

Cloud Modernization Assessment Framework:

Analyzing the impact of a potential
migration to Cloud



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Presentation Outline



- ARTIST project at a glance
- Cloud modernization assessment in ARTIST
 - Maturity assessment
 - Technical feasibility analysis
 - Business feasibility analysis
- Technical approach & tools
- A hands-on practice with PetStore

ARTIST at a glance



- **ARTIST Architecture** *and*
migratio

- **Mission**
 - ARTIST legacy

- **Vision**
 - ARTIST softw

- **Goal**
 - Adap a set of
Engin



Advanced software-based seRvice
provisioning and migratioN of legacy SofTware

ization of

legacy

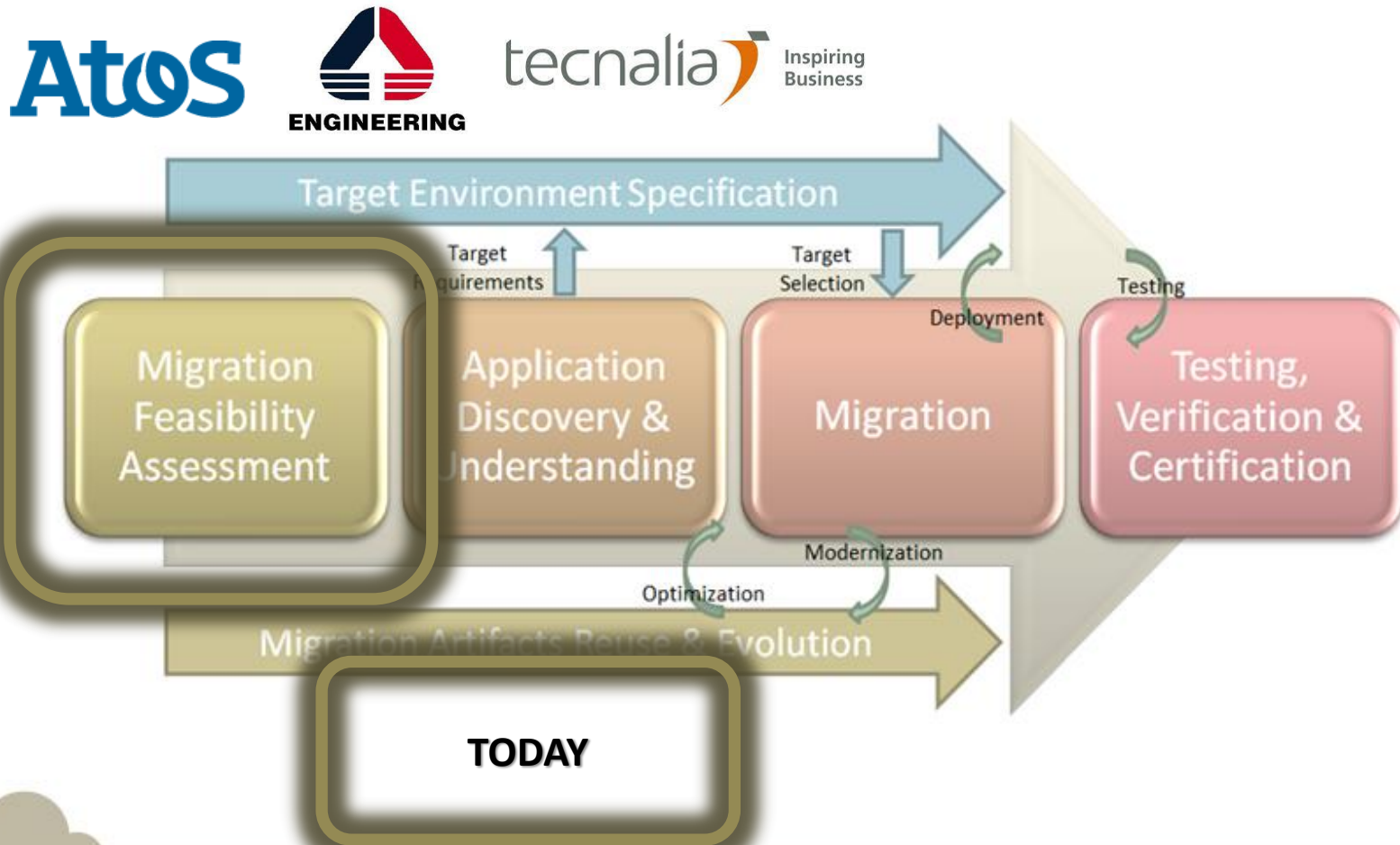
the creation of
Driven

Unlock the code, release the future!

