

# MDE In A Sales Management System: A Case Study

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SAP, INRIA & TUD

# Context of this work



- The present courseware has been elaborated in the context of the MODELPLEX European IST FP6 project (<http://www.modelplex.org/>).
- Co-funded by the European Commission, the MODELPLEX project involves 21 partners from 8 different countries.
- MODELPLEX aims at defining and developing a coherent infrastructure specifically for the application of MDE to the development and subsequent management of complex systems within a variety of industrial domains.
- To achieve the goal of large-scale adoption of MDE, MODELPLEX promotes the idea of a collaborative development of courseware dedicated to this domain.
- The MDE courseware provided here with the status of open-source software is produced under the EPL 1.0 license.

# Outline

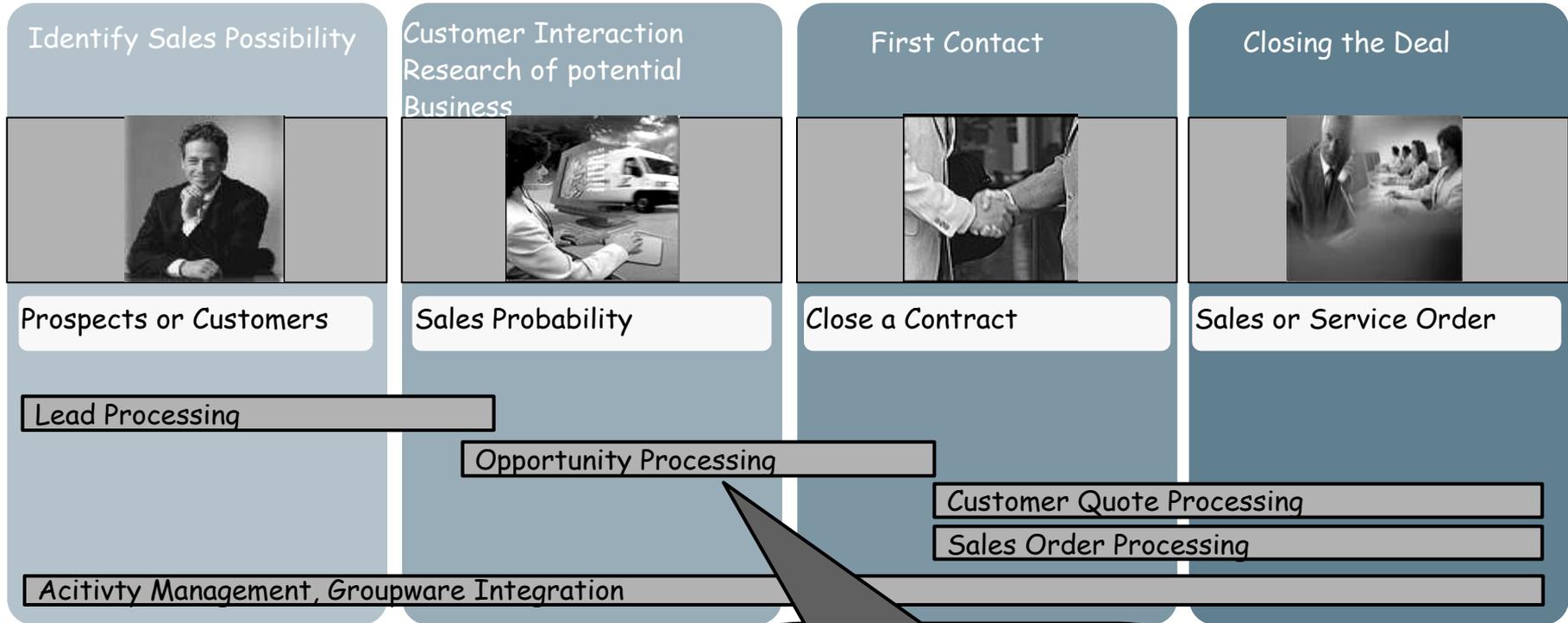
- Introduction
- Use Case Overview
- Model-Driven Performance Engineering for a back-end business process (work between TUD & SAP on part of the use case)
- Apply Global Model Management on Model-Driven Performance Engineering (current work between INRIA & SAP on part of the use case)
- Remaining work & challenges

