

MODELLing solution for softWARE systems



***MDA adoption for a SME:
evolution, not revolution – Phase II
Régis Vogel and Keith Mantell
WP5 Bilbao 2006***



- **Introduction**
- An overview of the experiments
- Education plan for MDD Stakeholders
- MDD Process
- Integration of an MDD tool chain
- The initial results
- Future work



- GOAL :
 - Introduction of MDD in SME with
 - maximum benefits
 - minimum disruption



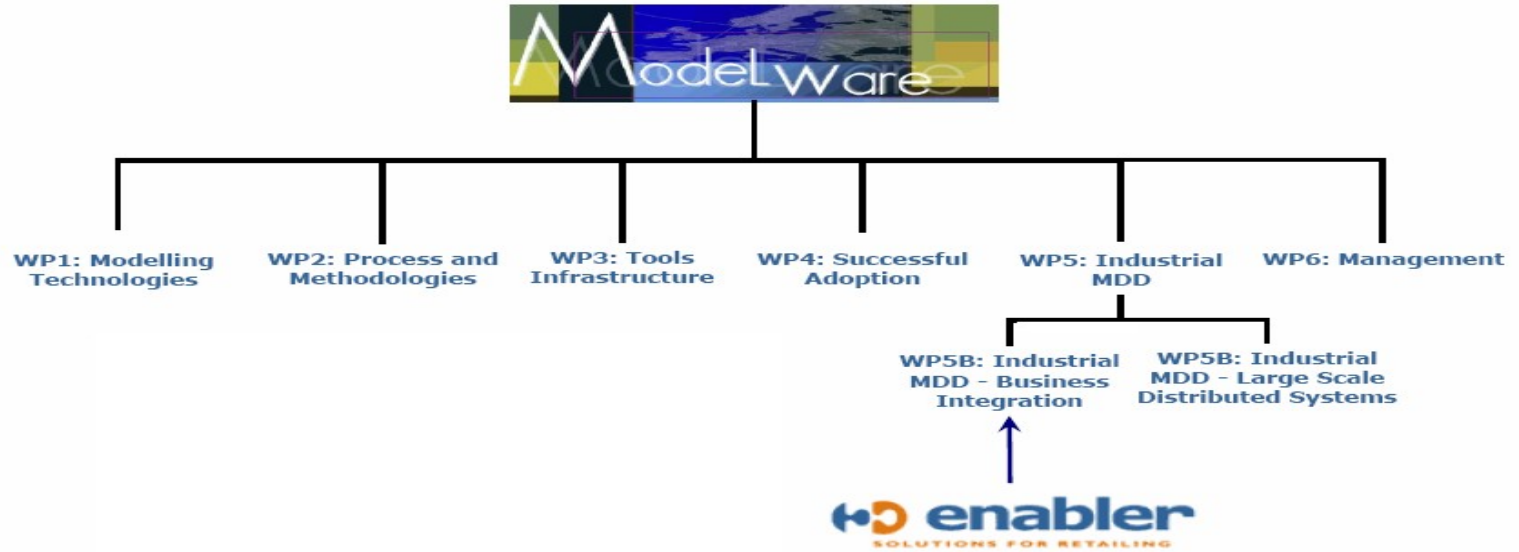
- Specialists in the design, implementation and support of retail IT solutions.
- Provide services to retailers who require business critical, high capacity solutions in merchandise management, logistics, data warehousing, business optimization and enterprise integration.
- Uses best-of-breed solutions and retail knowledge to help clients devise successful, integrated Information System Architectures and build competitive merchandise management models.
- A unique focus on retail, IT and IS solutions.

Some relevant and well-know customers ...




- Rapidly changing business requirements.
- Heterogeneous middleware platforms.
- Incorporation of legacy systems in new applications
- Systems with emerging applications and technologies.
- Geographical dispersion of teams:
 - Headquarters in Portugal.
 - Software factory in Brazil.
 - Offices in Portugal, United Kingdom, Germany, France, Brazil, Italy and Spain.
 - Operations around America, Europe and Asia.