ARTIST Core phases



- Four core migration phases



Cloud modernization assessment in ARTIST (I)



Pre-migration phase as the **starting point of each migration**



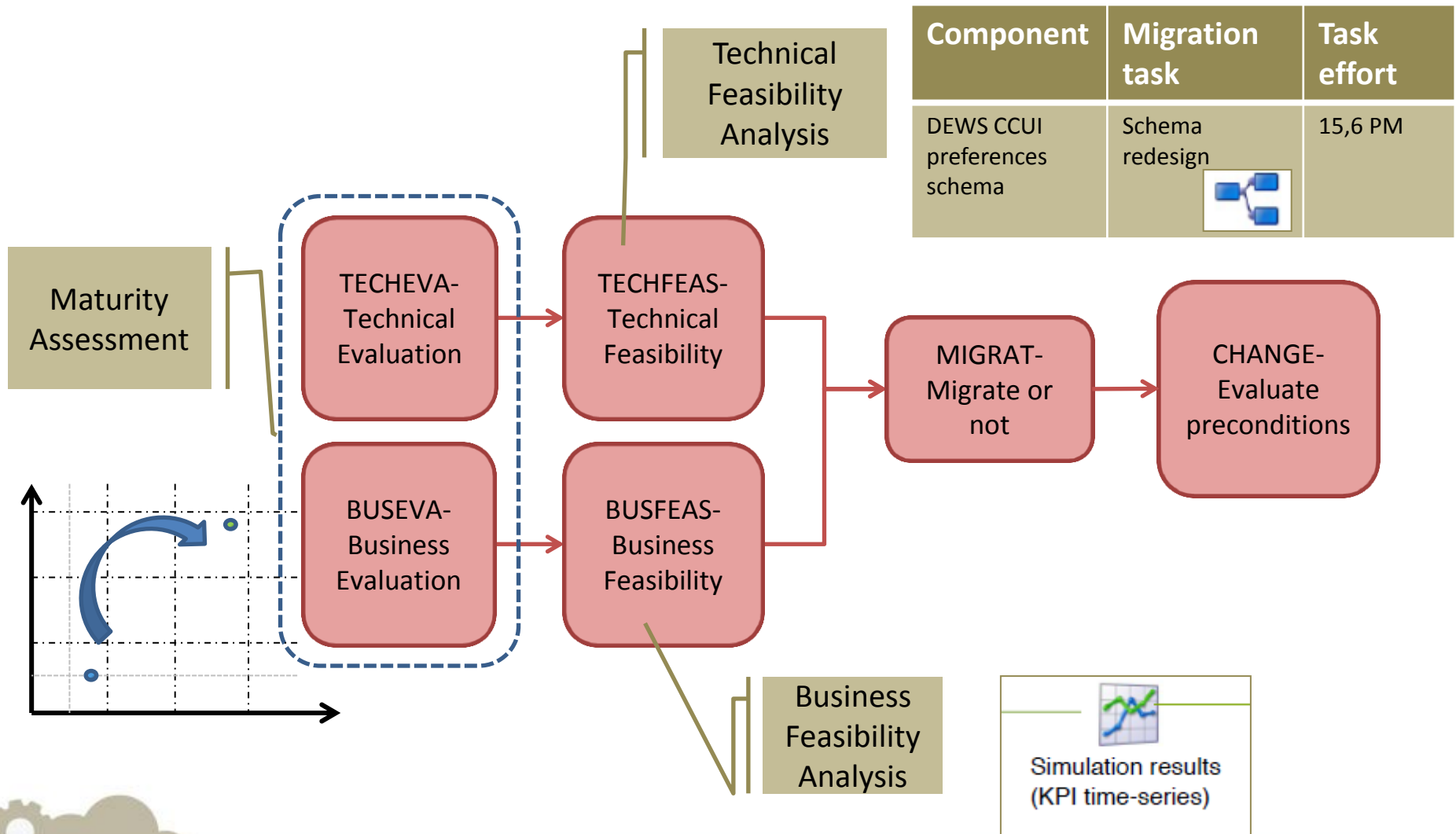
The **objective** of this phase is to measure the **impact of a potential migration** in terms of:

- Resources needed
- Changes needed (Processes & Business)



In order to have **quantitative & qualitative** metrics upon which to base the migration

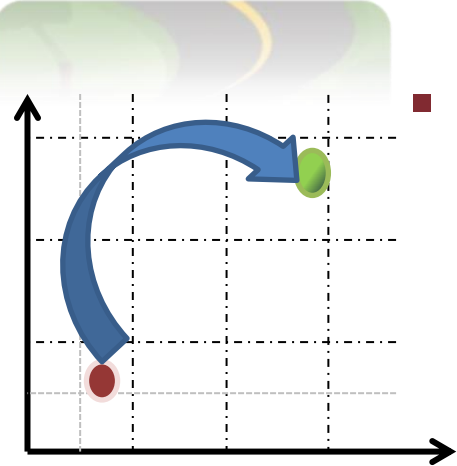
Cloud modernization assessment in ARTIST (II)



Maturity assessment (I)