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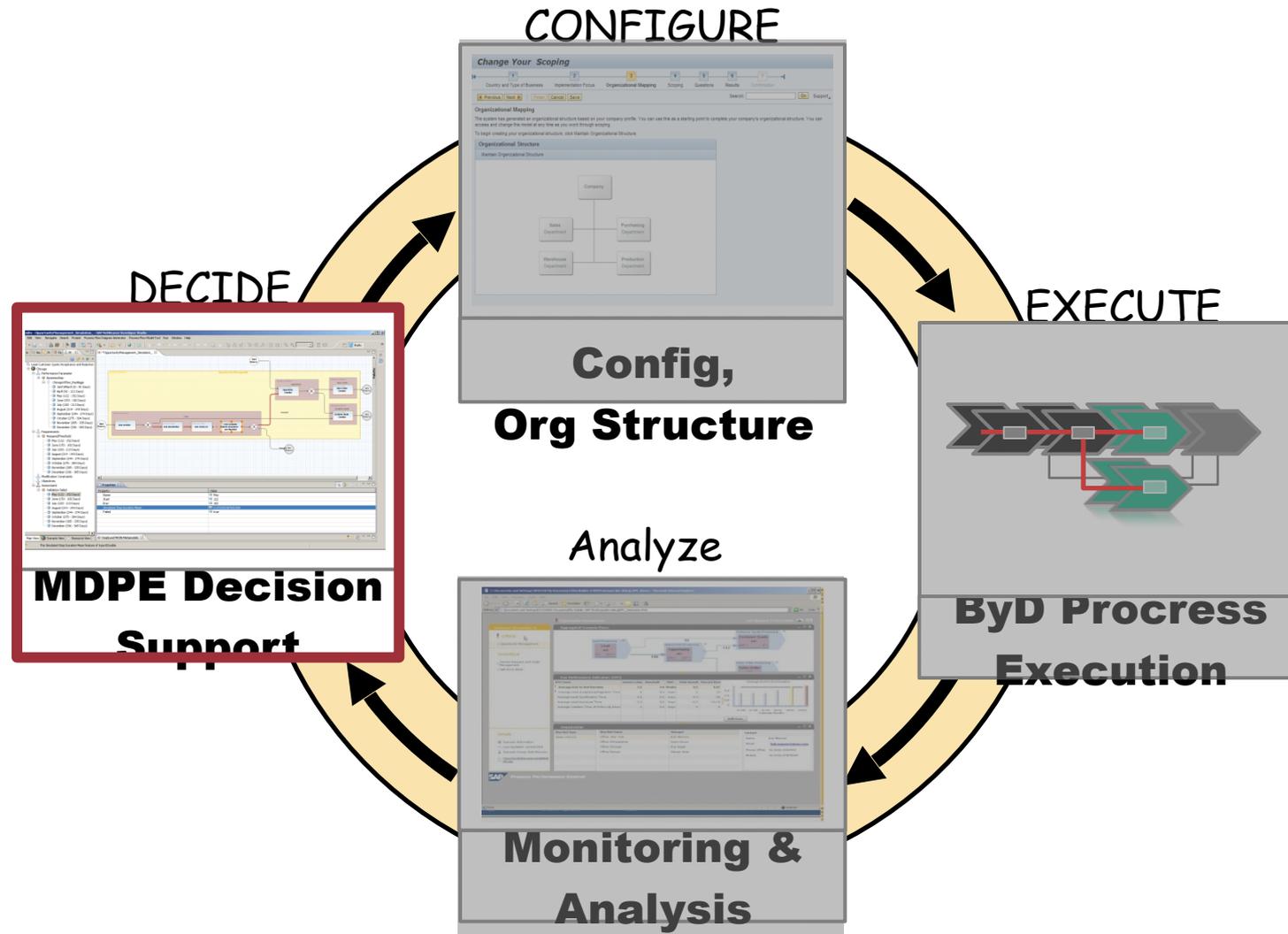
# A Sales Management System