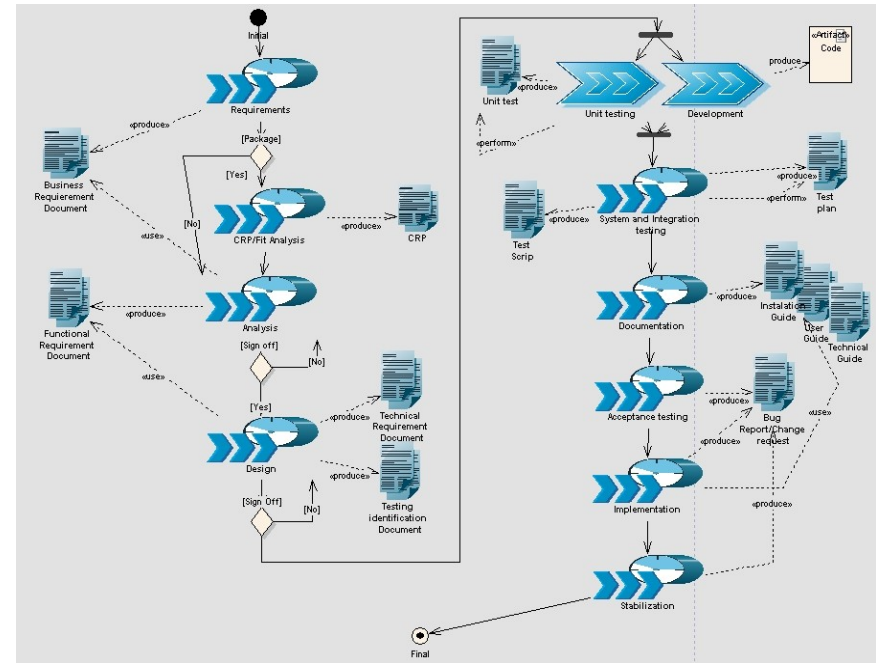
European commission project
Sixth framework program
6 work packages
19 participant entities



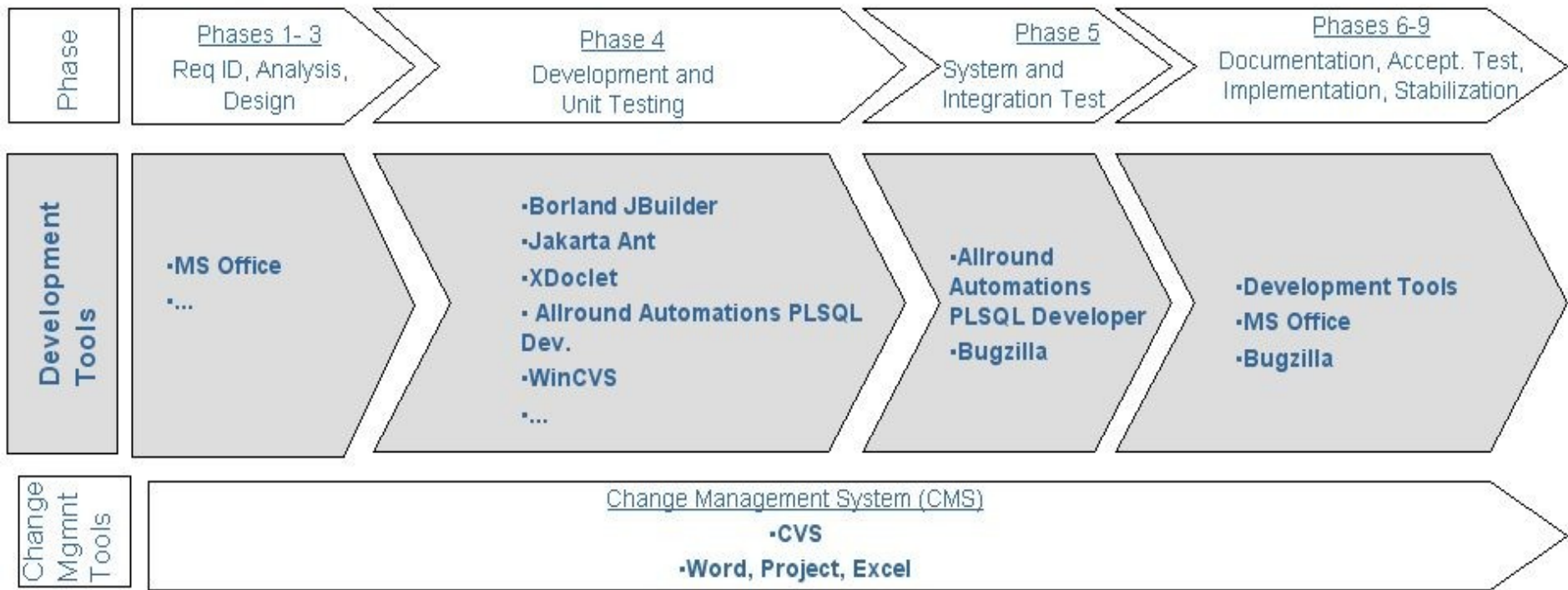
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- Waterfall
- ISO 9001 certified
- Sign-off process
- Manual process with templates for contractual and development documentation
- It is not supported by any specific tool or integrated toolset.
- The validation is done manually.
- Each phase of the life-cycle uses distinct tools and methods specific to their own goals.
- Our consultants are specialists in retail domain (even within the team of Java programmers)