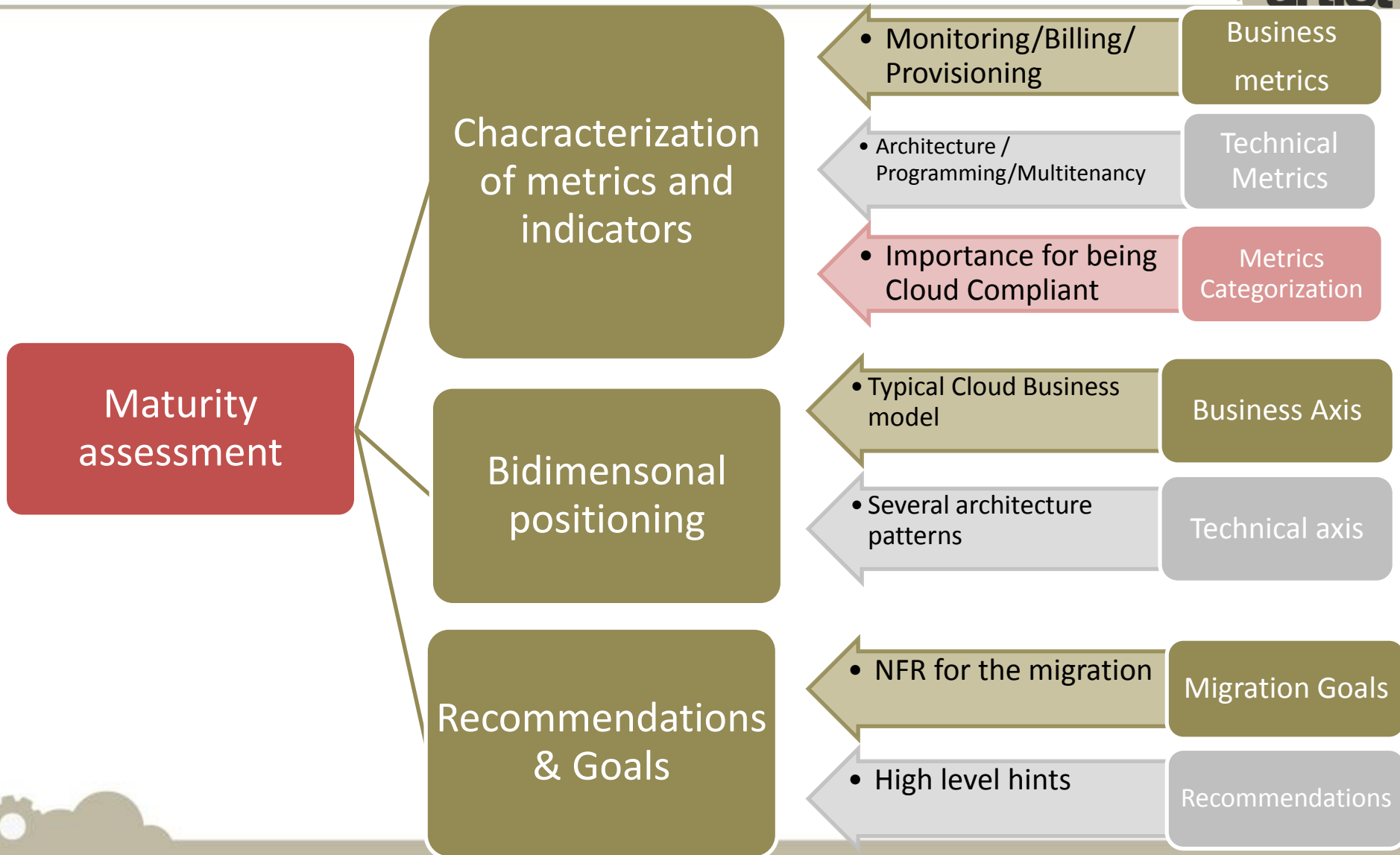
- Maturity Assessment has as objective to **analyze the current (initial) and desired (final)** situation of an application that is going to be migrated, and under two perspectives : **Technical and Business**.



- The assessment provides as a result:
 - 1) **A picture with the position** in a quadrant of the initial and the final situation of the application
 - 2) A set of **migration goals and recommendations**(high level)



Maturity assessment (II)