## MDPE for Opportunity Management



We started with Opportunity Processing

# Closed Loop of Continuous Process Optimization for business processes



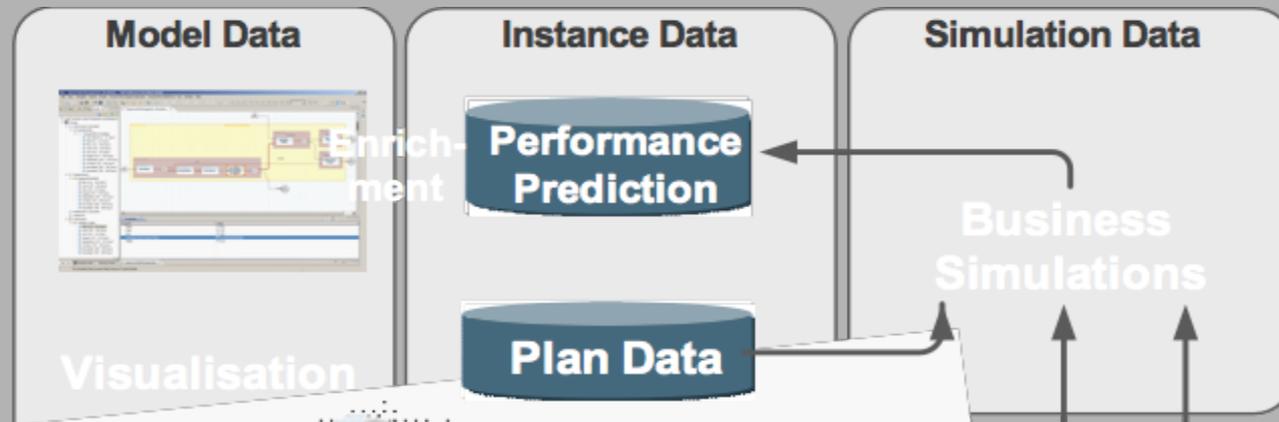
# BPPM Decision Support

## Architecture & Data Flow

Business  
Process  
Performance  
Decision  
Support

Business simulations are based on different data sources

- Historic Data (Business Process Instances from SAP Business Process Platform)
- Plan Data (e.g. Sales Planning)
- Process Models



SAP  
Platform

Model Driven Development  
of business processes  
enables Model Driven  
Performance engineering as

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# Screenshot 1: Integration between the Decision Support Workbench and SAP's NetWeaver Developer studio (NWDS)

The screenshot displays the SAP NetWeaver Developer Studio interface. The main window shows a process flow diagram for a business scenario titled 'Lead Customer Quote Acceptance and Rejection'. The diagram is set within a 'Business Object' named 'Lead'. The process flow starts with a 'Process Step Lead Creation', which leads to an XOR gateway. From the gateway, the flow branches into two paths: one leading to 'Process Step Lead Qualification' and another leading to 'Process Step Lead Handover'. Both 'Lead Qualification' and 'Lead Handover' lead to a final 'Process Step Lead Customer Quote Acceptance and Rejection'. The diagram is overlaid on a grid background.

On the left side, there is a tree view showing the project structure. It includes a 'Performance Parameter' section with a 'BusinessStep' for 'ChicagoOffice\_RayBiggs', which is further divided into months from January to December, each with a specific day range (e.g., January (0 - 30 Days)). Below this, there are 'Requirements' and 'Modification Constraints' sections, also organized by month.

At the bottom of the screenshot, there is a 'Properties' window showing details for the selected process step. The table below represents the data in this window:

Property	Value
Name	June
Start	151
End	180
Required Step Duration Min	0.0
Required Step Duration Max	5.0
Period Unit	DaysPerTask

Overlaid on the bottom right of the screenshot is the text: **SAP proprietary Model Editor**.

At the bottom left of the screenshot, the text **MDPE Workbench** is overlaid.

## Screenshot 2: Annotation of ProcessStep models with e.g. Business Requirements

The screenshot displays the SAP NetWeaver Developer Studio interface. The main window shows a Process Step Diagram for the process 'Lead Customer Quote Acceptance and Reject'. The diagram includes the following elements:

- Process Step Lead Creation**: The starting point of the process.
- Decision Diamond (X)**: A decision point following Lead Creation.
- Process Step Lead Qualification**: A step that follows the decision diamond.
- Process Step Lead Handover**: A step that follows Lead Qualification.
- Process Step Lead Customer Quote Acceptance and Reject**: The final step in the process.