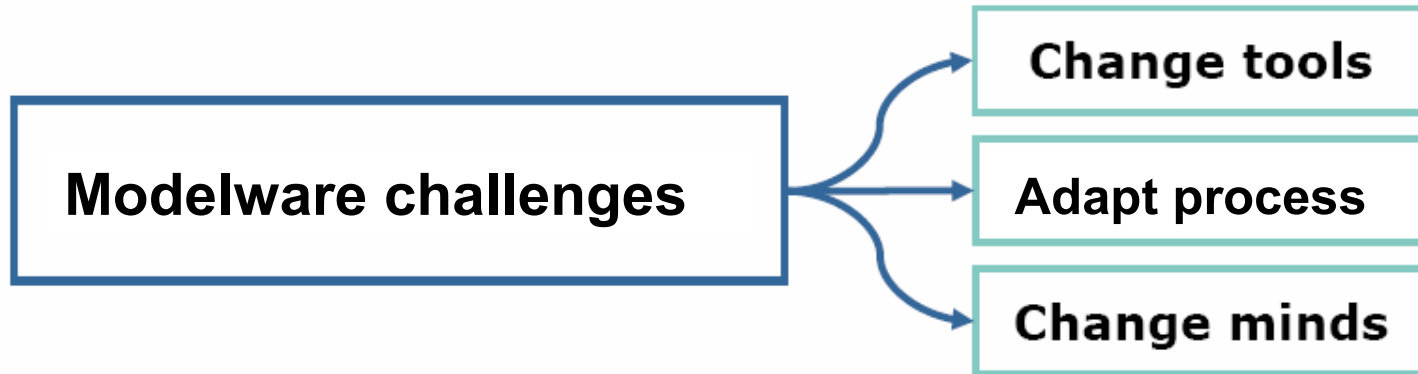
Experiment context: AS-IS (TOOL SET)