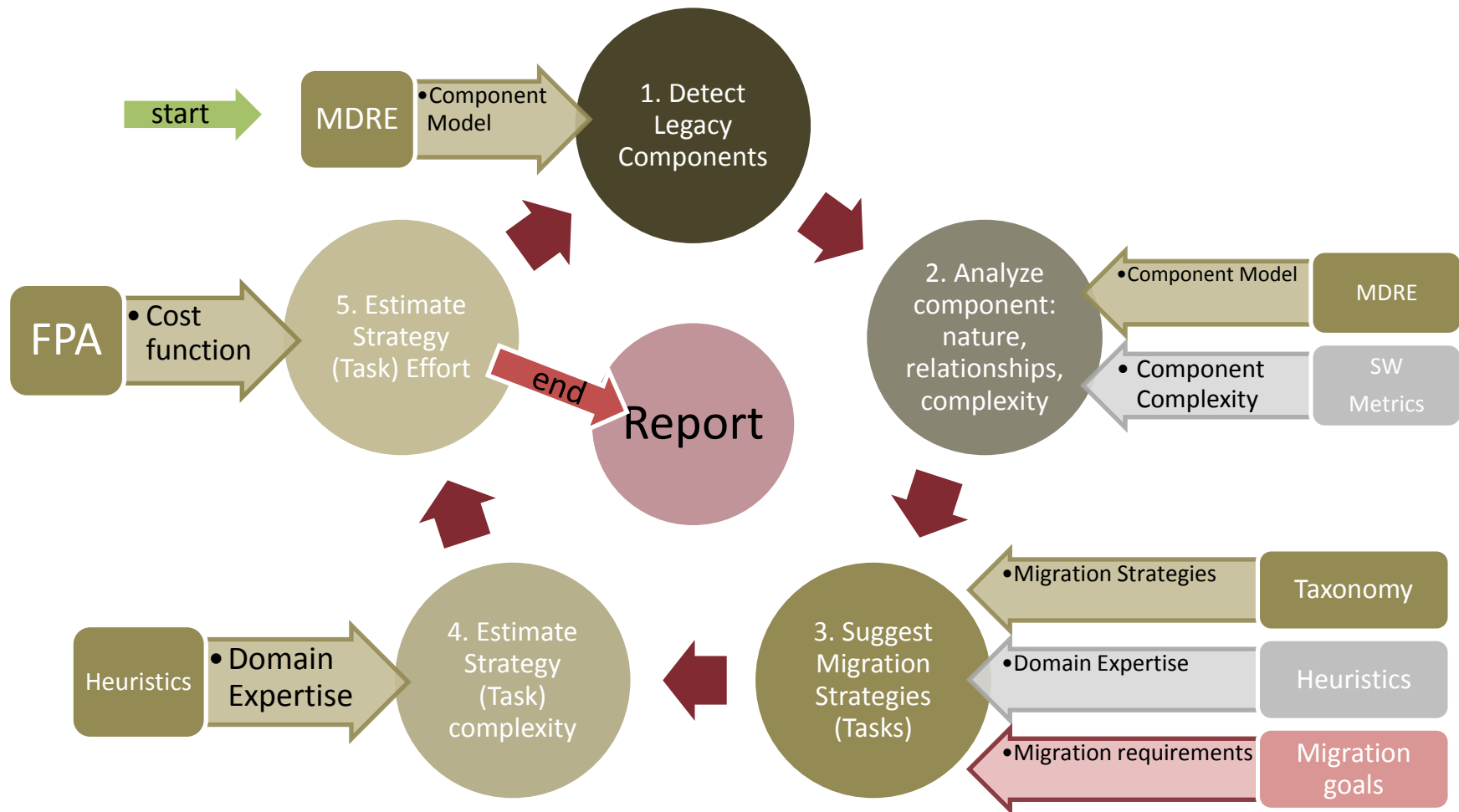
Technical Feasibility Analysis (I)



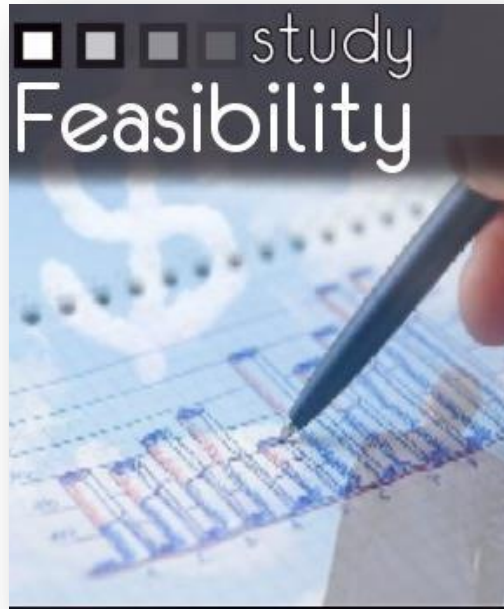
- Support users on the **early feasibility** assessment addressing the **technical aspects** of the migration
- Offer a detailed breakdown into **tasks of the technical migration process**
 - Estimate **complexity** for migration tasks and migrated components
 - Estimate **efforts** to accomplish migration tasks.
- Help to address **other technical related issues**, such as the selection of staff skills and expertise.



