

Model Driven Development integration  
MDDi  
Eclipse Creation Review

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# Mission statement

Build a framework for MDD tools integration

- Integrate best-of-breed MDD tools
- Avoid vendor lock-in

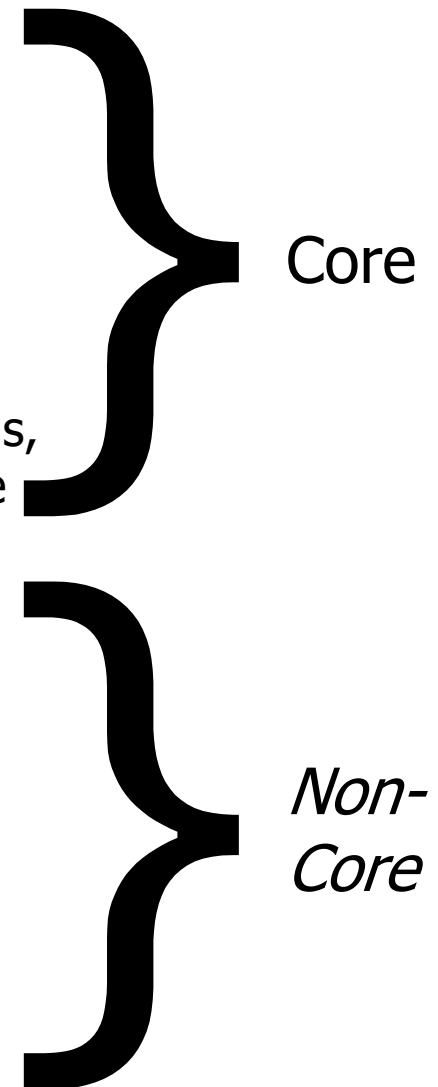
Address structural and behavioural consistency

- Validate behaviour at model level
- Maintain consistency of elements from different models, using different modeling languages, as models change

*Cover the modeling development life cycle*

- *Automate the modeling development process*
- *Automate consistency checking after changes*

*And eventually instantiate domain-specific Model Driven Development environments using DSLs, development processes, and their supporting tools*





## To meet the mission, we propose...

... an Eclipse framework to integrate modelling technologies and their supporting tools at three levels:

- Technological integration:
  - model representation / model transmission for tools independent of their semantics
  
- Semantics integration:
  - ensure semantics interchange via a description of modeling languages
  
- *Methodological integration:*
  - *enable experts to design processes and tools and then generate a dedicated supporting environment*



## Project principles

- Extension of the Eclipse value proposition
- Vendor neutrality
- Extensibility
- Standards-based innovation
- Agile development
- Inclusiveness and diversity



## Added value for Eclipse

### Modeling within Eclipse: EMF, UML2, GMF, GMT

- Available frameworks to build MDD tools
  - editors, repositories, transformation engines...
- Some attempts to tackle the integration issue
  - OMELET, ALMIIF

### Modeling outside Eclipse

- MOF, other implementations of the UML meta-model, interfaces with specialized modeling tools (e.g. Real-Time Embedded), non-modeling tools, other technological spaces

⇒ need for a extensible infrastructure allowing integration of heterogeneous tools and languages that support MDD

Eclipse at the center of the game



## End user scenario

Modeling tools rely on different meta-models and models of execution

### Scenario

1. Model the structure of a system, using a UML modeler
2. Model the behavior of the same system, using e.g. Petri nets
3. Check consistency between the two models
4. Generate code for the whole system from both parts



# Components

## ModelBus

- Provides modeling service interoperability facilities

## Semantic binding

- A complete description of modeling languages semantics
  - using a Profile Design Tool, as well as an Action Semantics Editor compliant with UML 2
- Meta-model negotiation service to find supported mappings
- Provision for user-defined semantics mappings between meta-models if negotiation fails

## Exemplary tools

- ModelBus generic client
- ModelBus adapters for ATL, a model repository, Front-End QVT



