M²VP

Which MDA Tools are Right for You?

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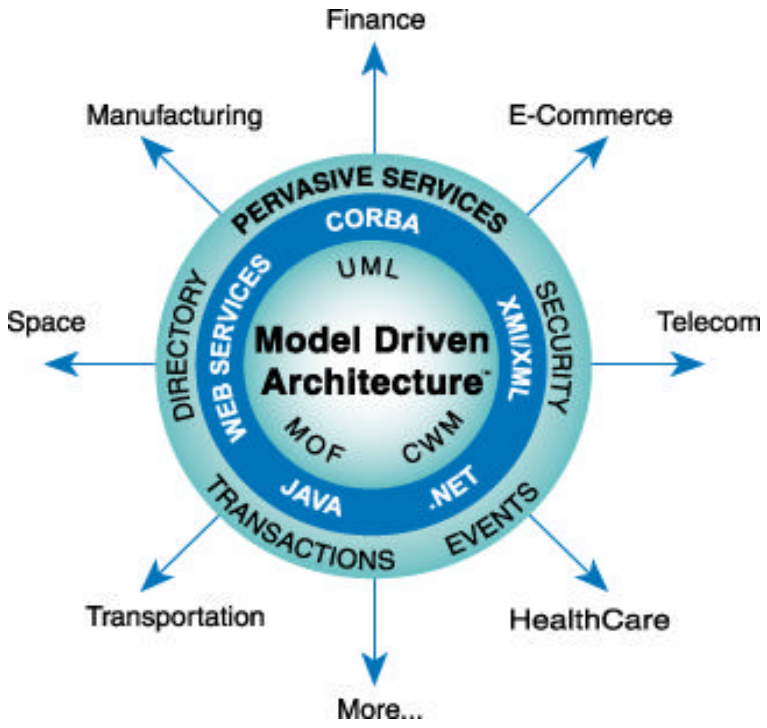
Model Driven Architecture



- A set of standards defining the scope, content, creation and usage of models
- An architecture-based process for integrating models into the development process
- Core Technologies
  - UML + OCL
  - MOF + XMI
  - CWM

Agenda

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- MDA context
- Development process
- Where tools fit in the process
- Requirements for tools
- Integration between tools
- Advanced Topics
- ROI

MDA Distilled

M²VP

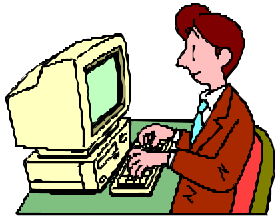
Business Analyst

Business Model (CIM)

Architect / Designer

Platform Independent Analysis Model (PIM)