Technical Feasibility Analysis (II)

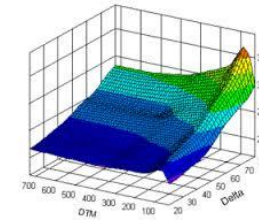
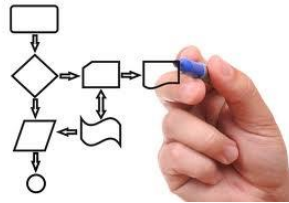
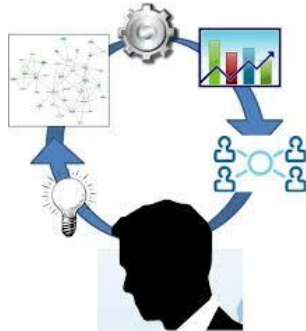
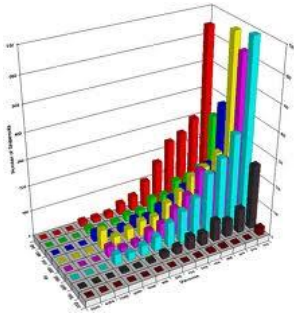


Business feasibility analysis (I)



- Business Feasibility Analysis aims to support decision makers in the context of **the assessment of Business Solutions by offering means to estimate costs, benefits and operational risks of the migration to a cloud deployment scheme**
- Business feasibility analysis will include an **economic, strategic, and analytic** study
- It will offer a **simulation of the KPI indicators** in each of the alternative scenario and the **main processes involved**

Business feasibility analysis (II)



Computer based simulation

Cost Benefit Analysis

Business process simulation

Agent Based Modelling

Cloud based Business models

Human resources modelling

Process Kit

Ideal cloud compliant processes

Agent based computational economics

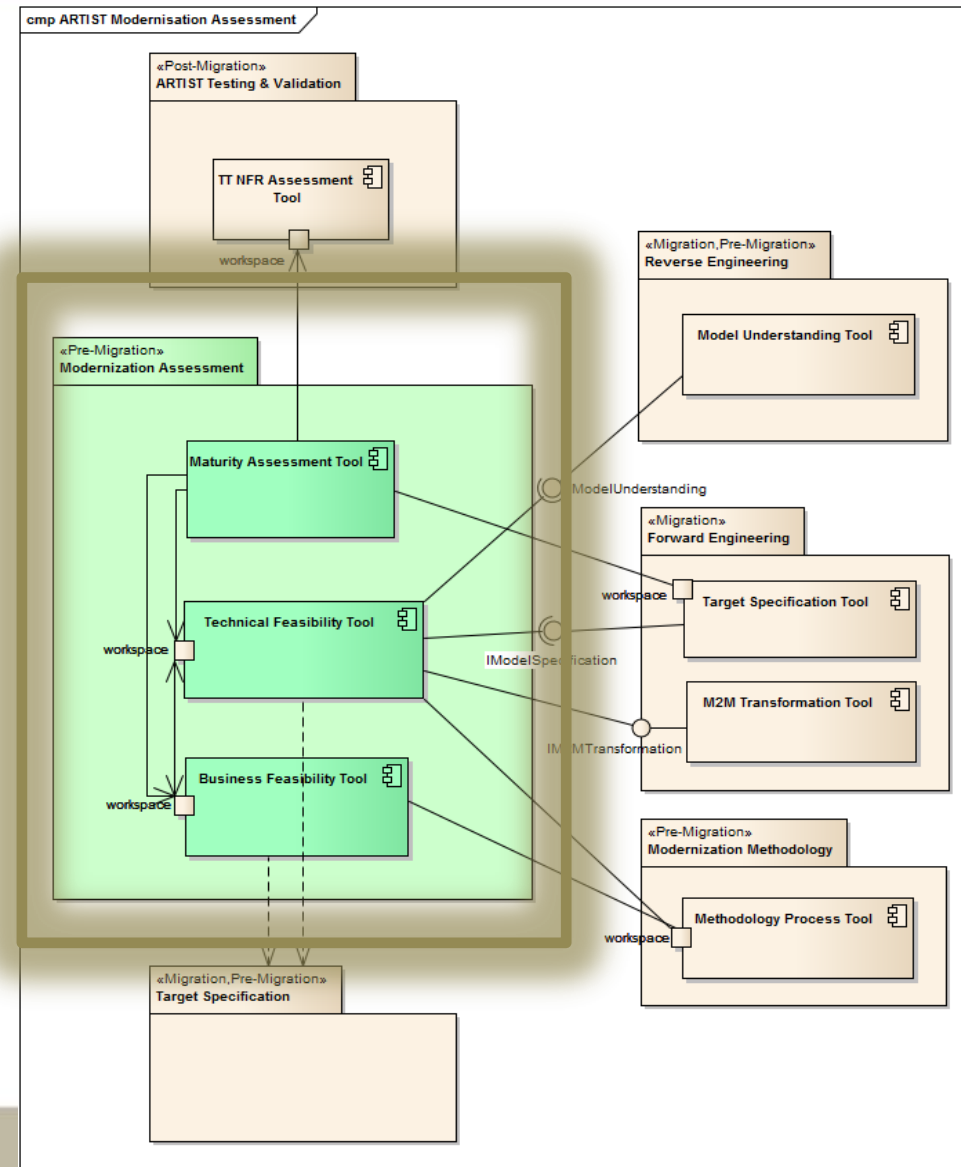
Enterprise simulation

“What if” support

Technical approach & tools



- Three different tools to perform the maturity assessment, the technical feasibility analysis and the business feasibility.
 - Maturity Assessment Tool (**MAT**) : Web User Interface + Java Application
 - Technical Feasibility Tool (**TFT**): Eclipse Plugin (Eclipse Views & Wizards + Backend)
 - Business Feasibility Tool (**BFT**): Eclipse Plugin (Scenario Workbench + simulation service component)