# Components: ModelBus

Provides modeling service interoperability facilities

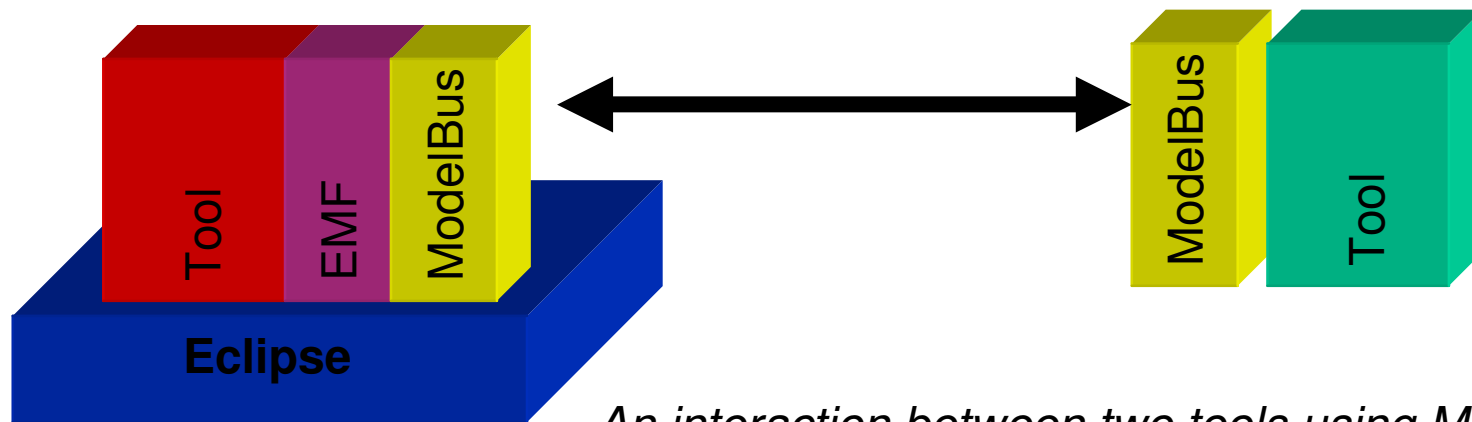
- For heterogeneous tools

Uses EMF

- for model manipulation and model representation

Extends Eclipse

- interoperability of MDA related tools inside and outside Eclipse.

