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Virtual EMF

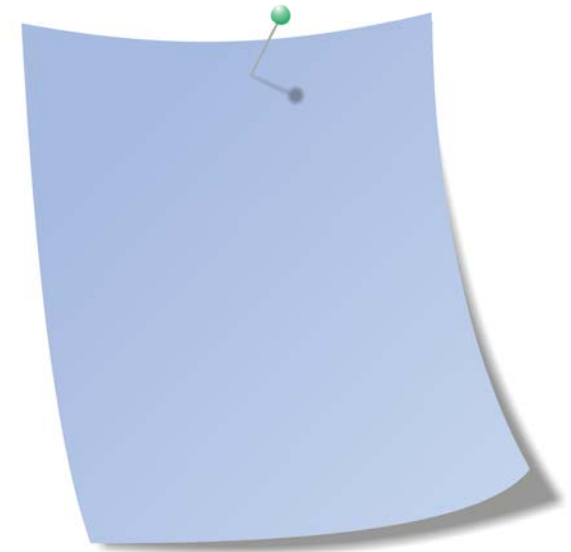
Transparent Composition, Weaving and Linking of Models

Hugo Brunelière (AtlanMod)
& Grégoire Dupé (Mia-Software)

EclipseCon Europe 2011
November 2nd, 2011

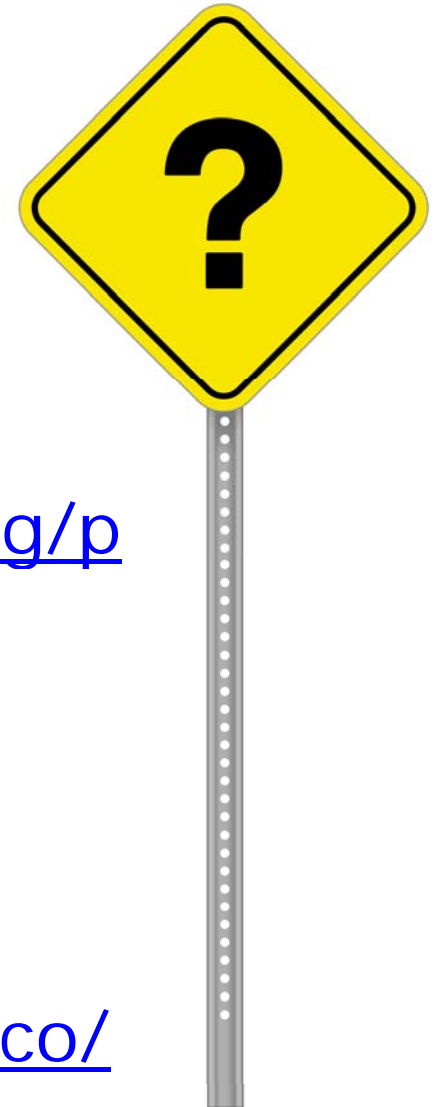
Outline

- **What's this talk about?**
 - Everything in one slide!
- **Virtual EMF in a Nutshell...**
 - Why “virtual”? Overview...
 - How “virtual”? Architecture...
 - Many potential real applications!
 - A brand new prototype on Eclipse Labs
- **MoDisco for the Use Case...**
 - What? The Eclipse-MDT project...
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- **Virtual EMF in Action on a MoDisco Scenario...**
 - Demo time!!!
- **Who We Are...**
 - AtlanMod (INRIA) & Mia-Software

