Reliability targets
- Maintainability targets
- Down times for maintenance
- Restrictions on maintenance, e.g. allowed maintenance windows, seasonal restrictions on maintenance, and procedures to announce planned service interruptions
- Definitions of major incidents
- Requirements regarding availability reporting
- Response times from applications
- Requirements for scalability (assumptions for the medium and long-term increase in workload and service utilization)
- Requirements regarding capacity and performance reporting
- Time within which a defined level of service must be re-established
- Responsibilities: Duties of the service provider, of the customer and of service users (e.g. with respect to IT security)
- IT Security aspects to be observed when using the service (if applicable, references to relevant IT Security Policies)
- Pricing model: Cost for the service provision, rules for penalties/charge backs
- SLA3-If the service provided depends, to some extent, on external suppliers, do you have an underpinning agreement?
 - Yes (+1)
 - No (+0)
- SLA4-Do you periodically review the SLA definitions/conditions and the underpinning agreement?
 - Yes (+1)
 - No (+0)
- **Auditing &reporting (4)**
 - SLA5-During the service provisioning do you regularly review the service levels committed? (One option) (2)
 - Service levels are monitored regularly +2
 - Service levels are monitored but not in a systematic way +1
 - No control or review the levels of service provided +0
 - SLA6-Is there a mechanism in place to communicate the non-compliance with the SLA? (2)
 - There is a mechanism for informing of the problem and the actions to carried out +2
 - There is a mechanism for informing of the problem +1
 - There is no mechanism +0

- *Cloud Provider Management (5/45)*
 - **Requirements and agreement (2)**
 - CP1-Do you have formalized the agreement with the cloud provider in any way (the best way is to have a SLA agreement with the cloud provide) (2)
 - Yes (+2)
 - No (+0)
 - **Auditing and reporting (3)**
 - CP2-Do you monitor in a systematic way the fulfilment of the conditions and characteristics defined by the agreement? Most of the cloud providers provide their own tools to facilitate the monitoring of their cloud services
 - Yes (+1,5)
 - No (+0)
 - CP3-Do you report to the cloud provider the non-fulfilment in order to assure the correct operation of cloud service?
 - Yes (+1,5)
 - No (+0)

- *Development process (10/45) (CMMI for services &ITIL)*
 - **Development process (5)**
 - DP1-Do you have defined a development process for this kind of applications?
 - Yes (+1)
 - No (+0)
 - DP2-If yes, is the process you have defined an agile process?
 - Yes (+2)
 - No (+0)
 - DP3-If yes, do you have followed in a systematic way the following steps?
 - Select the requirements to be developed in the sprint.
 - Analysis and modelling.
 - Development.
 - Testing of functional and non-functional requirements.
 - Review and add if necessary the requirements.
 - Test and deploy the final application
 - Yes (+2)
 - Partially (+1)
 - No (+0)
 - **Update and maintenance process (5)**

- DP4-Do you have a defined procedure where update mechanisms and frequency are defined? (once a year, every 6 months, persons/roles who update ...)
 - Yes (+1)
 - No (+0)
- DP5-Are people responsible for the updates defined?
 - Yes (+1)
 - No (+0)
- DP6-Do you have a maintenance process?
 - Yes (+3)
 - i. DP7-This maintenance process covers the following activities: (multiple selection)
 - ii. Corrective actions +1
 - iii. Enhancements actions +1
 - iv. Actions related to SLA noncompliance +1
 - No (+0)
- *Roles Alignment process (5/45) ITIL*
 - **Definition and adaptation of new roles (2)**
 - RA1-Select in the following list those activities you have done in order to adapt the roles of you organization to be cloud compliant (multiple choices)
 - Define new roles (i.e Service delivery management) +0.5
 - Review the existing ones and identify those that should have new functionalities +0.5
 - Define the responsibilities for the new and existing ones. +1
 - None +0
 - **Communication and training (3)**
 - RA2-Do you have Communicate the changes about roles? (2) (multiple choices)
 - To the affected people their new activities and responsibilities +1
 - To the entire organization the new and modified roles. +1
 - No +0
 - RA3-Which of the following actions do you carry out for training the affected? (1) (multiple choices)
 - Collect the requirements for new skills +0.25
 - Look for them in the organization. +0.25
 - Prepare a training plan +0.25
 - Train those people who are going to be assigned to the new or modified roles. +0.25