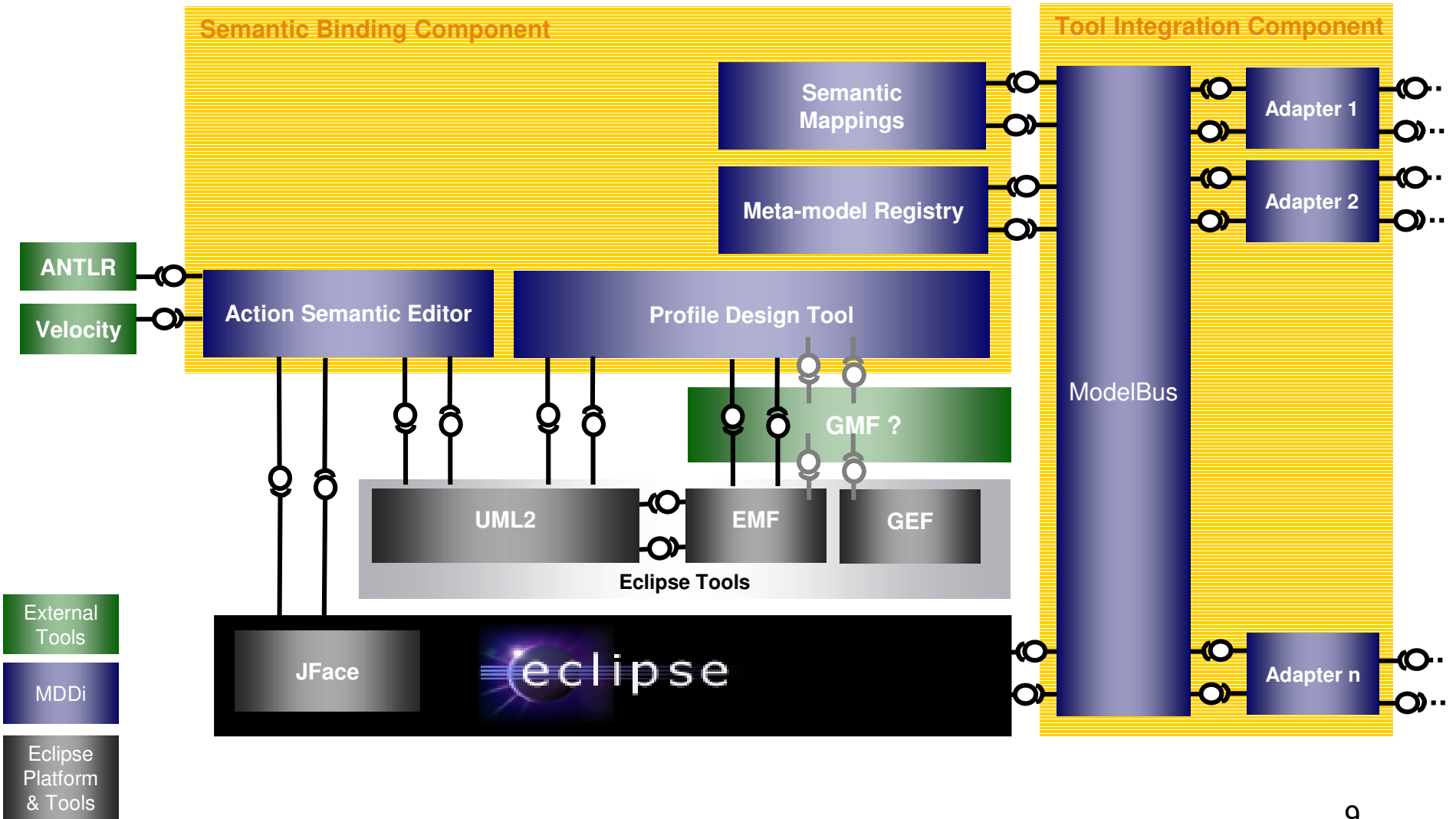


*An interaction between two tools using ModelBus*



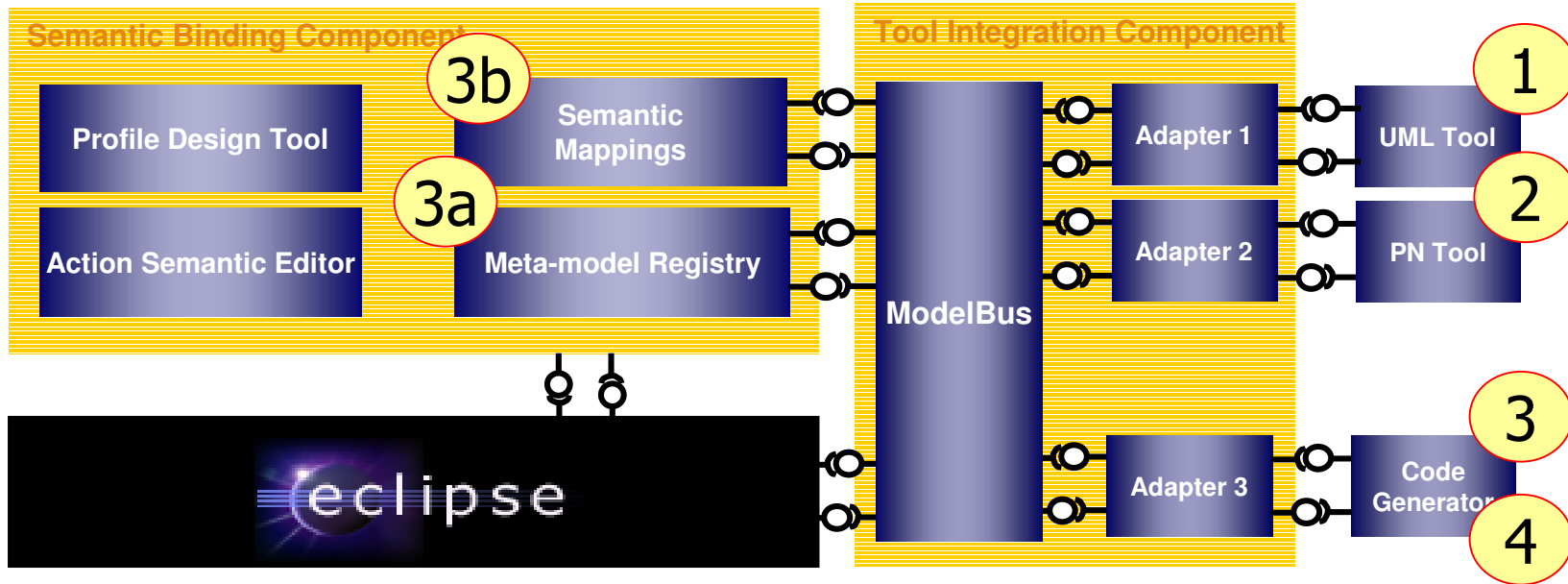


# Components (cont'd)





# Preliminary data flow for scenario



- ① *Create the structural model with a UML tool*
- ② *Create the behavioural model with a Petri Net tool*
- ③ *The Code Generator tries to find suitable semantic mappings for the UML and Petri net tools*
  - ③a *A compatible meta-model is found through the registry, or . . .*
  - ③b *A compatible inter-meta-model mapping exists using QVT (or other mapping tool)*

*Otherwise: a mapping does not exist: the tools cannot exchange data*
- ④ *Code can be generated*



# Interested parties

- A keen interest from the community
  - Adaptive Limited
  - Airbus France
  - Commissariat à l'Énergie Atomique (CEA-List)
  - Communications and Systems
  - Enabler Informática, S.A.
  - Financial Toolsmiths AB
  - France Telecom
  - IBM UK Limited
  - Imbus AG
  - Institut National de Recherche en Informatique et en Automatique (INRIA Nantes)
  - inStream
  - Laboratoire d'Informatique Fondamentale de Lille (LIFL)
  - Laboratoire d'Informatique de Paris 6 (LIP6)
  - Mentor Graphics
  - MetaMatrix
  - Philips Medical Systems
  - Politecnico di Milano
  - Stiftelsen for industriell og teknisk forskning ved NTH (SINTEF)
  - THALES
  - Universidad Politécnica de Madrid (UPM)
  - Versata
  - Xactium