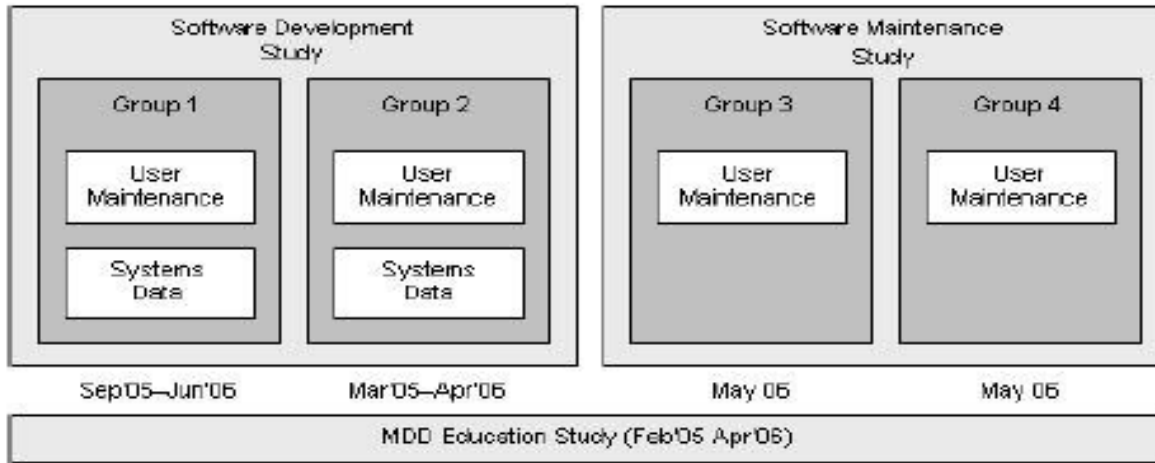




- Due to the commercial sign-off process, requirements must be settled before the system is designed, because their evolution makes the development process unstable.
 - Reacting to later change is high cost in terms of time and effort.
 - Therefore fast and accurate solution to change management requests is needed or accurate identification of requirement.
- Traceability is difficult due to the different phases and documentation format.
- Heavy human-based validation process.
- Early detection of conformity problems is a key
- Distributed team.
- Reusability.
- Keep the same Process outputs

- What has to be changed to make MDA work?
 - To change developer's minds: from a code centric- to a model-centric paradigm.
 - To change the tools they used to do their work
 - To adapt the actual development process and the actors roles





■ Divided into 3 studies:

- **Software Development Study:** A full module developed from top to bottom using MDA. Still continuing
- **Software Maintenance Study:** Applies a change request to a module, with and without MDA.
- **MDD Education Study:** Captures the perceived value of using MDD in different job functions and technical areas, as well as providing insight into the subject's view on advantages, constraints, and concerns of MDD.

Goal => 3 parts of the study are complementary and help us in understanding

- MDD learning curve
- MDD improve development in term of performance and quality
- MDD technique Adoption
- Tools readiness



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- Education Plan was developed to introduce and prepare team members for their initial usage of MDD and infuse MDD into the company.
- Roles and responsibilities drawn from MDD Process
- Forums, newsletter used in addition to courses
- Courses
 - Introduction to MDA
 - Introduction to MDA for executives
 - UML 2.0 (MOF, extension, OCL...)
 - Tool support: We develop a top to bottom example using a model of the Retail application(Point Of Sale) to provide the trainee with concrete and contextual example
 - UML tool RSA
 - Methodology Process and profiles
 - Modelware tools chain and language such as MOFSCRIPT, OCL...

=> Education study monitored by: surveys of participants to capture **learning curve and resistance to change**

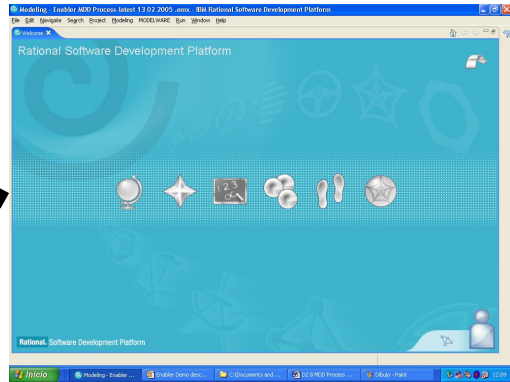


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MDD PF

SPEM v1.1

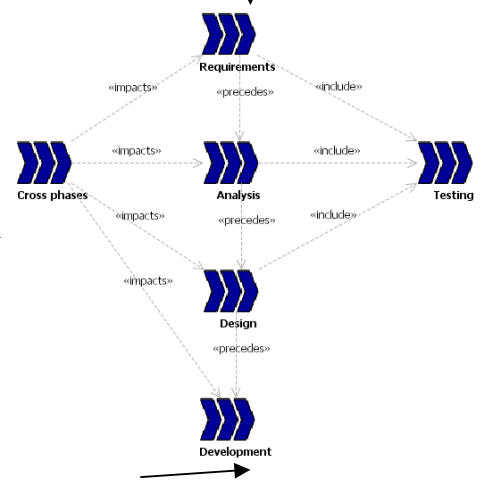
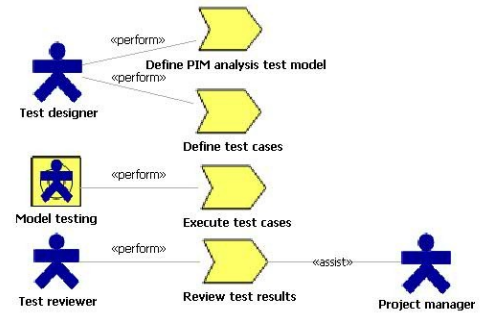
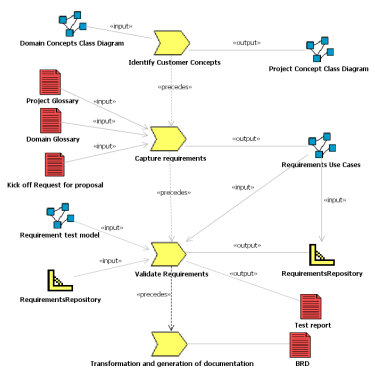


