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

- **Mission**
  - ARTIST aims at facilitating the transformation and modernization of legacy software assets and businesses to the cloud.

- **Vision**
  - ARTIST helps in the process to modernise and transform legacy software to run in the Cloud/SaaS.

- **Goal**
  - ARTIST adapts legacy software to run on the cloud through the creation of a set of methods, tools and techniques based on Model Driven Engineering.

Unlock the code, release the future!
ARTIST Core phases

- Four core migration phases
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)

<table>
<thead>
<tr>
<th>Component</th>
<th>Migration task</th>
<th>Task effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEWS CCUI preferences schema</td>
<td>Schema redesign</td>
<td>15,6 PM</td>
</tr>
</tbody>
</table>

Maturity Assessment

- TECHEVA - Technical Evaluation
- BUSEVA - Business Evaluation
- TECHFEAS - Technical Feasibility
- BUSFEAS - Business Feasibility
- MIGRAT - Migrate or not
- CHANGE - Evaluate preconditions

Business Feasibility Analysis

Simulation results (KPI time-series)
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)

- Characterization of metrics and indicators
- Bidimensional positioning
- Recommendations & Goals

- Monitoring/Billing/Provisioning
- Architecture/Programming/Multitenancy
- Importance for being Cloud Compliant
- Typical Cloud Business model
- Several architecture patterns
- NFR for the migration
- High level hints

Business metrics
Technical Metrics
Metrics Categorization
Business Axis
Technical axis
Migration Goals
Recommendations
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)

1. Detect Legacy Components
2. Analyze component: nature, relationships, complexity
3. Suggest Migration Strategies (Tasks)
4. Estimate Strategy (Task) complexity
5. Estimate Strategy (Task) Effort

Start

Report

End

MDRE
Component Model

FPA
Cost function

Component Model
MDRE

Component Complexity
SW Metrics

Migration Strategies
Taxonomy

Migration requirements
Heuristics

Domain Expertise
Heuristics

Domain Expertise
Migration goals
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
  - Business level: Petstore business case
A hands-on practice with PetStore (II) → MAT approach

- MAT experiment:
A hands-on practice with PetStore (III) → MAT approach
## A hands-on practice with PetStore (VI) → TFT approach

<table>
<thead>
<tr>
<th>Component</th>
<th>Component Complexity</th>
<th>Task</th>
<th>Task Type</th>
<th>Complexity Level</th>
<th>Task Complexity</th>
<th>Task Effort (hours/person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J2EE Server</td>
<td>1.0</td>
<td>App Server Installation &amp; Configuration</td>
<td>Installation and Configuration</td>
<td>Average</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Non-SQL Server</td>
<td>1.0</td>
<td>Non-SQL persistence framework installation and configuration</td>
<td>Installation and Configuration</td>
<td>Average</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>PetStore Web App</td>
<td>40.0</td>
<td>PetStore Persistence Layer re-coding based for Non-SQL persistence framework</td>
<td>Code refactoring</td>
<td>High</td>
<td>5.0</td>
<td>40.0</td>
</tr>
<tr>
<td>PetStore Web App</td>
<td>1.0</td>
<td>Petstore data schema refactoring for Non-SQL persistence framework</td>
<td>Data source</td>
<td>High</td>
<td>5.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Non-SQL Server</td>
<td>1.0</td>
<td>Petstore data dump into Non-SQL persistence framework</td>
<td>Data source</td>
<td>Low</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>JDBC Resource</td>
<td>1.0</td>
<td>Petstore JDBC Resource reconfiguration</td>
<td>Connection/Configuration</td>
<td>Low</td>
<td>1.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Connection Pool</td>
<td>1.0</td>
<td>Petstore connection pool reconfiguration</td>
<td>Connection/Configuration</td>
<td>Low</td>
<td>1.0</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>53.2</td>
</tr>
</tbody>
</table>
A hands-on practice with PetStore (VII) → TFT approach
A hands-on practice with PetStore (VII) → BFT approach
A hands-on practice with PetStore (VIII) → BFT approach
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)
Thank you for your attention!

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