A hands-on practice with PetStore (I)



- Initial experiments conducted to evaluate the functional approach proposed.
- Based on:
 - Technical level: Java PetStore code
<http://www.mia-software.com/html/miaStudio/download/modisco/examples/javapetstore-2.0-ea5.zip>
 - Business level: Petstore business case

A hands-on practice with PetStore (II) → MAT approach



■ MAT experiment:

Maturity Assessment Tool - Technical and Business Issues related questionnaires - Mozilla Firefox

localhost/technoquestions.php

Maturity Assessment Tool - Technical and Business Issues related questionnaires.

0% 100%

Technical

1- Which is the programming language for the legacy code?

☐ Event driven language (i.e. VB)

☐ Structured programming language (i.e. Cobol, C)

☐ Python, .NET, J2EE

☒ Object oriented language (i.e. C++, Java)

This question only affects the current situation.

2- Will you use the same programming language for the migrated application than for the original one?

☐ Yes

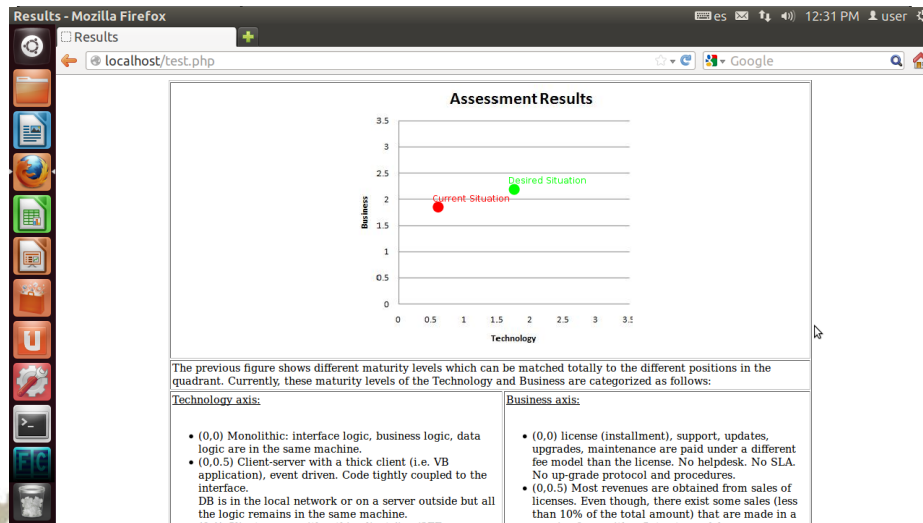
☐ No

☐ Partially

This question only affects the future situation.

3- Should the application database be migrated, will it be restructured (new tables, new primary keys, Tenant ID, etc...) and will be migrated to a new environment? (i.e. from Oracle to SQL Server, from Oracle to NoSQL)

☐ Yes ☐ No



Results - Mozilla Firefox

localhost/test.php

DB application, n appearance customizations.

High Level Recommendations

Model the application to have a better knowledge of the application

Redesign the database to be multitenant

Redesign the architecture and distribution of stateful/stateless nodes

Integrate a module of concurrent users monitorization

Define authentication mechanisms

The coexistence of the two business models may bring difficulties in the support processes.

Define new SLA's taking into account the infrastructure part.

EXISTENCE OF SLA'S: "SLA's, upgrade protocol but upgrades are still seldom, legal department.

(3,0) 100% of the sales are from the product as a service. Existence of a 24x7 helpdesk, multilingual, Marketing mostly done through the Internet (social media), SLA, upgrade protocol and procedures, Long Tail.

Migration Goals

Migrated programming language: java

Multi-tenancy level: Virtualization by tenant

Target Database requirements: RDBMS (scaling horizontally and scaling vertically)

SLA requirements & performance indicators:

Reliability: Free

Data location awareness: UK

Response time: Free (units)

Throughput: Free

Configuration requirements: Interface configuration & Language configuration

Authorization mechanisms: ID and password

Target platform: GAE

Elasticity requirements: High scalability of data

Interoperability requirements: Yes: ERP (SAP)