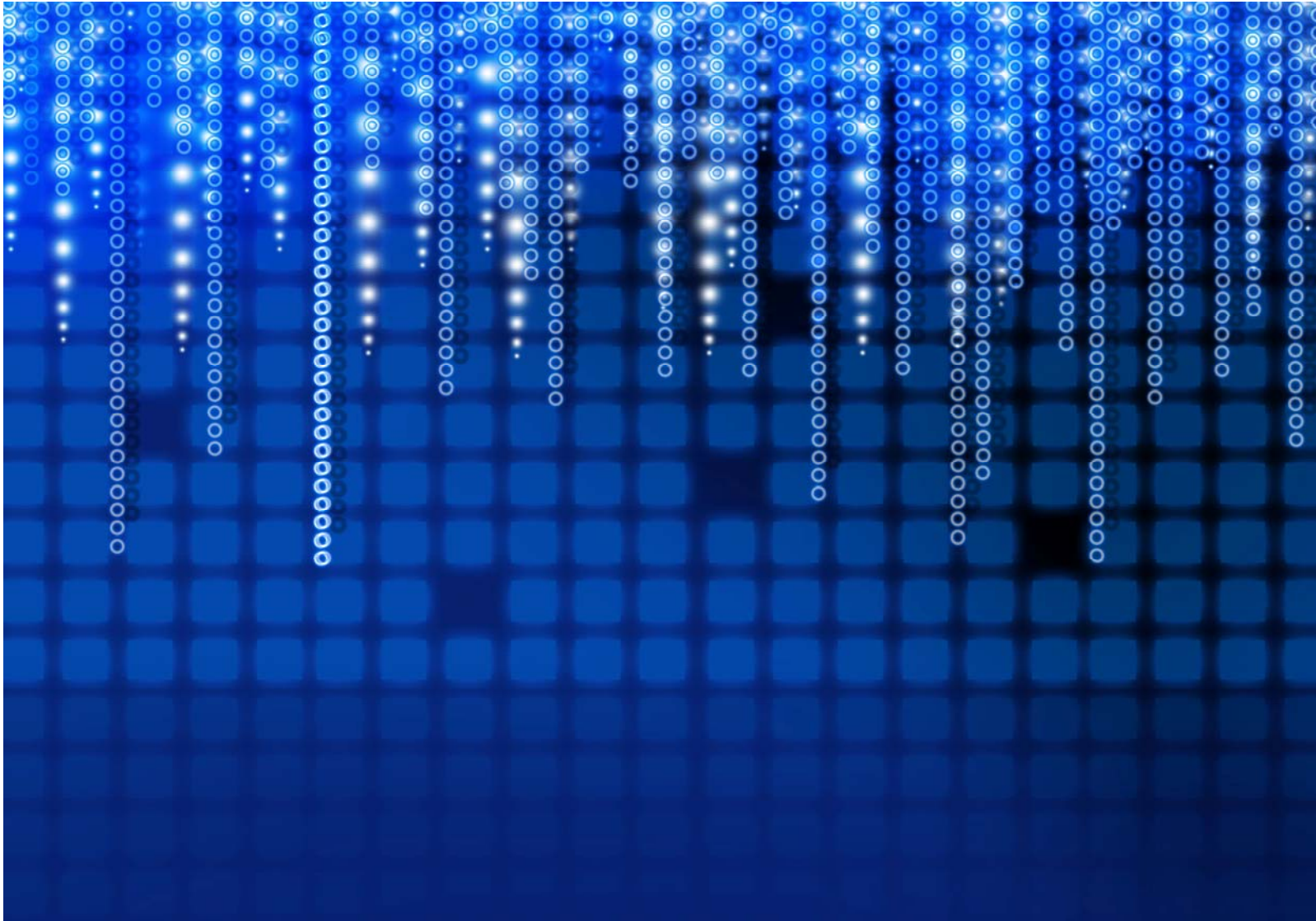


What's this talk about?

- **Virtual EMF** (for the purpose)
 - A new prototype dedicated to the transparent composition, weaving and linking of models
 - A direct extension of EMF
 - An Eclipse Labs project
<http://code.google.com/a/eclipselabs.org/p/virtual-emf/>
- **MoDisco** (for a possible use case)
 - A generic and extensible framework for elaborating on Model Driven Reverse Engineering solutions
 - A MDT project: <http://eclipse.org/MoDisco/>