Annotations are provided in speech bubbles:

- Left Annotation:** "Different Periods can be defined for the simulations and optimizations." This points to the 'BusinessStep' tree in the left-hand pane, which lists months from January to December with their respective day ranges (e.g., January (0 - 30 Days)).
- Top-Right Annotation:** "Model Elements can be annotated with e.g. business requirements by selecting them." This points to the 'Lead Customer Quote Acceptance and Reject' process step in the diagram.
- Bottom-Right Annotation:** "Annotation: Lead Acc/Reject in June 2009 must be processed within 3 days!" This points to the 'Required Step Duration Max' property in the Properties window, which is set to 3.0.

The Properties window at the bottom shows the following data:

Property	Value
Name	June
Start	151
End	180
Required Step Duration Min	0.0
Required Step Duration Max	3.0
Period Unit	DaysPerTask

### Screenshot 3: Running Business Performance Decision Support out of the NWDS

Rialto - OpportunityManagement\_Simulation\_ (Process Step Diagram) - SAP NetWeaver Developer Studio

File Edit View Navigate Search Project Process Flow Diagram Generator Process Flow Model Tool Run Window Help

Opportunity Management  
Chicago  
Performance Parameter  
Requirements  
Modification Constraints  
Objectives

Business  
Opportunity

Process Step  
Lead Progress Information

Process Step  
Lead Qualification

Process Step  
Lead Handover

Process Step  
Lead Customer Quote Acceptance and Rejection

Lead

Simulating Model

Perform Dev 2 TIPM Transformation

Cancel

Properties

Property

Will the Lead Acc/Reject In June 2009 be within 3 days? Just trigger a simulation out of the NWDS!

Input Models are transformed stepwise and a simulation is executed.

## Screenshot 4: Visualization of Business Performance Decision Support results

**Business Scenario**

**Business Object**

Lead

Process Step: Lead Creation

Process Step: Lead Qualification

Process Step: Lead Handover

Process Step: Lead Customer Quote Acceptance and Rejection

Start Process

**Properties**

Property	Value
Name	June
Start	153
End	182
Simulated Step Duration Mean	4.215642857142857
Failed	true

**Lead Customer Quote Acceptance and Rejection**

A business requirement is not passed:  
The Lead Acc/Reject in June 2009  
will not be processed within the  
required 3 days!

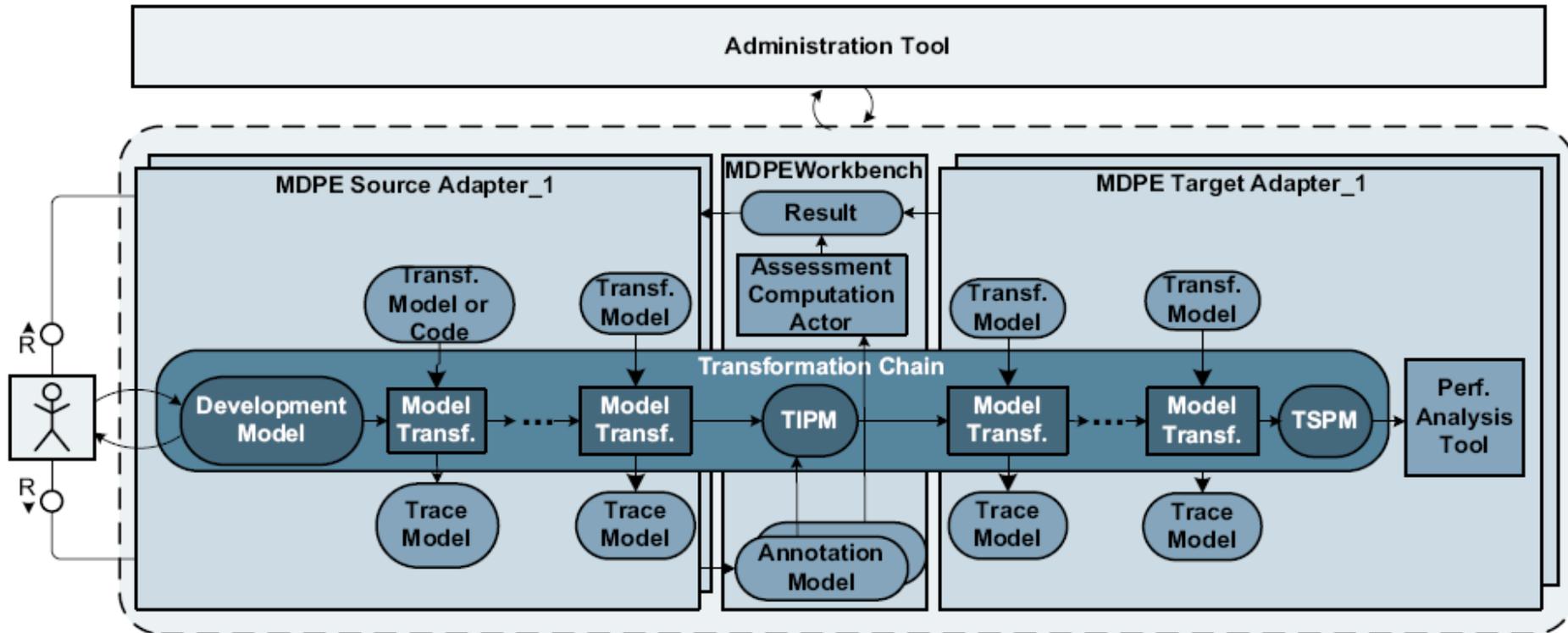
The Simulation results  
are visualized based on  
input models.