Required elements to be measured to assess the use of the system: Time

Rules to determine the final amount to bill to the customer: By use

License model: By use

A hands-on practice with PetStore (III) → MAT approach



```
<?xml version="1.0" encoding="UTF-8" ?>
- <MigrationGoals>
- <Technical>
  - <a_p>
    <migratedpl>java</migratedpl>
    <multitenancy>virtualizationbytenant</multitenancy>
    <tdatabasereq>RDBMSmultitenant</tdatabasereq>
  </a_p>
  - <SLA>
    <reliability>13</reliability>
    <datalocation>UK</datalocation>
    <responset>3</responset>
  </SLA>
  - <u_s>
    <configreq>interface_language</configreq>
    <authorreq>ID_password</authorreq>
  </u_s>
  - <iaas>
    <targetplat>GAE</targetplat>
  </iaas>
  - <interop>
    <interopreq>yesERP(SAP)</interopreq>
  </interop>
</Technical>
- <Business>
  - <mon>
    <measur_elem>time</measur_elem>
  </mon>
  - <use>
    <WAI>yes</WAI>
  </use>
  - <bil>
    <rule>use</rule>
  </bil>
  - <pro>
    <license_mod>use</license_mod>
  </pro>
</Business>
</MigrationGoals>
```

Done

Local intranet

100%

A hands-on practice with PetStore (VI) → TFT approach



Component	Component Complexity	Task	Task Type	Complexity Level	Task Complexity	Task Effort (hours/person)
J2EE Server	1.0	App Server Installation & Configuration	Installation and Configuration	Average	2.0	2.0
Non-SQL Server	1.0	Non-SQL persistence framework installation and configuration	Installation and Configuration	Average	2.0	2.0
PetStore Web App	40.0	PetStore Persistence Layer re-coding based for Non-SQL persistence framework	Code refactoring	High	5.0	40.0
PetStore Web App	1.0	Petstore data schema refactoring for Non-SQL persistence framework	Data source	High	5.0	8.0
Non-SQL Server	1.0	Petstore data dump into Non-SQL persistence framework	Data source	Low	1.5	1.0
JDBC Resource	1.0	Petstore JDBC Resource reconfiguration	Connection/Configuration	Low	1.0	0.1
Connection Pool	1.0	Petstore connection pool reconfiguration	Connection/Configuration	Low	1.0	0.1
Totals						53.2

A hands-on practice with PetStore (VII) → TFT approach

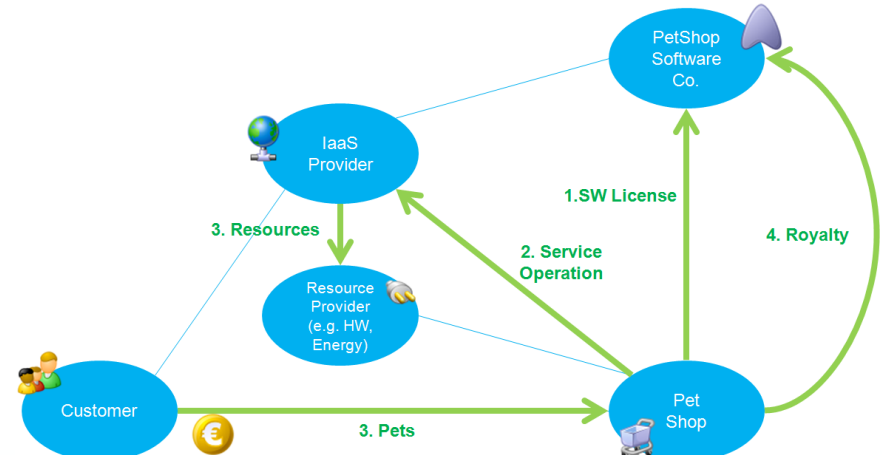
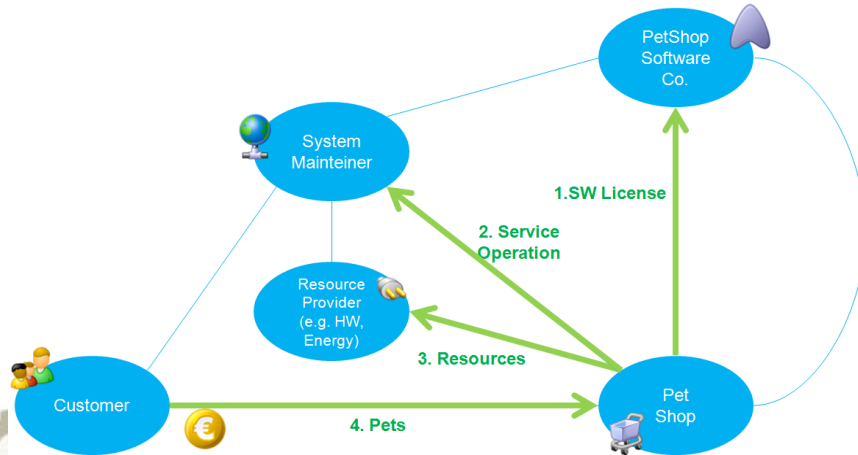
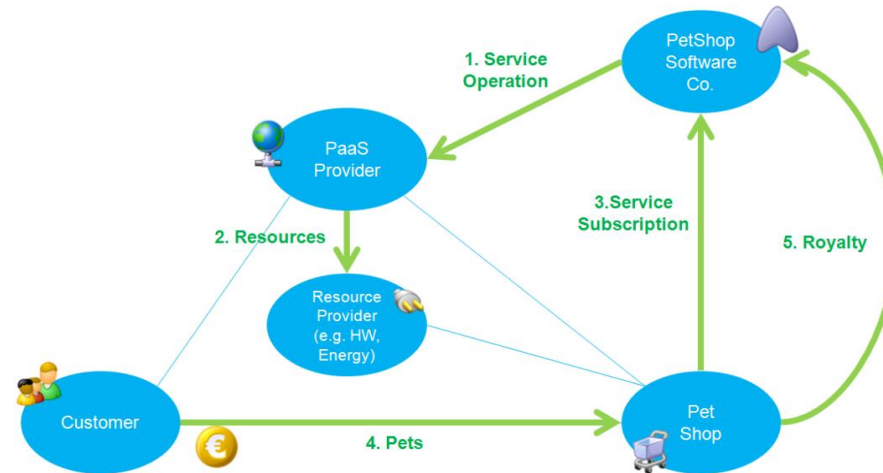