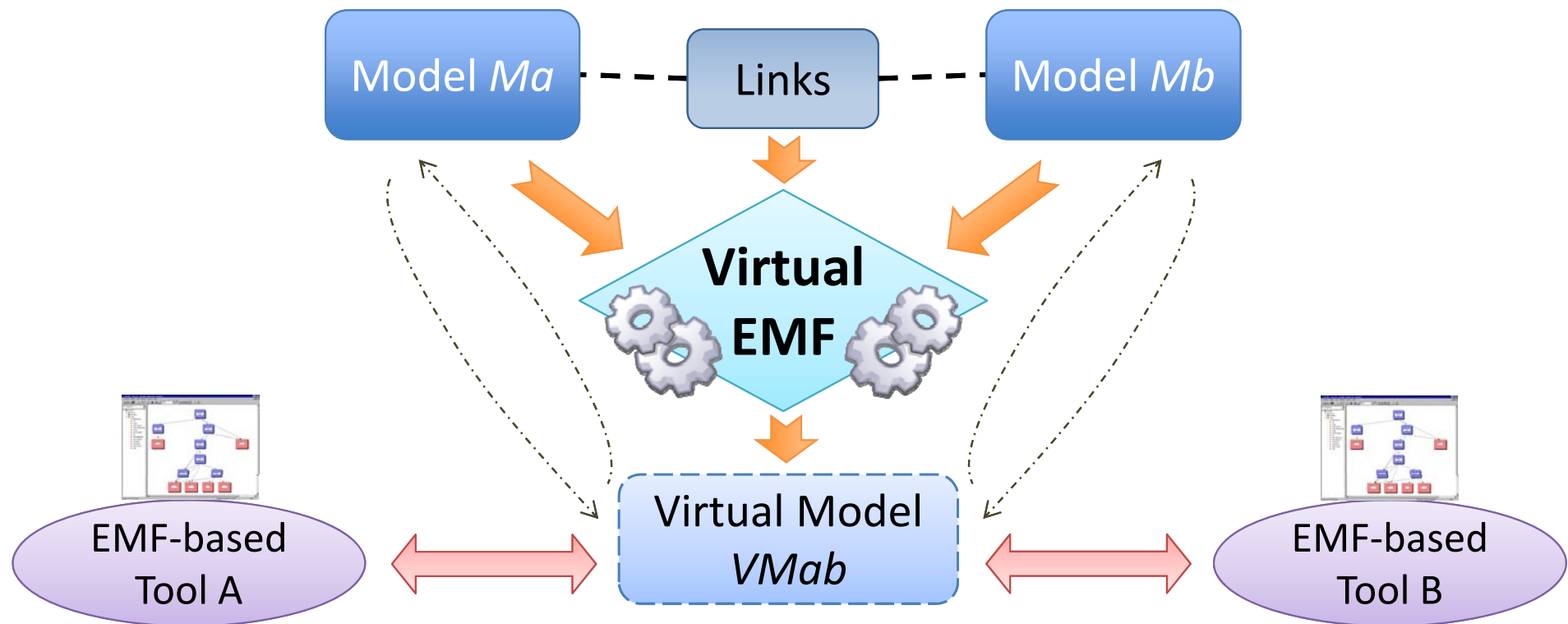


Virtual EMF in a Nutshell...



Why “virtual”? Overview...

- Definition: *“a virtual model is a model whose (virtual) elements are proxies to elements contained in different models”*



Why “virtual”? Overview...

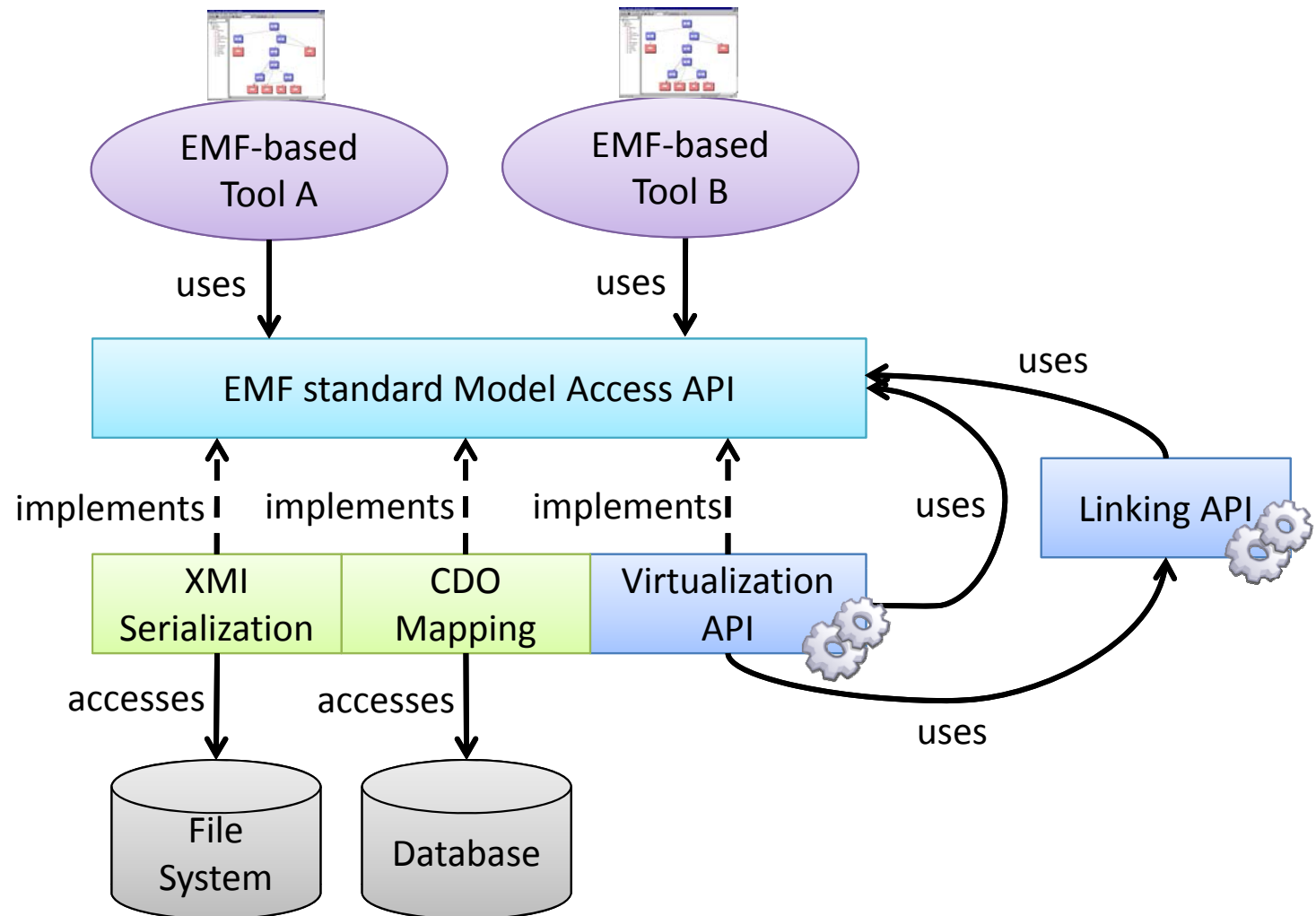
- Virtual model properties:
 - **Interoperability.** Transparent use with all standard modeling tools
 - **Scalability.** Support for very big models
 - **Faster creation time.** No additional copy of model elements
 - **Low memory usage.** No data duplication, direct access to model elements
 - **Synchronization.** Automated because of shared model elements
 - **Genericity.** Support for all types of inter-model links (e.g.; associate, filter, merge, ...)