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# Megamodelling and Model Driven Performance Engineering

- Model Driven Performance Engineering involves numerous interrelated modelling artefacts which taking part in a long model transformation chain
- Megamodelling enables us to systematically deal with numerous modelling artefacts involved in the Model Driven Performance Engineering Process



# Megamodelling and Model Driven Performance Engineering



## AM3 Megamodelling tool:

- deal with the numerous modelling artefacts involved in the Model Driven Performance Engineering process
- <http://www.eclipse.org/gmt/am3/>



## ATL Model-to-Model Transformation tool:

- implement most of the transformations from the MDPE transformation chain
- <http://www.eclipse.org/m2m/atl/>

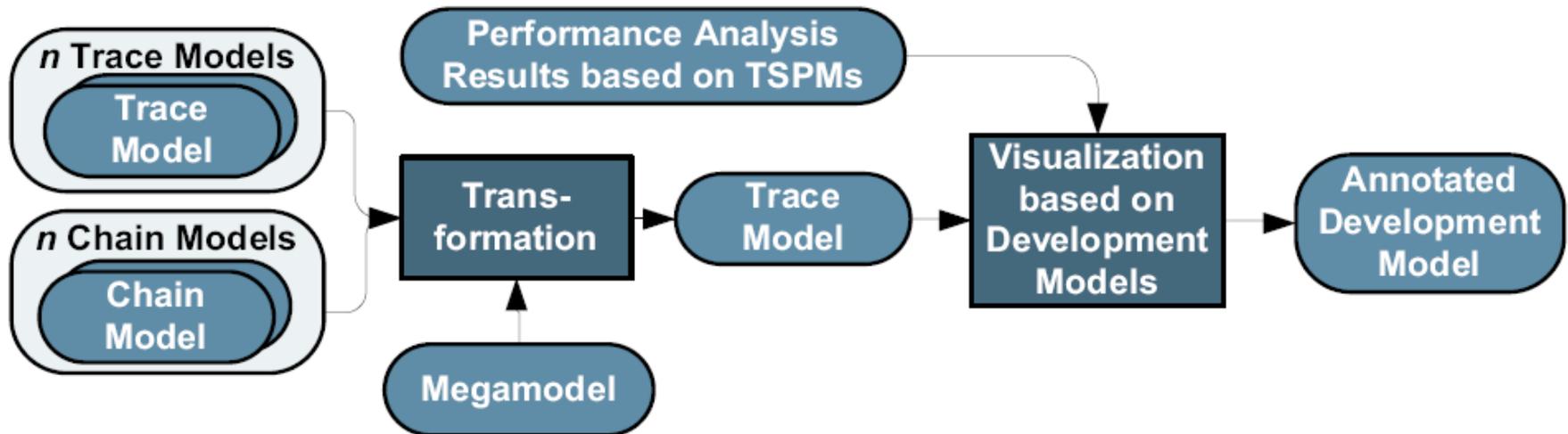


## AMW Model Weaving tool:

- define, represent and handle traceability models and annotation models
- <http://www.eclipse.org/gmt/amw/>