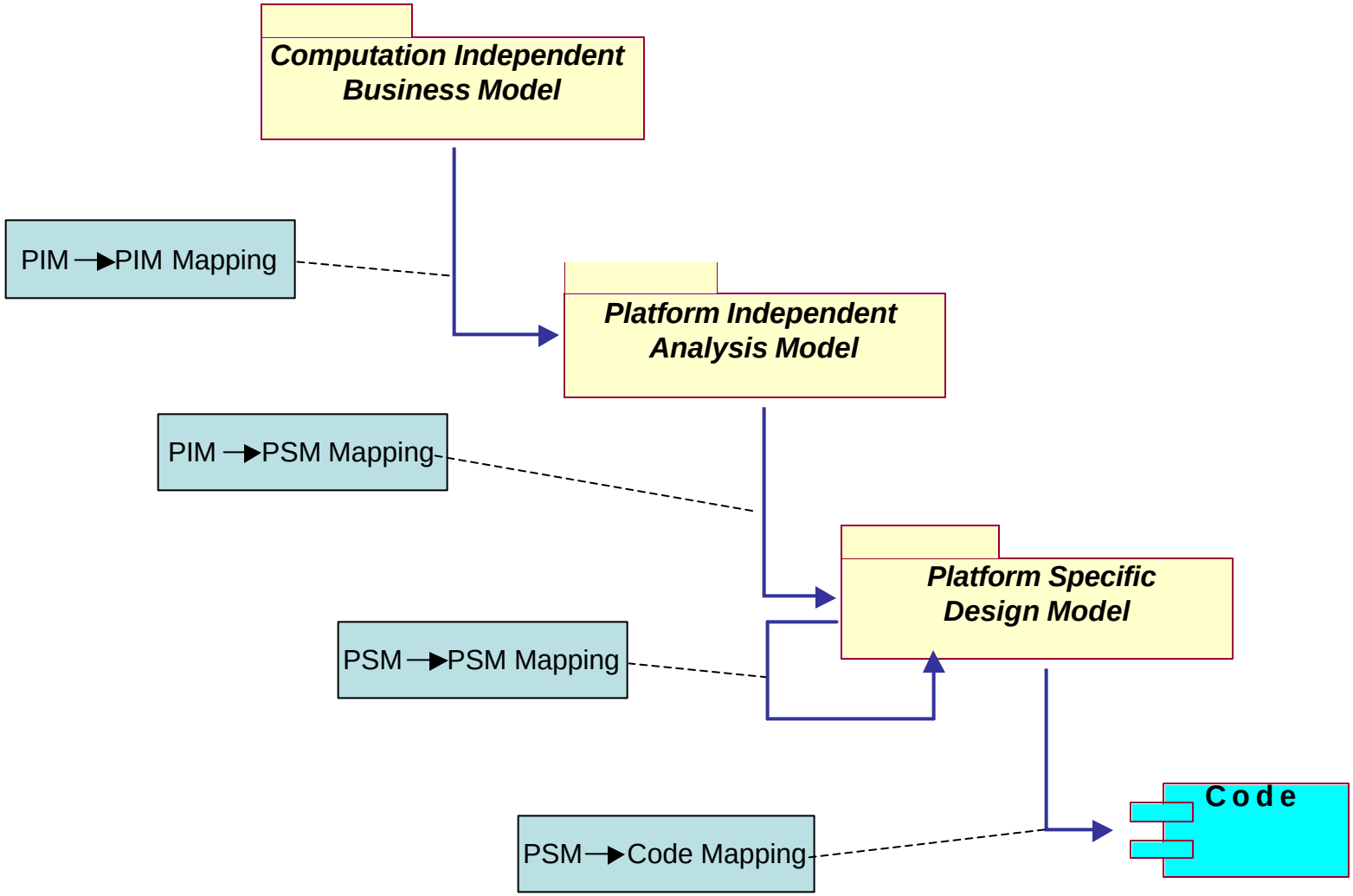
Platform Specific Design Model (PSM)