How “virtual”? Architecture...

- **Virtual EMF** is made of 2 main components

- Implement the Model Access API

- Manage the “virtual” links



How “virtual”? Architecture...

■ **Virtualization API**

- Refinement of base EMF model access operations (e.g.; *createResource*, *eGet*, *eSet*, ...)
 - Retrieval of referenced elements
 - Support for virtual links
- Generation of the “virtual” composed metamodel
 - Could be also “virtualized” in next versions

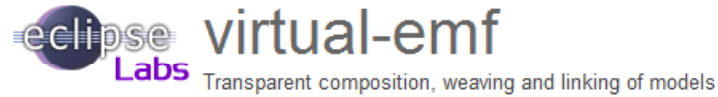
■ **Linking API**

- Current implementation via a model weaving technology (AMW), others may be provided later
 - Representation of inter-model relationships
 - Transparent usage of virtually linked elements

Many potential real applications!

- **Model association** in general
 - E.g.; transparent inter-model dependencies
- **Model composition**
 - E.g.; complementary models integration
- **Model merging**
 - E.g.; similar models fusion
- **Model filtering**
 - E.g.; model elements hiding
- **Model overriding**
 - E.g.; duplicated elements removal
- **Etc.**

A brand new prototype on Eclipse Labs

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Virtual EMF

When using the Eclipse Modeling Framework (EMF), one frequently faces the problem of having to deal with several large heterogeneous and interrelated models. The information relevant for a specific user at a given time is often scattered across those models. Therefore, we often have the need for composing, weaving or simply linking (parts of) these models in order to provide a more unified and usable view of the modeled system(s). With the currently available technologies, this is not a trivial task. Ideally, we would like to have a kind of *virtual model* offering a centralized and transparent access point to a global view on these different interconnected models.

The nature of a (EMF) virtual model should be such that:

- It behaves as a normal model, so interoperability (compatibility with existing EMF-based solutions/tools) is guaranteed;
- There is a perfect synchronization between the composed view (virtual resource) and the original models;
- Performance is not an issue, because neither creating nor accessing the global view results in additional costs (loading time, memory usage, etc.).

Virtual EMF is a brand new tool to allow tackling this issue. The tool enables users to efficiently access, handle and combine a set of interrelated EMF models in a completely transparent way.

A [talk](#) presenting Virtual EMF has been accepted at [EclipseCon Europe 2011](#).