RSA integration as plug-ins

Used by

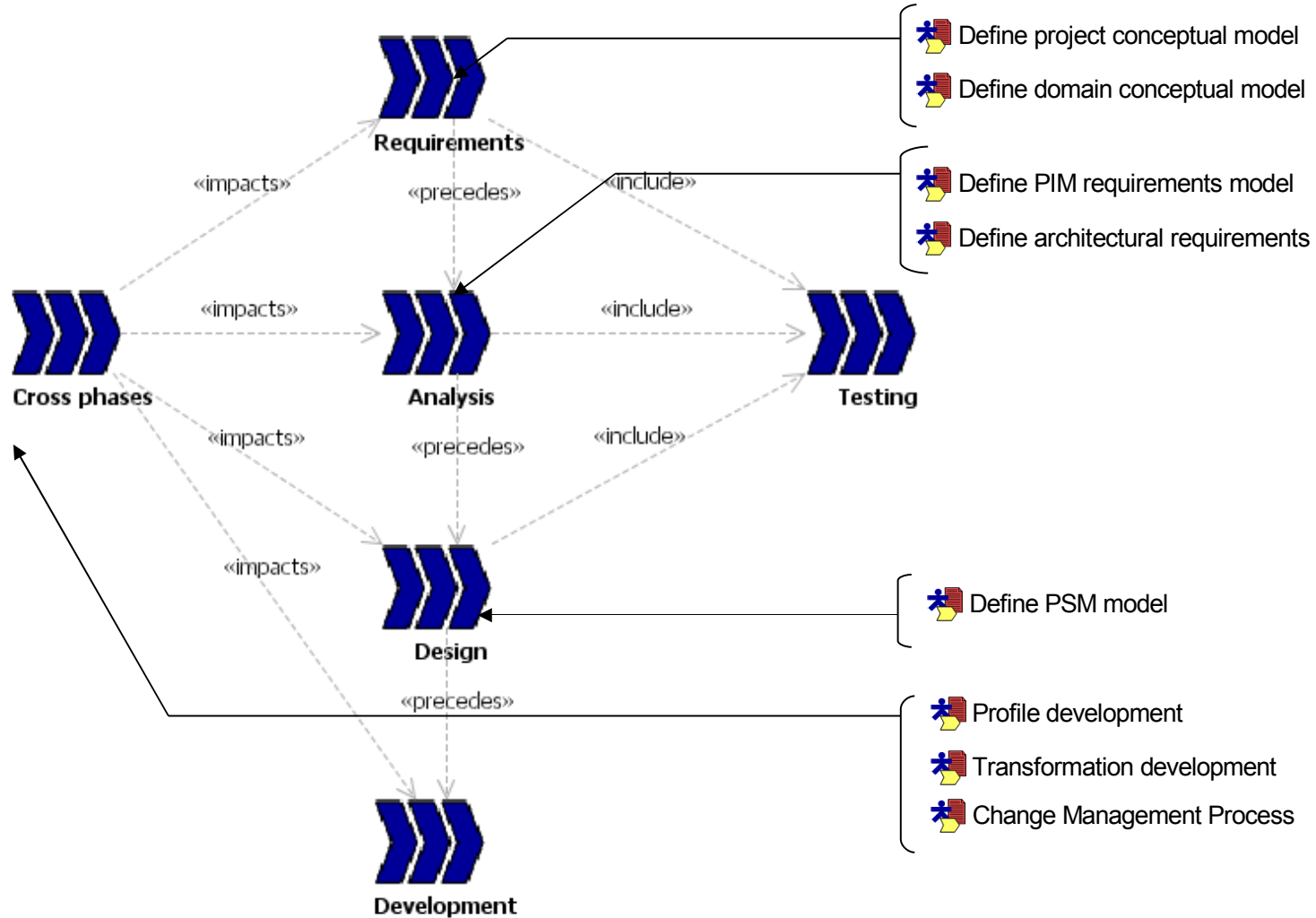
ENABLER
IBM UK
ESI

Enabler MDD Development Process





MDD process high level description:



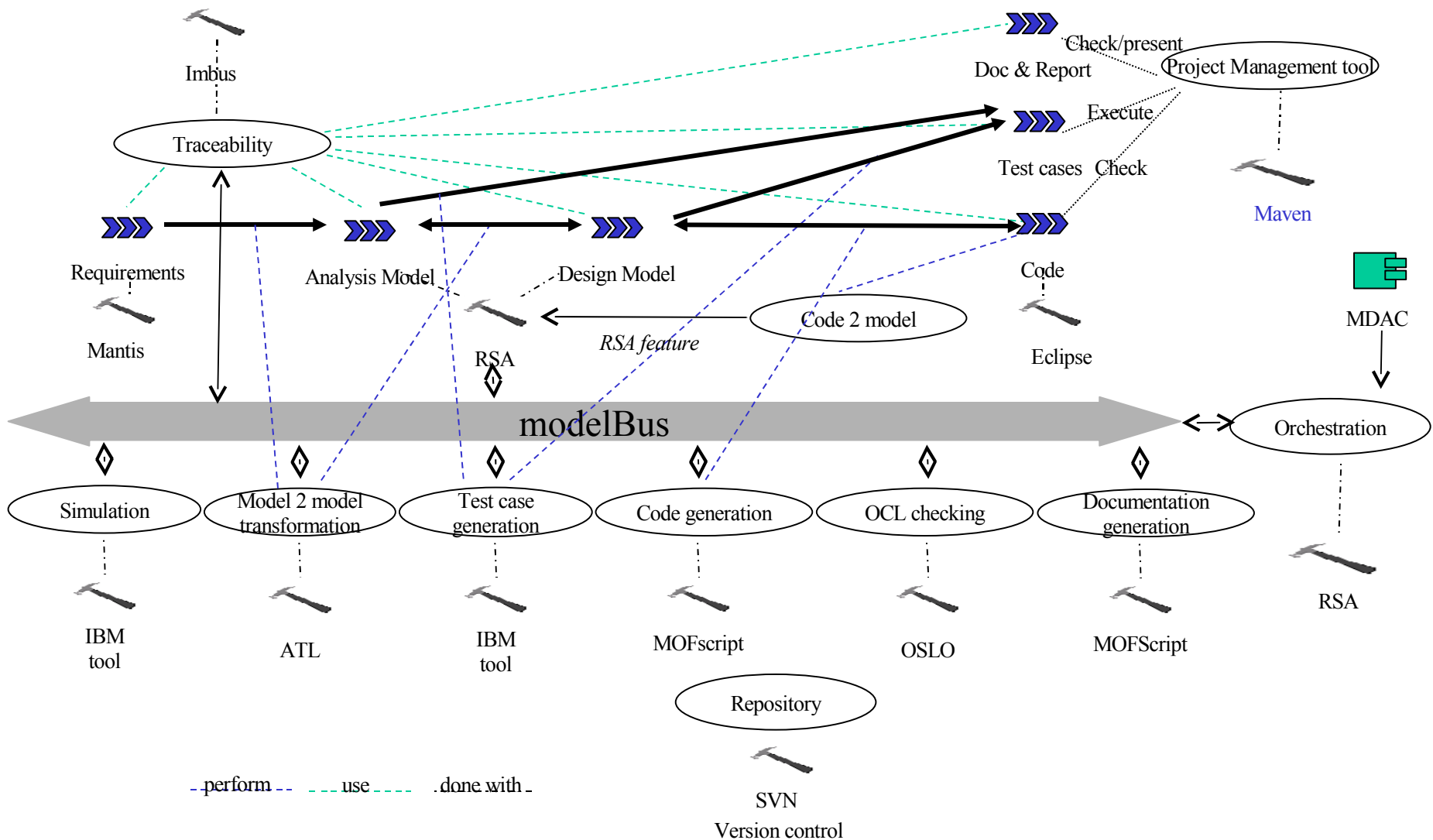


- What: help to capture Enabler MDD process
- Pre-condition: Must fit within existing business process => Evolution not revolution
- How: Keep the iterative development loop between Enabler, IBM UK with European Software Institute(ESI)
- Result so far: Enabler adapted or feedback to/from the base Process Framework.
 - Retained its own role titles and responsibilities, but mapped the stakeholders, processes and deliverables from the MDD PF
 - Meta-team: developing the meta-models and developing transformations
 - ``Product-line" model
 - Change management request: Modification of existing feature
- Further work:
 - QA modelisation needed (ie Testing...)
 - Capture traceability process in the MDD PF
 - Meta-model evolution



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Enabler MDD Tool Chain VISION



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- **OCL- OSLO** is Used for validation of the model and quality control. The Client is integrated in RSA
- **Orchestration tool** is done by RSA extension (pluglets) to execute our MDD process. Mainly it's used to invoke transformation processes. By a transformation process, we mean first calling the OCL to validate the quality of the model, then invoking a transformation.
- **Modeller:** Rational Software Architect (RSA) is used to create profiles, and models and also as our main MDD tools since we implement the orchestration tools using the pluglet feature provided by RSA.

Traceability is used to maintain links (dependency or traceability) between artefacts created/generated during the MDD process and The traceability client integrated in RSA allows us to trace any kind of any kind of artefact that are in the RSA workspace. Automatic update event is manage by the client.

Requirement tool: Mantis is a bug management tool that is tailored for requirement management. It is not integrated on model bus we developed an export to an UML2.0 model with profile to be able to manipulate// validate the requirement within the MDD tool chain.

SVN Subversion: It's the repository management for the project. All artefacts used and generated have to be in the RSA workspace and in SVN. SVN supports the merging of models and version management with graphical interface.

Open Office: ODF is an ISO standard and also "cleaner" than RTF. ODF is XML-based and easier to generate. Also the master document concept of Open Office allows users to divide the BRD structure in different sub-documents that are autonomous.

