Cloud Computing for Agile Software Development and Resources Management Optimization

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Agenda

• Introduction
• The Methodology
• Implementation of the Platform
• Conclusions
Introduction

• The goal of a research:
  - The Methodology of the Process Optimization Platform

• The Methodology supports:
  - identification, analysis, planning and optimization of enterprise resource management processes in domain-specific information systems
Introduction

- The Methodology supported with specialized set of services (called Optimization Platform)
  - identifies and describes business activities
  - uses systematic knowledge in the form of dictionaries and repositories of data gathered from previously conducted studies
  - supports preparation and validation of algorithms solving identified optimization problems
The Methodology

• The Methodology proposes a complete procedure to be followed by development teams.

• It defines a series of steps, from the very beginning of business analysis, through the structured specification of an optimization problem, to the final delivery of a prototype solution - a software implementation of an algorithm solving the identified optimization problem.
The Methodology also defines a set of structures and software elements which are required while following the procedure defined by the Methodology:

- a tool to assist work of an analyst
- a method of identification of optimization needs
- a collection of dictionaries and corresponding development tools
- a repository of tasks decision models
- a method of selecting or generating algorithms solving optimization problems
- a repository of algorithms solving optimization problems
The Methodology

- Depending on analyzed context, preparation of a prototype requires selection of one of four possible paths defined by the proposed Methodology
  - Path 1: Finding Solutions
  - Path 2: Model construction
  - Path 3: Modification of a class
  - Path 4: Defining a new algorithm
The Methodology

• Path 1: Finding Solutions
  - an adequate solution of decision making task already exists and is available in one of the Process Optimization Platform repositories.
  - we assume that the matched algorithm can be re-used in the preparation process of prototype solution for the given organization.
  - in this path of the Methodology all decisions regarding the choice of the model and the algorithm class are undertaken independently by an appropriate system analyst.
The Methodology

• Path 2: Model construction
  - an analyst builds a description of an organization using online Platform modeling tools
  - the Platform, supplied with a set of tools, allows for interactive use of domain knowledge accumulated in its repositories and domain dictionaries
  - the goal of organization modeling process is to enable automation of task model definition and aided selection of relevant classes for the defined optimization tasks
The Methodology

• Path 3: Modification of a class
  - an analyst using the modeling tools provided by the online Platform states that available types and classes of tasks are not sufficient to properly reflect the optimization problem of the analyzed organization and it is not possible to precisely define the optimization task
  - there is a need to update the definition of an available class to match the analyzed optimization problem and a need to build new solution algorithm
• **Path 4: Defining a new algorithm**
  - a new, previously not described problem of organization’s optimization needs
  - there are no classes available or none of the classes can be modified to match the identified problem
  - a new class of optimization problems to the Platform repository, matching the definition of the analyzed task must be added
  - a need to provide a new algorithm solving the new optimization problem
Implementation of the Platform

• The Methodology and Process Optimization Platform implementation benefits from Service Oriented Architecture (SOA) concept.
• This architecture paradigm facilitates building agile service systems.
• The services can be deployed in distributed environments, executed on different hardware and software platforms, reused and composed into composite services.
Implementation of the Platform

- The infrastructure supporting the implementation of Methodology and Process Optimization Platform:
  - 6 physical machines (servers)
    - Windows Server 2012 R2 Datacenter with Hyper-V virtualizer
  - about 90 virtual machines
  - cluster on Windows Failover Cluster technology - "live migration"
  - To facilitate the management of the environment has also been created domain "mscloud.santos.pwr.edu.pl" and the Domain Controller (Active Directory Domain Services).
Conclusions

• The key benefits offered by using the proposed Methodology:
  - quicker development, implementation and adaptation of the system by the possibility of using libraries of standard and specialized processes and algorithms dedicated to the areas of transport management,
  - reduction in the system implementation costs by simplifying and speeding up the analysis of the requirements for the development or adaptation of the system,
Conclusions (cont)

• The key benefits offered by using the proposed Methodology:
  - optimization of organization’s management processes and utilization of resources by selecting appropriate optimization methods dedicated to specific customer requirements,
  - integration of optimization modules and functionality of monolithic and legacy systems through the use of service-oriented paradigm (Service Oriented Architecture)
Thank you for your attention!