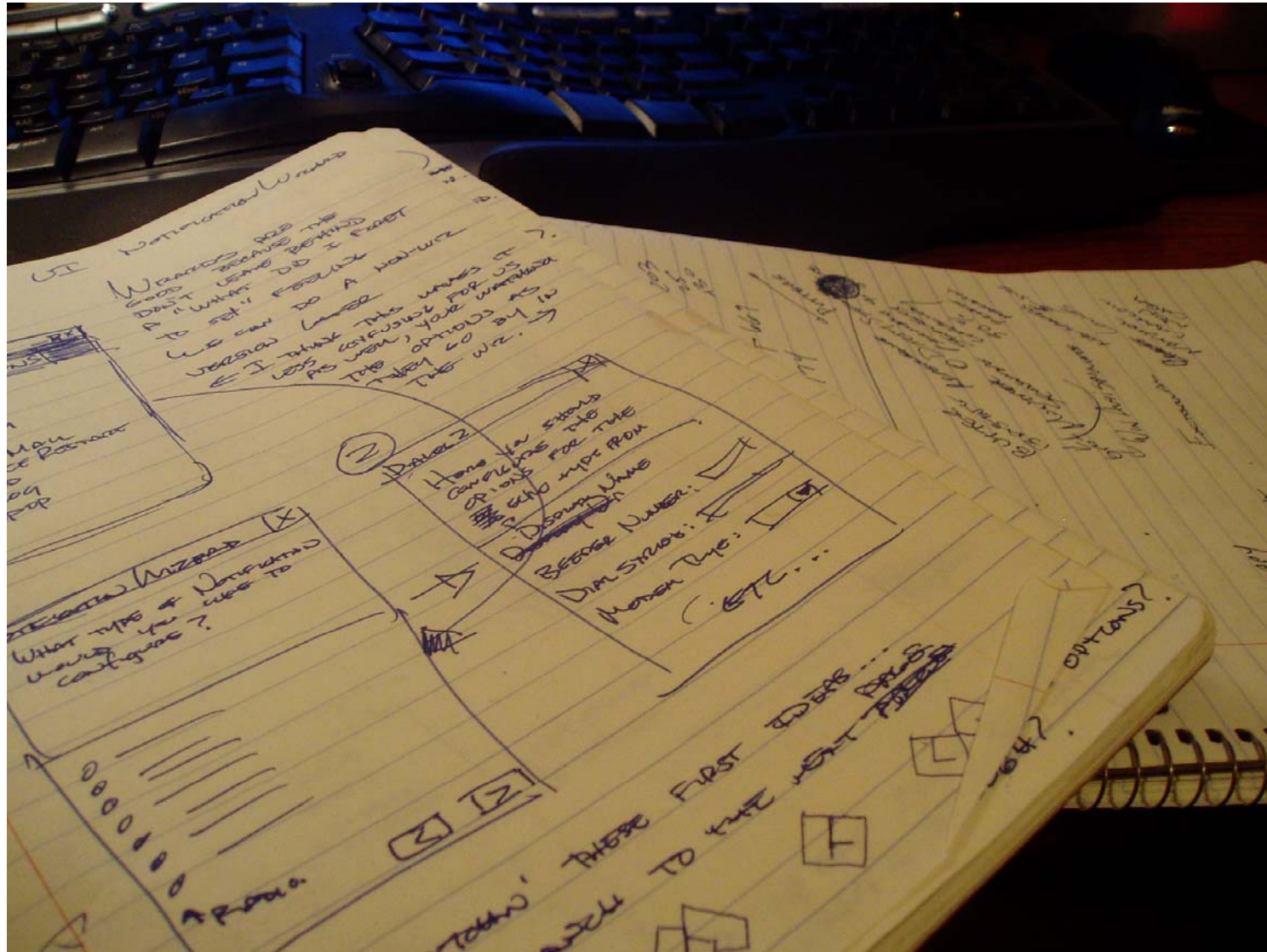
Documentation

- [Installation](#)
- [User guide](#)
- [Examples](#)

Publications

- Cauê Clasen, Frédéric Jouault, Jordi Cabot. "[Virtual Composition of EMF Models](#)". In: *IDM2011 - 7èmes Journées sur l'Ingénierie Dirigée par les Modèles*. Jul 2011, Lille, France.
- Cauê Clasen, Frédéric Jouault, Jordi Cabot. "VirtualEMF: a Model Virtualization Tool". In: *ER2011 - 30th International Conference on Conceptual Modeling*. Oct 2011, Brussels, Belgium. To appear.


MoDisco for the Use Case...



Eclipse-MDT MoDisco



An **Eclipse framework** to support the elaboration of **Model Driven Reverse Engineering** solutions

- Official Eclipse Modeling project (in MDT)
 - Open-source (EPL)
 - Based on other Eclipse Modeling projects
 - Released with Helios & Indigo
- Supported by the 
 - Reference implementations for ADM (Architecture Driven Modernization) standards:
 - KDM (Knowledge Discovery Metamodel)
 - SMM (Structured Metrics Metamodel)
 - ASTM (Abstract Syntax Tree Metamodel)



MoDisco Overall Architecture

Supported Technologies

Java

- ✓ Metamodel
- ✓ Discoverer
- ✓ Generator
- ✓ Transfo. to KDM/UML

JSP

- ✓ Metamodel
- ✓ Discoverer
- ✓ Generator

XML

- ✓ Metamodel
- ✓ Discoverer
- ✓ Generator

...

