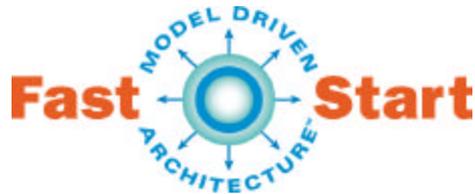




An SOA Solution Driven from Business Process Models using MDA: Methods and Lessons Learned

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Agenda

- Provide an Overview of Our Background
- Describe SOA-BPM Project Using MDA
- Our MDA Approach
- Hurdles to Overcome
- Lessons Learned

Our Background

- 1997 - We founded INHERIT, LLC
 - Since its inception we were focused on driving software development from UML models
- 1999 – Developed initial version of our toolset
 - Transformation engine built upon a declarative rules engine
- 2001 – OMG Coins term “MDA”
 - We realized that OMG’s definition of MDA was very much in line with the software development approach we were pursuing
 - *Good news and bad news*
- 2003 – Developed MDA Express

Current Version of MDA Express

- Our transformation engine is called MDA Express
 - Provides a flexible environment that supports complete customization of architectural frameworks
 - Supports software development in any language
 - Provides multiple ways to preserve changes to generated artifacts during re-generation
 - Captures and incorporates system details from all types of UML Diagrams
 - Supports a combination of declarative rules that then execute a series of imperative statements
 - Works with Eclipse Modeling Framework (EMF) and Net Beans Meta Data Repository (MDR)



Applicable Experience

- Modeling Business Processes
 - Exposed to business process modeling mid 1990's
 - Applied consistently on all of our projects
 - Formalized on BPM over the past two years
- Applying SOA Concepts
 - Began developing projects using elements of SOA in 2002
 - Currently working on very large scale SOA applications
- Applying “MDA” Concepts
 - Have developed numerous MDA projects since 1998

Proof-of-Concept Project

- 2006, January – asked to use MDA to develop a pilot project
 - We recognized that there would be business process and workflow elements to this project
 - *Good candidate for developing business process models*
 - *Need to leverage business processes*
 - We recognized that there were existing legacy systems that we thought would be good candidates for services
 - *There was a notion of atomic services that they wanted to share*
 - *It was a message oriented approach with loose coupling*
 - *We could wrap these into web services to create consistent access*
 - We recognized new services that we would need to develop
 - *Additional services to add that would offer value to other parts of the enterprise*
 - *Both non functional as well as business services*

Our MDA Approach

- MDA Express provides a mechanism to rapidly generate an application from domain models
 - Capture requirements from subject matter experts (SME)
 - Build representative UML models of the requirements (PIM)
 - Rules engine (Rete algorithm) applies a series of transformation rules and templates (Archetype) to create the downstream PSM and code/artifacts
 - Validate the requirements and re-generate as necessary
- Additional Tools Employed
 - Together Architect 2006 for Eclipse
 - JBoss Application Server
 - JBPM (workflow Engine)
 - Eclipse

Goals of the Project

- Client's Initial Goal
 - Prove that MDA is a viable approach to building software
 - *Apply MDA to a proof-of-concept project to begin to generate metrics*
 - *Validate or refute claims about MDA*
 - *Prove that MDA can be applied to an SOA application*
- Revised Goal
 - Figure out how to integrate Business Process Modeling with Service Oriented Architecture using MDA

Hurdles to Overcome

- Business Processes and SOA are complimentary, but a gap exists in how they map to each other
 - We felt that MDA would bridge this gap
- Using BPM in an MDA process
 - Needed to figure out how to take BPM and run MDA transformations
 - *We figured we could do it because our engine works with EMF*
- Needed a way to describe the message structure
 - Knew we could use a UML class diagram to capture the structure

Hurdles to Overcome (cont.)

- Needed to relate the BPM model to the UML model
 - Used the data object in BPM
- Capturing the contract for communication between services
 - Knew we could create a component diagram to define the contract
 - Use data object to mark the relationship between the BPM artifact and UML artifact
- How to add metadata that's used in the transformation process
 - Knew how to use stereotypes in UML
 - How do we do the same thing with BPM models
 - *Together Architect has a concept of categories*

Lessons Learned

- MDA is the glue that can bring Business Process Modeling and SOA together
- A Belief exists that SOA and MDA are mutually exclusive
 - Need more education across the industry
 - Small proof-of-concept project will provide localized education
- Need a strong team lead who understands BPM, SOA, and MDA and how to integrate them
 - Provides direction to individual team members who may only know one of the technologies
 - Instills confidence across the team and client base

Lessons Learned

- An MDA approach allows for a well-architected solution under tight schedule and budget constraint
- MDA tools must support the development of applications that are built upon a variety of architectures, languages, and platforms
- An organization's previous experiences with modeling may effect their willingness to adopt an MDA approach
 - Need to understand the benefits of modeling before they can discuss the benefits of MDA

Lessons Learned

- Management, Architects, and Developers may express various levels of resistance to MDA
 - Managers
 - *May not understand the significance if they do not fully understand their current processes or the software development lifecycle*
 - *Tend to delegate the evaluation of MDA to the technical people*
 - Architects/Developers
 - *May have had experiences with code generation in the past*
 - *Have worked hard to establish their value to their organization*
 - *Tend to believe that it is not possible that a “program” can do a better job*
 - It’s the Monet syndrome
 - » *Asking developers to use MDA is like asking Monet to paint by numbers*

Lessons Learned

- Readiness to use MDA does not have anything to do with a tool
 - Do they have a process for capturing requirements?
 - Do they manage the requirement lifecycle?
 - Are they experienced at modeling their requirements?
 - Do they understand UML?
 - Do they have an enterprise vision for software development?
 - Does their organization dictate one or more architectural frameworks in a reference implementation document?

PSM Creations

- Created a class diagram of the message structure using a UML profile
 - XSD profile based on “Modeling XML Applications with UML” – David Carlson
- Created the logical data model for information that needed to be persisted
 - UML Profile based on “Refactoring Databases” - Scott Ambler
- Created a class diagram that captured the WSDL structure using an SOA profile
 - Profile for software service based on several things we read in the open space
- We generated an activity diagram to capture the business process model

Metrics

- PIM
 - 8 business process models of average complexity
 - Identified 6 services
 - 15 UML diagrams (component and class diagrams)
- PIM to PSM
 - 265 transformation rules were utilized
 - Created
 - *36 Packages*
 - *249 Classes*
 - *790 Attributes*
 - *230 Associations*
- PSM to Code
 - Used 220 Rules
 - Used 78 Templates
 - Created
 - *Files 250*
 - *Lines of Stuff (xml, JAVA, BPEL, WSDL, etc.) 32,480*



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