Maven is used to publish generated documentation, generate reports, build the application The goal is also to use it to do continuous integration with unit testing.

MOFSCRIPT is used to generate code and documentation

ATL is used for model transformation (ie: Analysis to Design)



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- The structure of the models (e.g. Requirements Model, Use Case Model etc.) and the definition of the MDD process helped the team cope with the complexity of the application and also to structure their work.
- Interest in MDA has been raised and maintained throughout the project.
- The development teams saw the value of the techniques and processes – and we win the hearts and minds of development
- Community created will ease future acceptance by the broader audience
- MDD process coupled with traceability and OCL allows the user to focus on higher values tasks and ultimately boost morale.
- Generation improve the quality and the time spent to perform certain task (ie: code and documentation).
- OCL checking/rules was found useful by the users because it was used like the compiler errors in the code centric paradigm (Warning/Errors)



■ Issues

- Project timeframe – only 2 years to produce a new toolset, processes and training
- Toolset:
 - Interoperability not standardised – leads to difficulties.
 - Currently rather fragile as might be expected at this stage in its life-cycle.
 - Some tools still alpha quality
 - More support with administration, security tool from Modelbus are needed
- Traceability:
 - Only manual entry of links
 - No support for analysis of links
- Documentation and education materials:
 - Need a lot of effort to create and customize to our particular need. Also at the time of the training much was still rudimentary
- Functionality and performance:
 - Handcraft modification should be preserved: merge models/text
 - Traceability, none of the transformation facilities produce traceability links automatically;
 - Reverse engineering.



- Technical Change Management is an iterative process. We are at the end of the first iteration we need to:
 - Capture and analyse the experiment results to be able to plan the next iteration of infusing MDD within Enabler.
- The next areas under consideration are:
 - Automatic test generation from use cases
 - Capture specific process of Meta model evolution.
 - SOA, Workflow (BPEL...)
 - And Automates the MDD process instantiation and execution



■ Questions????



www.modelware-ist.org

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