Discovery Manager



Plug and orchestrate transformations

Model Browser



Navigation through complex models

Customization & Extensibility



Definition of specific viewpoints

OMG/ADM Standards



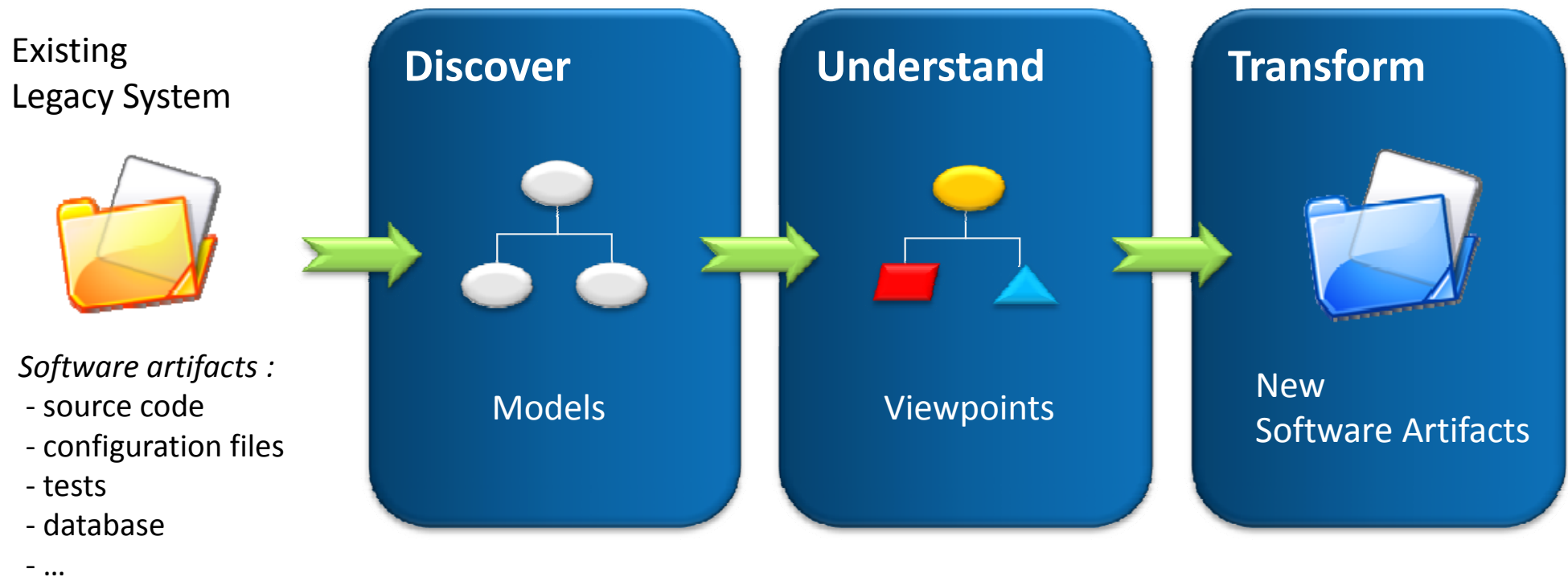
Pivot metamodels (KDM, ASTM, SMM)