Developer / Tester

Code

MDA Mappings

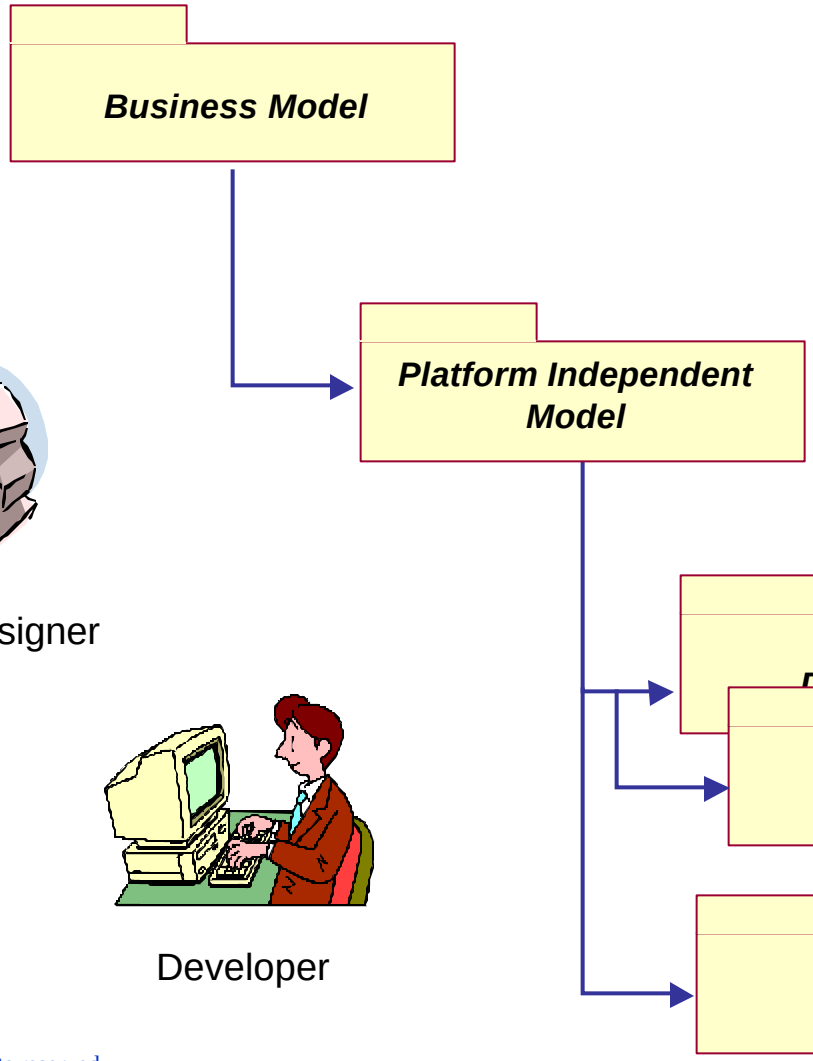


Technology Independence

Business Analyst

Architect / Designer

Developer



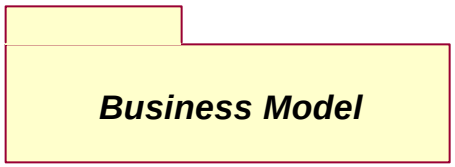
- Applications are “Future-Proof” against technology churn
- When technology evolves, a new PSM can be generated rather than rewriting it
- Artifacts can be generated for multiple platforms from the same design

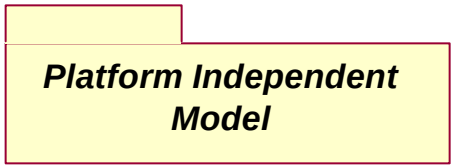
Generation Tools

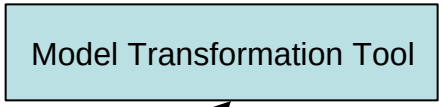
Business Analyst

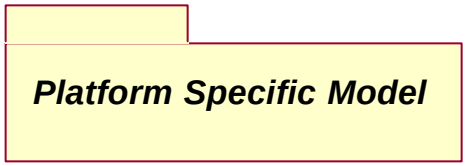
Architect / Designer

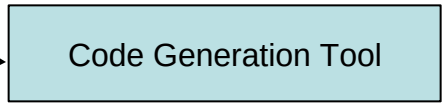
Developer / Tester

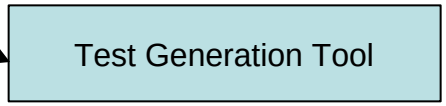


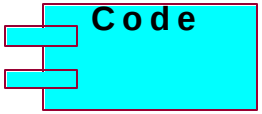












- Tools are standards based, not proprietary
- Resulting code base doesn't require a specific runtime infrastructure
- 70-80% of the structural code can be generated
- Test Cases can be generated from OCL

M²VP 4 Stage MDA Process

M²VP

1. Define the approach
   - Integrate enterprise architecture and standards into the development process.
   - ➢ Create meta-models and profiles
2. Define the problem
   - ➢ Create Business Models (Domain, CIM, System)
3. Define the solution
   - ➢ Refine into PIMs and PSMs
4. Leverage the solution
   - Integrate assets into a corporate reuse program and repository
   - Architecture and design accommodates: reuse, customization, enhancements, versioning…

MDA Profiles

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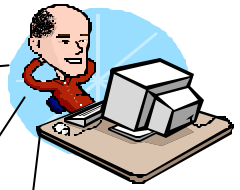
- Computational Independent Model
  - Simplified UML subset appropriate for business analysts. Incorporates GRM
- Platform Independent Model
  - Custom profiles for enterprise architecture and standards
  - Standard based profiles (EDOC, EAI)
- Platform Specific Model
  - Standards based profiles (CORBA, EJB, .NET)

MDA Process Review

Business Analyst

Business Model



MDA Architect

Meta & Modeling

Application Architect

Platform Independent Model

Model Transformation

Platform Specific Model

Developer / Tester

Code, Test, Doc Generation

Code

Meta and Modeling Concerns

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- Ability to create models and meta-models in UML
  - Formally define model constructs and constraints
- Ability to create profiles in UML
  - Since most modeling tools don't support MOF directly, profiles extend standard UML tools
- Ability to validate correctness of model against meta-model
- Ability to import / export meta-models and models in standard XMI format

Transformation Concerns

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- Ability to formally define mapping between models
- Ability to customize standard mappings
- Ability to parameterize mappings
- Ability to modify transformation result
- Ability to trace elements in one model to the elements the were derived from in another model

Generation Concerns

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- Preserves separation of concerns
  - Platform specific info is not required in PIM
  - Platform independent info in not required in PSM
- Can generate to multiple technologies and platforms
- Generation can be parameterized and modified
- Generation based on standard and custom patterns
- Completeness
  - Structural code (stubs, etc.)
  - Procedural code
  - OCL can be compiled, generate run-time code
- Can be integrated into an automatic build process (command driven)