The screenshot displays the PetStore-2.0-EAS-FinalComponentModel.di diagram, which is a UML component diagram. It shows several packages and components:

- blueprints** package:
 - petstore** package:
 - controller** package:
 - `<<controller>>` `<<Component>>` `ControllerComponent`
 - `<<managedBean>>` `<<Component>>` `ManagedBeanComponent`
 - mapviewer** package:
 - `<<managedBean>>` `<<Component>>` `MapBean`
 - model** package:
 - `<<model>>` `<<Component>>` `ModelComponent`
 - `<<managedBean>>` `<<Component>>` `ManagedBeanComponent`
 - `<<Component>>` `CatalogFacade`
 - search** package:
 - `<<managedBean>>` `<<Component>>` `SearchBean`

Properties		
MigrationGoalsView		
Target Platform: Google App Engine		
Migration Goals		
Technical Goals		
Architecture and Programming		
Migrated Programming Language	java	
Multitenancy	virtual_tenant	
Database Scalability Requirements	RDBMSmultitenant	
SLA		
Reliability	13	
Data Location	UK	
Response Set	3.0	
User Control and Security		
Reliability	ID_password	
Data Location	interface_language	
IAAS		
Target Platform	GAE	

A hands-on practice with PetStore (VII) → BFT approach



A hands-on practice with PetStore (VIII) → BFT approach



The screenshot displays the Eclipse IDE interface. On the left, the 'New' wizard is open, titled 'Select a wizard' with the subtitle 'Creates BFT Bpmn Process diagram.' The 'Wizards:' list shows a tree structure with 'General' and 'BFT' folders. The 'BFT' folder is expanded, and a red rectangle highlights the following items:

- BFT Bpmn Process Diagram
- BFT Entity Types Diagram
- BFT Goals Diagram
- BFT Organisational Structure Diagram

At the bottom of the wizard are buttons for '?', '< Back', and 'Next >'. The main workspace shows several overlapping windows. The active window is 'Resource - PetShop/PetShop.bpmn - Eclipse Platform', which displays a BPMN diagram. The diagram consists of a start event (green circle) followed by three tasks: 'Choose Pet', 'Create Invoice', and 'Provide Pet', connected by sequence flow arrows, and ending with an end event (red circle). Other windows in the background show 'Resource - PetShop/PetShop.types', 'Resource - platform/resource/PetShop/default.structure#_ky5-M8-gEeO7ppaflvbUg', and 'Resource - PetShop/default.structure'. The 'Project Explorer' on the left shows a project named 'MyFirstScenario' with a sub-project 'PetShop' containing files like 'default.structure', 'PetShop.bpmn', and 'PetShop.types'. The 'Outline' view at the bottom left shows a small diagram. The 'Properties' view at the bottom right is titled 'BPMN Process' and has tabs for 'Core', 'Rulers & Grid', and 'Appearance'. The 'Core' tab is active, showing a table with columns 'Property' and 'Value'. The system tray at the bottom indicates the date and time as 16:09 on 17/09/2013.

Conclusions



- Pre-migration phase **can measure the impact of a potential migration to Cloud** assessing the decision taking
- Both technical and business aspects **have to be considered**
- Several “**migration paths**” can be supported

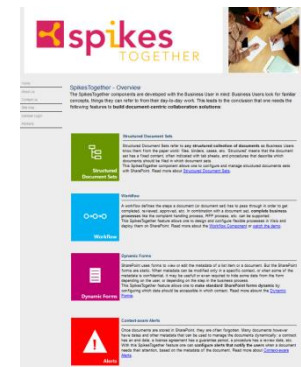
Future Work



- Work on the technical solution and integrated prototypes
- Validate the first prototypes in “real” cases (ARTIST use-cases)



eGOV IT SPcoop



Thank you for your attention!



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IT Competitiveness Area

TECNALIA



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