Infrastructure

Eclipse Modeling projects

Model Driven Reverse Engineering (MDRE) Approach in MoDisco

- Use **models** to represent and manipulate **artifacts** from existing systems

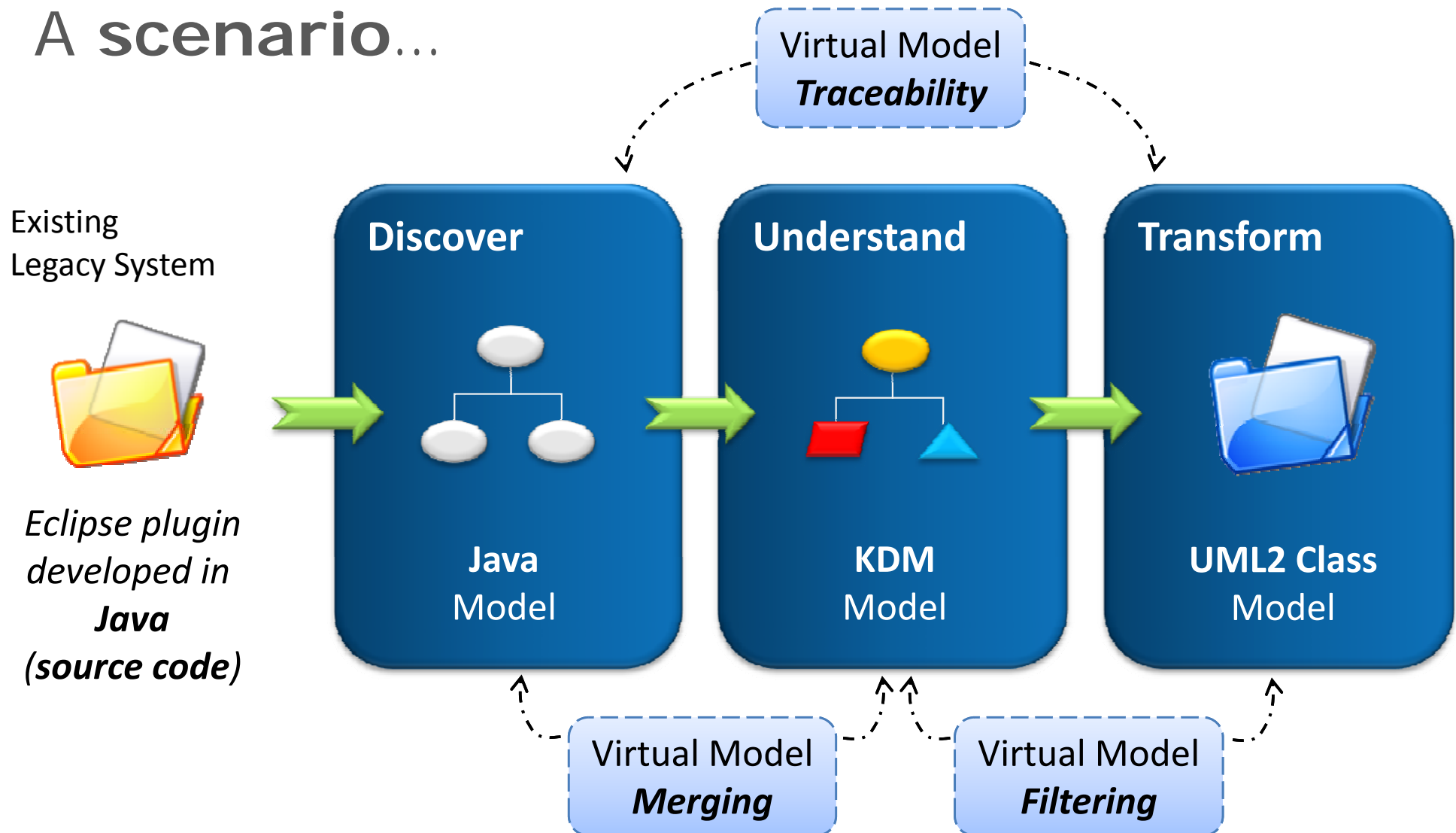


Virtual EMF in Action on a MoDisco Scenario...



Virtual EMF Applied in a (MoDisco) Reverse Engineering Context

■ A scenario...

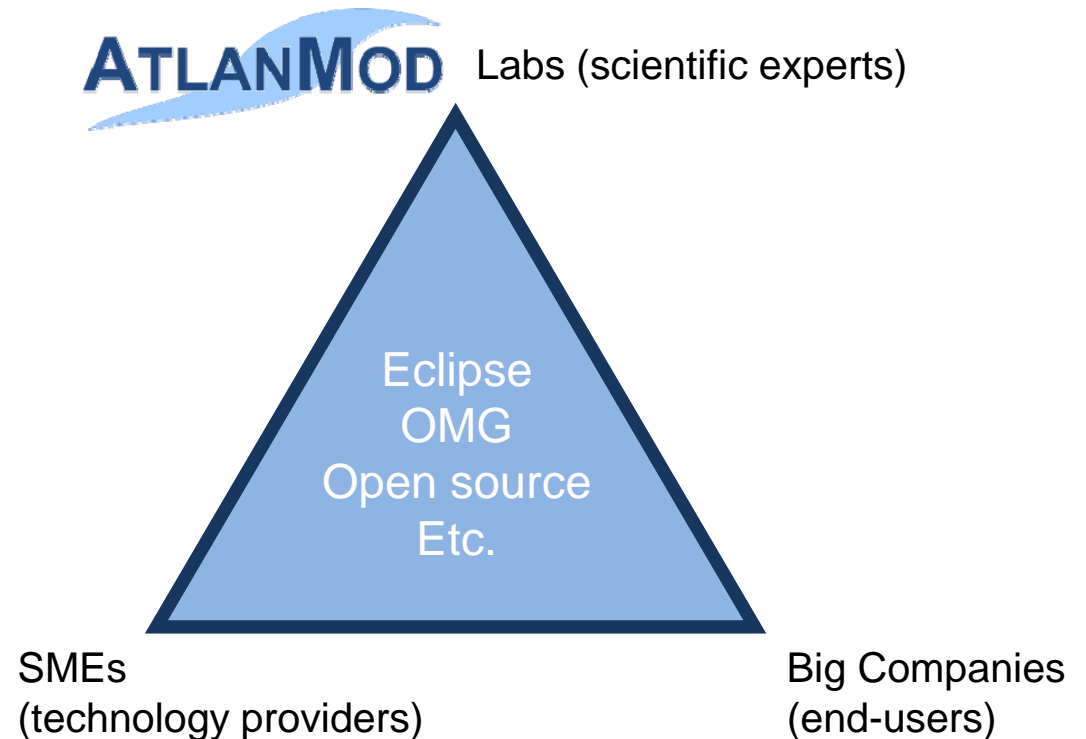


Who We Are?