More About Generation

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- Procedural code
  - Some code can be generated from OCL, but
  - Requires support for Action Semantics and Language
  - Generally necessitates reducing scope of target and environment
- Tests
  - Can be generated from OCL and (Action Language)
  - Can be integrated into a framework (e.g. JTEST, JRUN)
- Documentation
  - Ability to create analysis and design documentation from information in all levels of models
  - Ability to customized document and report generation
  - Ability to create some form of user documentation

Advanced Capabilities

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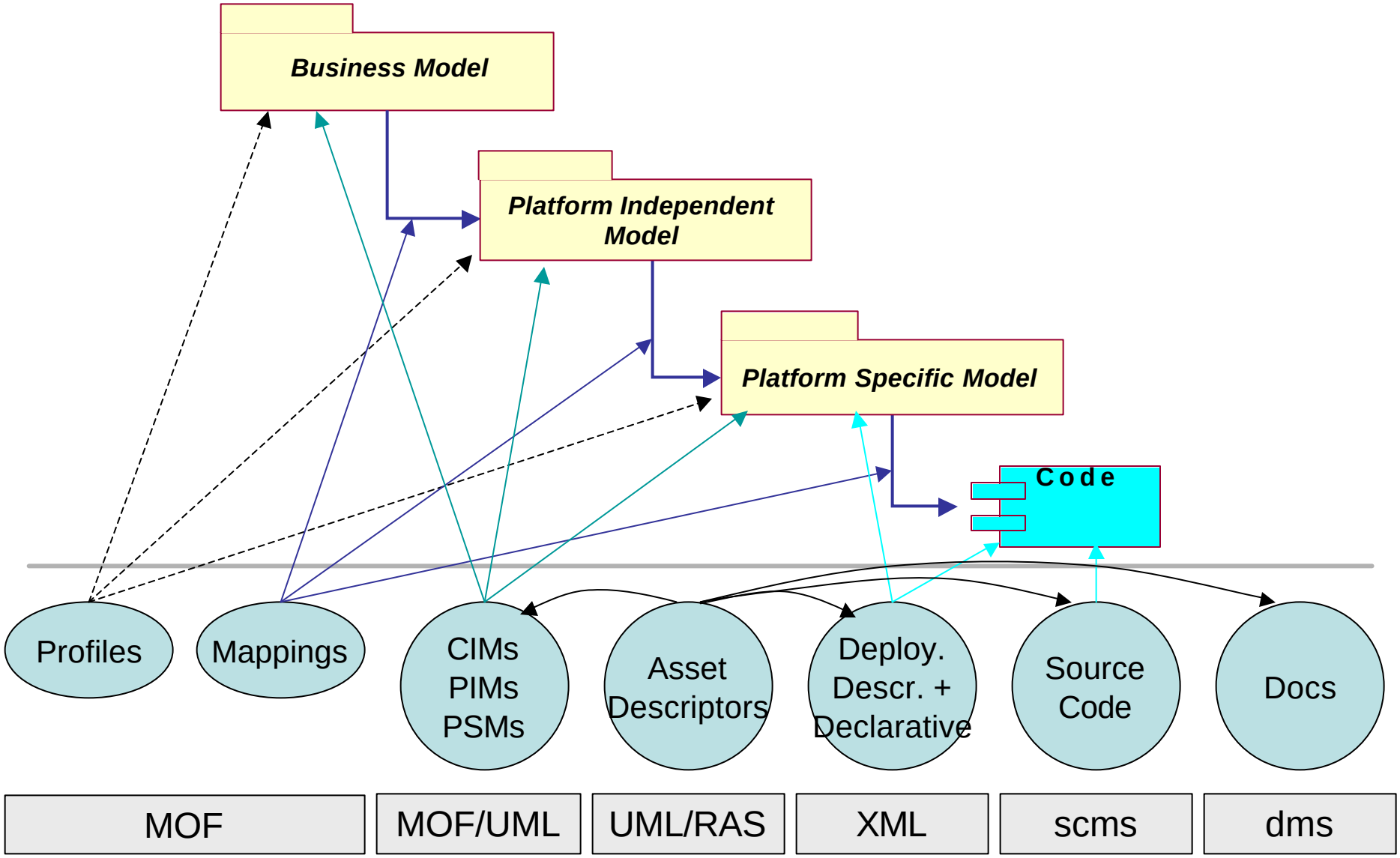
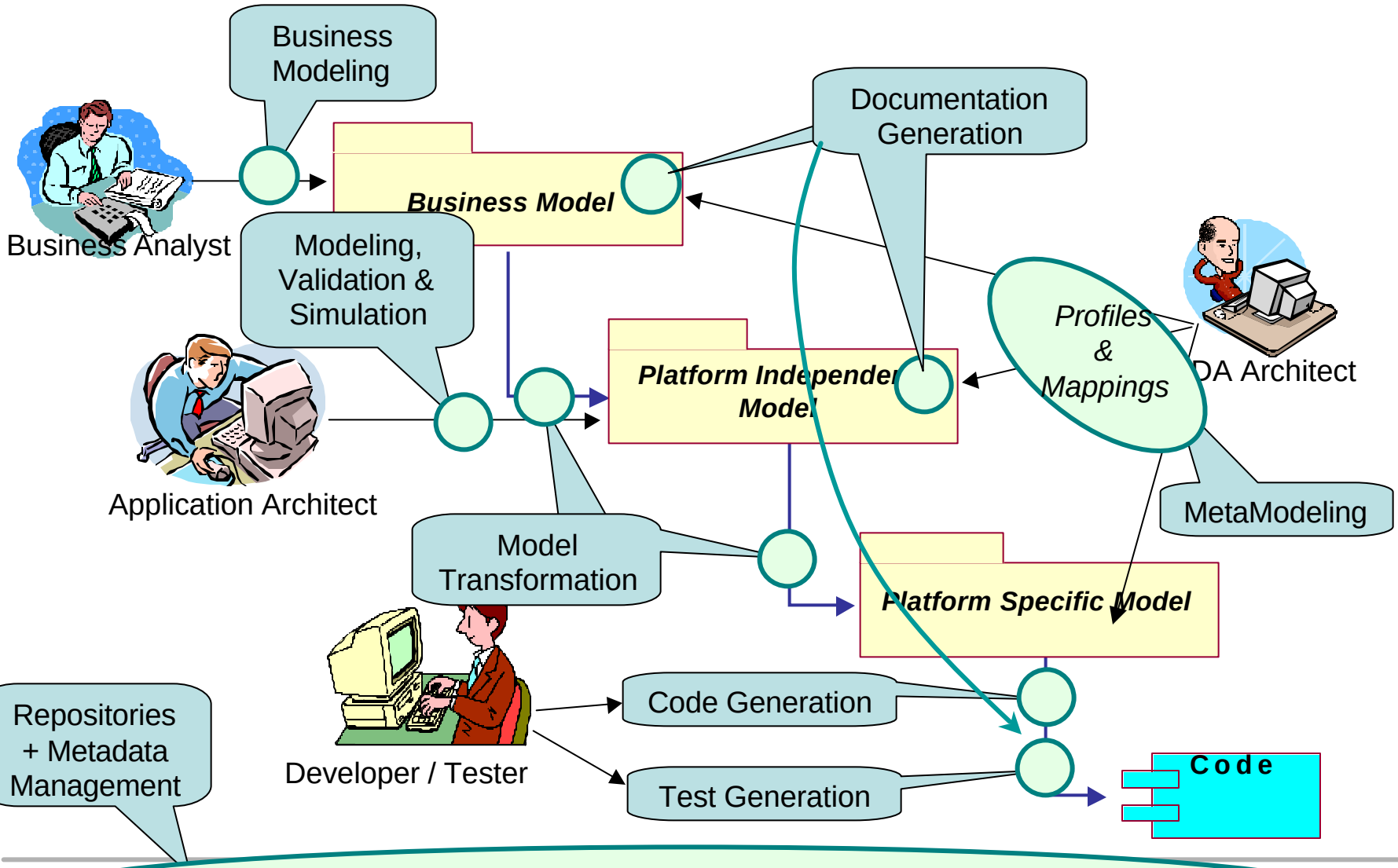
- Model correctness can be validated against meta-model
- Model can execute in a simulation environment
- Support for versioning of models
- Support for model synchronization
  - Reverse or Round-Trip engineering
- Support for XMI/JMI programming
- MOF Repository
- Support for CWM

