



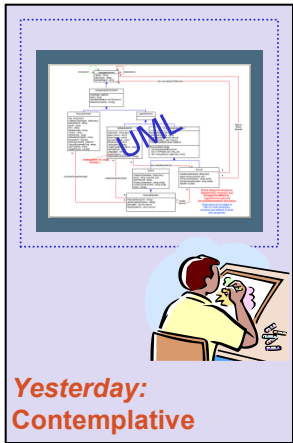
Combining Model Transformation, Model Weaving and Megamodeling

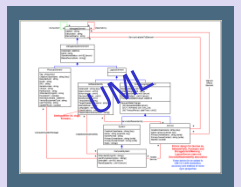
Use Case: Performance-Annotated UML2 State Charts

Hugo Bruneliere (INRIA)

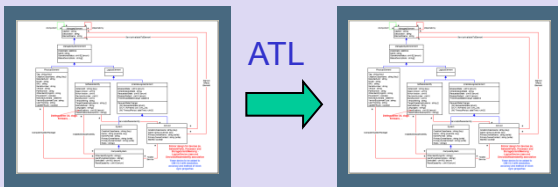

MODELPLEX Technology Showcase
University of Twente, Enschede (The Netherlands),
23rd of June 2009






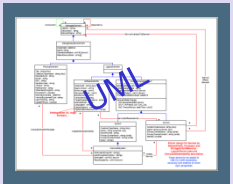


Yesterday:
Contemplative




Today:
Towards automation
(Model Transformation)

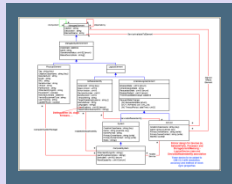





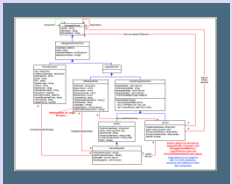

UML



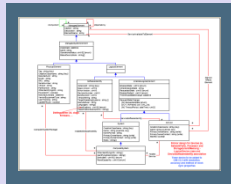
Yesterday:
Contemplative




ATL




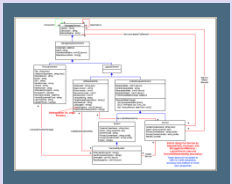
Today:
Towards automation
(Model Transformation)



ATL

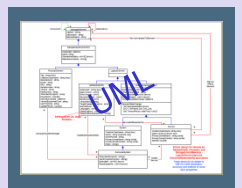


AMW




Today & Tomorrow:
Declarative Model Correspondences
(Model Weaving + Model Transformation)

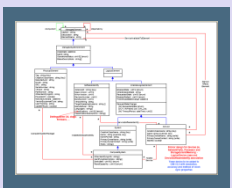





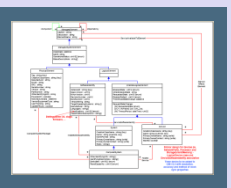

UML



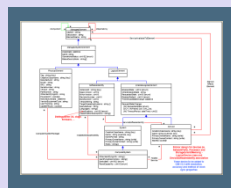
**Yesterday:
Contemplative**




ATL



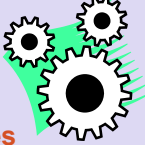
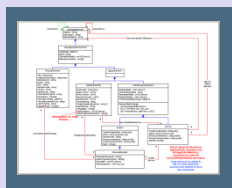
**Today:
Towards automation
(Model Transformation)**