# Participation

## Initial committers

- Freddy Allilaire (INRIA Nantes)
- Mariano Belaunde (France Telecom)
- Xavier Blanc (LIP6)
- Nick Dowler (Adaptive)
- Madeleine Faugère (THALES)
- Stephen Mellor (Mentor Graphics)
- Miguel A. de Miguel (UPM)
- Jon Oldevik (SINTEF)
- Yann Tanguy (CEA-List)



# Community

An interactive development process driven by user requirements

- UPM QoS tool chain
- Looking for others...

Relationships with other Eclipse projects

- ALMIIF
- EMFT
- GMF
- GMT
- OMELET

There is a need for a top-level project dedicated to modeling

- Identified in the Eclipse roadmap  
(<http://www.eclipse.org/org/councils/roadmap.html>)
- Matches a call from tool vendor, industrials, researchers
- We are willing to work with other projects to achieve this goal



# Outcome

## Initial objectives

- Implement an extensible infrastructure on top of Eclipse, enabling a technological and semantics integration, plus initial adapters
- Provide complementary modeling frameworks (e.g. action semantics modeling)
- Create a community of users ready to experiment technology and provide feedback

## Long-term objectives

- Drive, in collaboration with GMF, GMT and others, the creation of a top-level Eclipse modeling project



# Questions?

## Project proposal

- <http://www.eclipse.org/proposals/eclipse-mddi>

## Newsgroup

- <news://news.eclipse.org/eclipse.technology.mddi>