AtlanMod – An Expert Research Team in Modeling

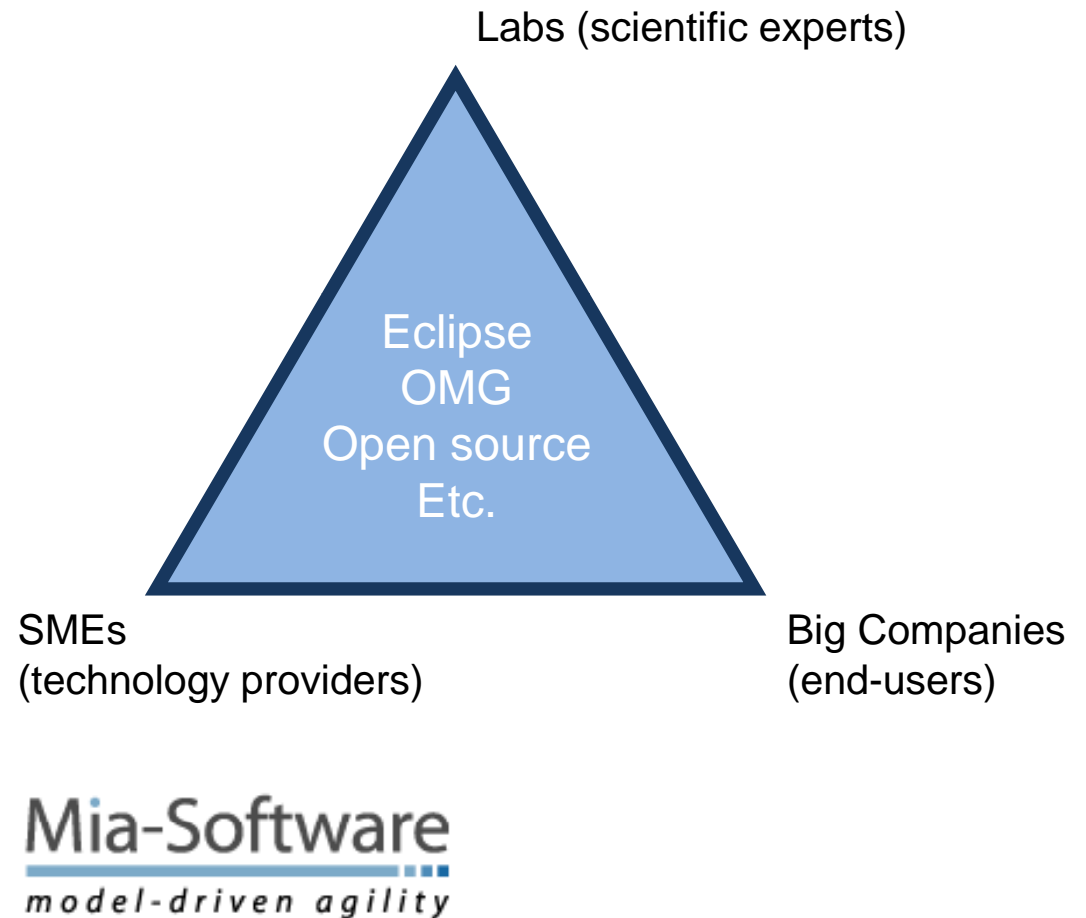
- A common team between INRIA, Ecole des Mines de Nantes (EMN) & LINA
- Expertise on **Model Driven Engineering (MDE)**
- Focus on “Modeling Technologies for Software Production, Evolution, and Operation”
- Actively involved in Eclipse via **MoDisco, EMF Facet, ATL**



Application Driven Research
A virtuous triangle...

Mia-Software – Model Driven Agility Company

- A software provider specialized in the Model-Driven approach
- Involved in Eclipse via **MoDisco, EMF Facet & Papyrus**
 - A subsidiary of SODIFRANCE Group benefiting from the efforts engaged in R&D about the evolution of legacy systems



Thanks for your attention!

■ Useful links

– **Virtual EMF** on Eclipse Labs

- <http://code.google.com/a/eclipselabs.org/p/virtual-emf/>

– Eclipse-MDT **MoDisco** project

- <http://www.eclipse.org/MoDisco>



■ Contacts

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- Virtual EMF & MoDisco

– Grégoire Dupé – gdupe@mia-software.com

- MoDisco