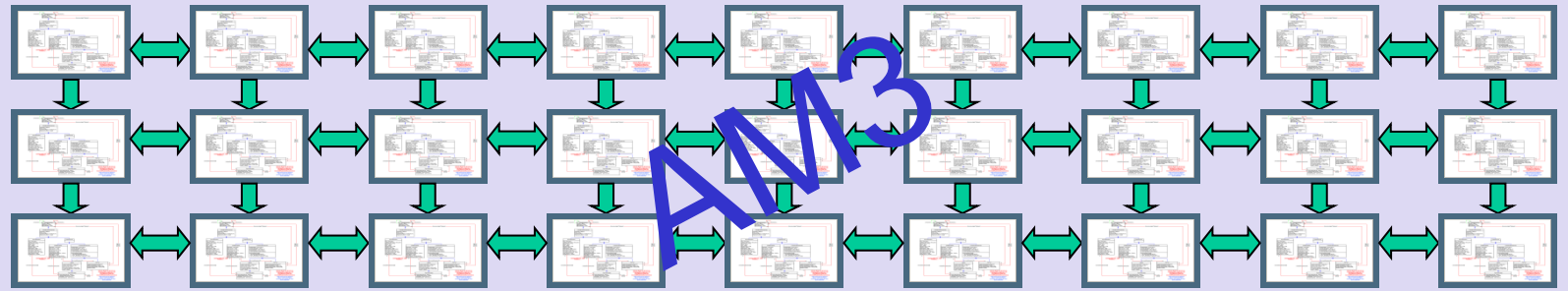
ATL



AMW

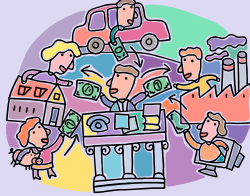


**Today & Tomorrow:
Declarative Model Correspondences
(Model Weaving + Model Transformation)**



AMW3

**Tomorrow:
Managing global modeling resources
in MDE-oriented development
of complex software systems
(Global Model Management + Model Weaving + Model Transformation)**





AM3 Megamodeling (Global Model Management) tool:

Deal with the numerous modeling artifacts involved in the Model-Driven Engineering process

- <http://www.eclipse.org/gmt/am3/>



ATL Model-to-Model Transformation tool:

Implement the transformations composing the transformation chain

Provide an automated traceability support

- <http://www.eclipse.org/m2m/atl/>



AMW Model Weaving tool:

Define, represent and handle traceability models

- <http://www.eclipse.org/gmt/amw/>





- Megamodeling: represent references to models and relationships between them as models (called ***megamodels***)
 - Similar to a metadata repository on involved modeling artifacts
- Generic & extensible solution applied to **Traceability**:

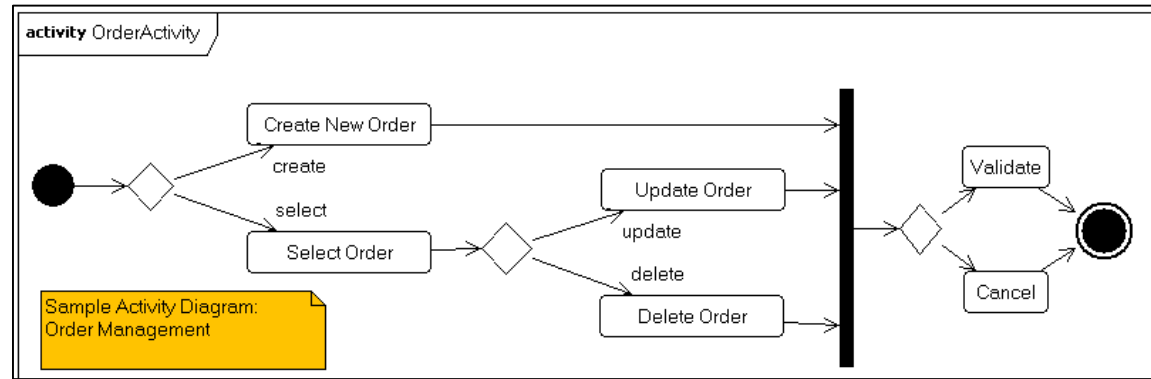
<u>Problem</u>	<u>Solution</u>
• Create traceability links	Higher Order Transformations or HOTs (Model Transformation)
• Represent traceability links	GMM + Model Weaving
• Use traceability links (navigation)	GMM + Model Weaving

<u>Potential Applications</u>
• Inter-DSLs' navigability
• Transformation Chain's Traceability
• Tool Interoperability
• Etc



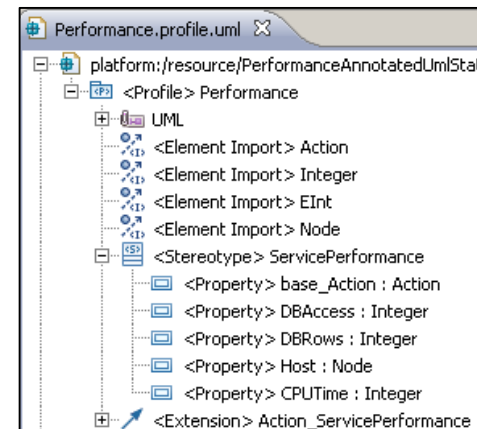


Inputs



Microsoft Excel - Order_PerformanceTrace.xml

Index	Node	DB Accesses	DB Rows	CPU Time
1	1 Create New C	0	0	8725
2	2 Select Order	2	2645	10122
4	3 Create New C	0	0	7463
5	4 Select Order	3	4225	12473
6	5 Select Order	2	2386	10242
7	6 Select Order	4	5786	12703
8	7 Create New O	0	0	8364
11	1 Validate	1	1114	9789
13	2 Update Order	0	0	12322
14	3 Cancel	0	0	486
15	4 Delete Order	0	0	4838
16	5 Delete Order	0	0	5017
17	6 Update Order	0	0	11634
18	7 Validate	1	1115	9662
21	2 Validate	1	1115	9964
23	4 Cancel	0	0	451
24	5 Validate	1	1115	9423
25	6 Validate	1	1114	9756