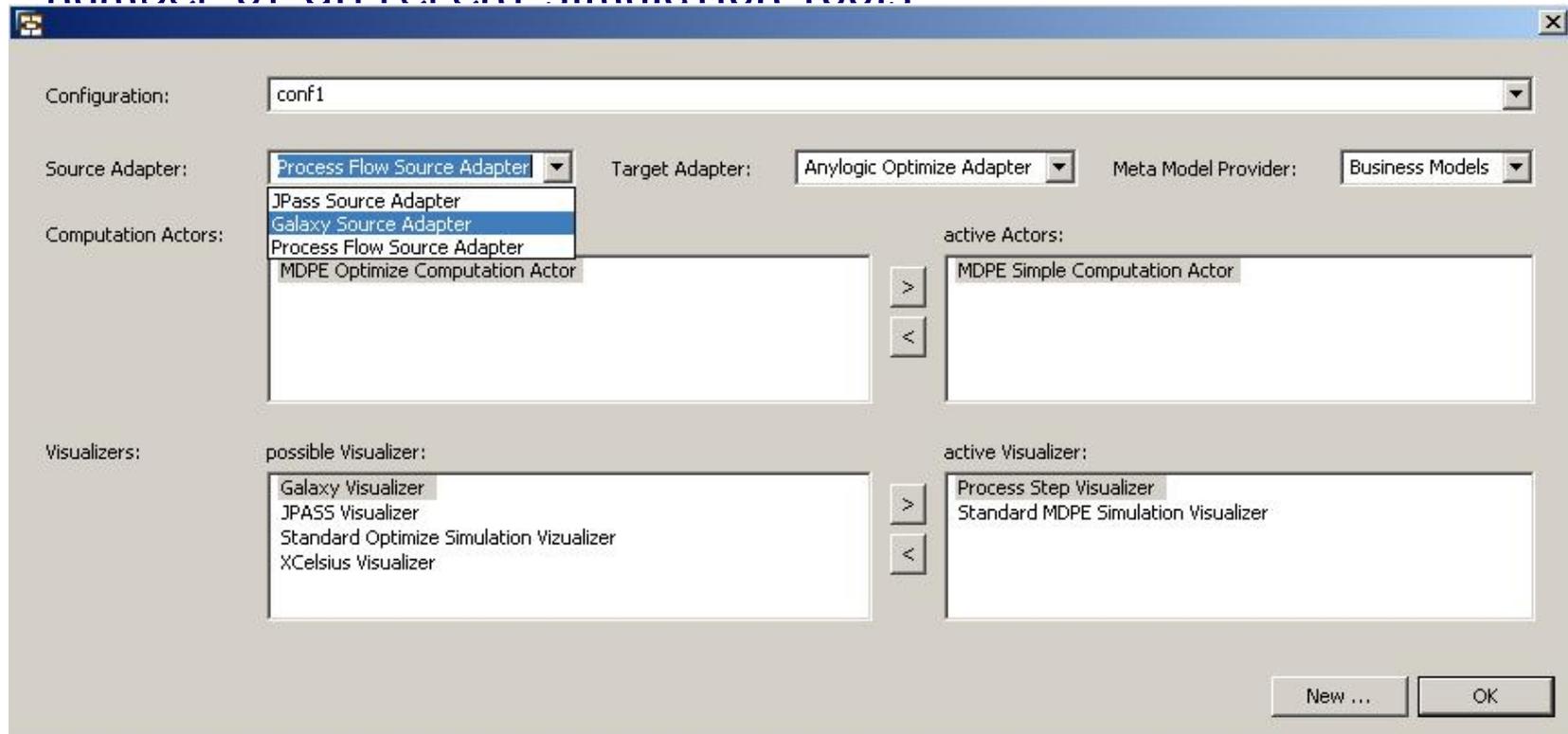
## Usage example for the megamodel: Tracing

- The megamodel enables us to navigate from models in our transformation chain to its related trace models.
- This navigation is required to trace performance analysis results back to the original development models



# Usage example for the megamodel: Administration Tool

- The megamodel is the underlying data source for the MDPE Administration tool
- The MDPE Administration tool is required to use MDPE as extension for a number of modelling tools and together with a number of different simulation tools



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# Remaining Work and Challenges

- Applying MDPE for the more complex xWURST scenario (Composite Application on top of a back-end process such as Opportunity Management)
- Dealing with uncertainties in the input data of MDPE
- Integration of the Model Driven Performance Engineering Workbench in a general V&V Workbench
- Experimenting with a number of different simulation engines
- Gain customer feedback on automatically generated business simulations
- Model Driven Performance Engineering as a Service?
- Improvements of the current user interface