Output

The screenshot shows a UML model tree for 'PerformanceAnnotatedStateChart-UML.uml'. The tree structure is as follows:

- platform:/resource/PerformanceAnnotatedUmlStateCharts_MoDisco-UseCase/Outputs/PerformanceAnnotatedStateChart
 - <Model> OrderModel
 - <Package> OrderPackage
 - <Activity> OrderActivity
 - <Comment> Sample Activity Diagram: Order Management...
 - <Initial Node> InitialNode1
 - <Activity Final Node> ActivityFinalNode1
 - <<servicePerformance>> <Call Operation Action> Create New Order
 - <Decision Node> DecisionNode1
 - <Decision Node> DecisionNode2
 - <<servicePerformance>> <Call Operation Action> Select Order**
 - <<servicePerformance>> <Call Operation Action> Update Order
 - <<servicePerformance>> <Call Operation Action> Delete Order
 - <<servicePerformance>> <Call Operation Action> Validate
 - <<servicePerformance>> <Call Operation Action> Cancel
 - <Join Node> JoinNode1
 - <Decision Node> DecisionNode3

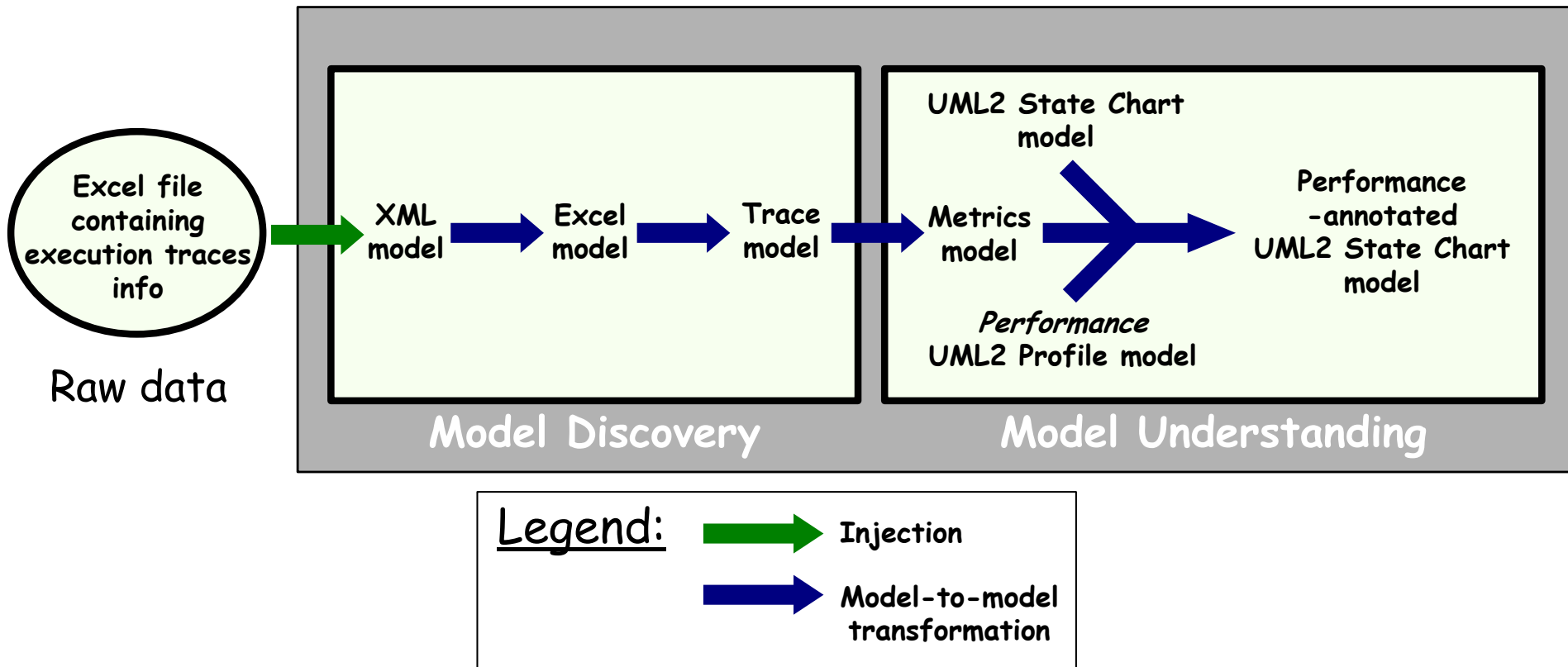
Below the tree is a Properties view with the following table:

Property	Value
Service Performance	
CPU Time	11385
DB Access	3
DB Rows	3761
Host	
UML	



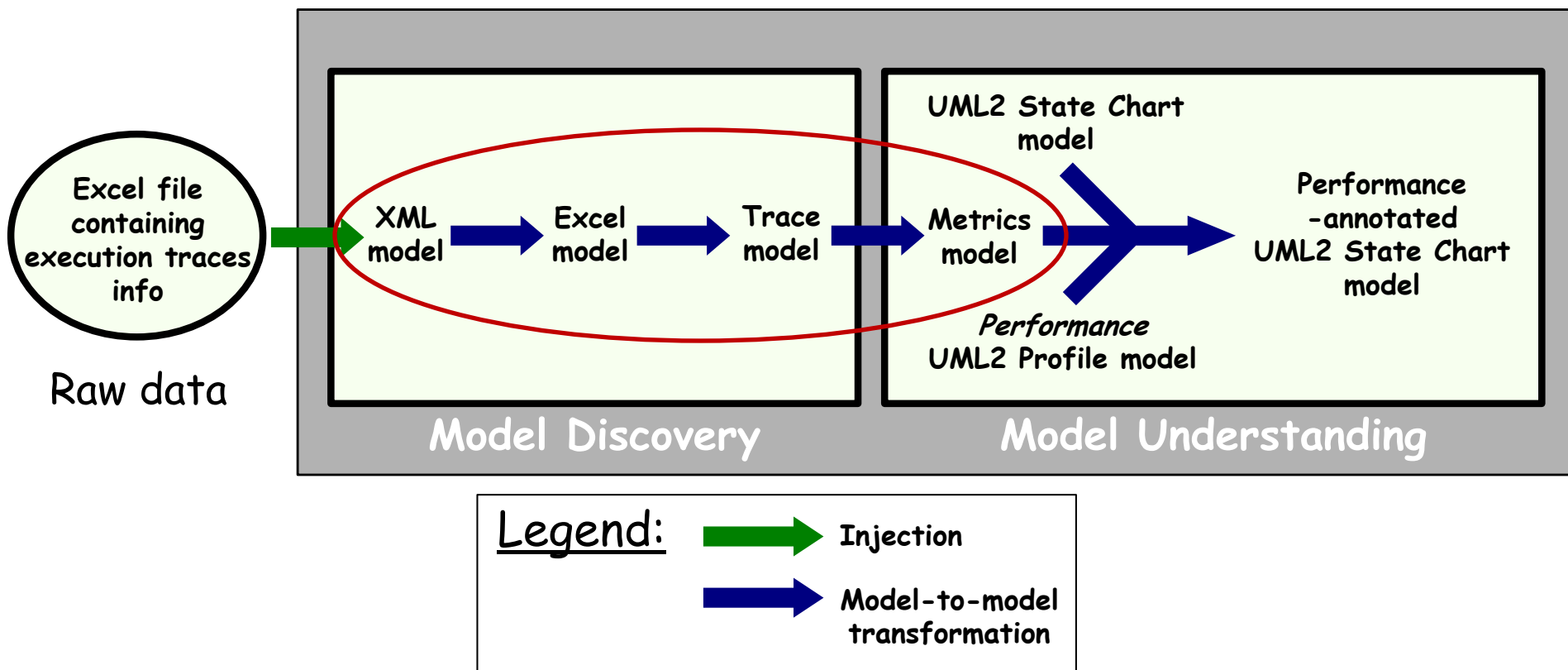


- Transformation chain from an Excel file to a profiled UML2 model





- Transformation chain from an Excel file to a profiled UML2 model





■ Demo...

- Starting from the ATL project providing the transformation chain (metamodels, transformations, inputs, etc)
- Automated discovery of the megamodel from this ATL project
- Launching of the transformations composing this chain using the discovered information
 - Application of the automated traceability mechanism
- Inter-model navigability from the result of the execution of the different transformations composing this chain