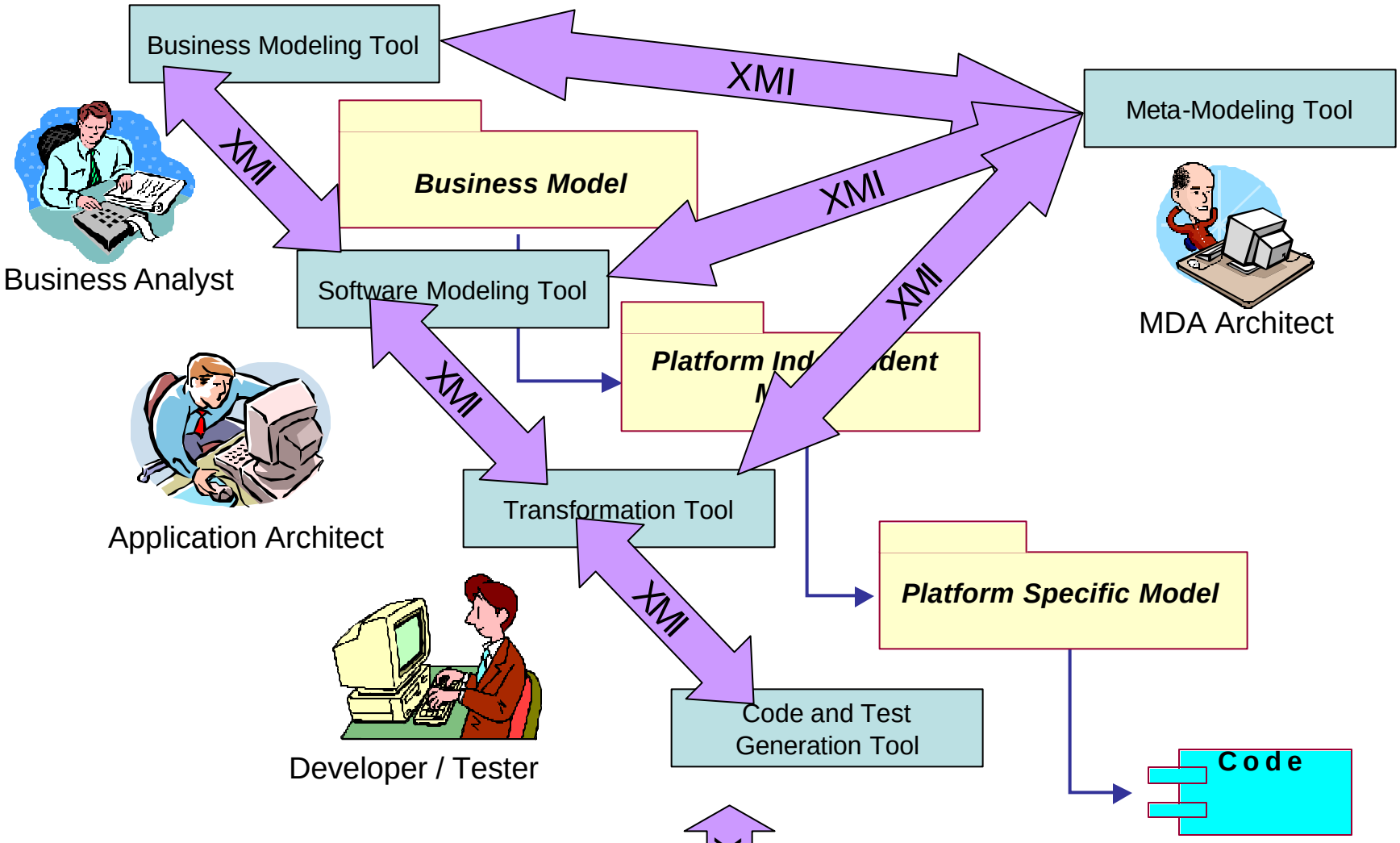
Metadata in the MDA Process



Tools in the MDA Process



MDA Tool Integration



Hard Criteria

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- Meets *YOUR* criteria
- Addresss Full Lifecycle
  - Meta-models, transformations, generation
- Generation
  - SOC, Customization, Completeness
- Advanced Capabilities
  - Synchronization, Versioning, Validation, Simulation, MOF
- Integration with other tools
  - Modeling
  - IDE
  - Repository
- Standards Conformance

Soft Criteria

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- Cost
- Product Architecture
  - Evolvability with the market
  - Support for future platforms
- Documentation, samples, training
- Ease of Use
- Company
  - Support, enhancements
  - Future looks bright
  - Product line is integral
  - Easy to work with

MDA ROI Opportunities

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- By reduced production and operation costs
  - Development automation
  - Improved quality
  - Improve utilization through reuse initiatives
- For MDA to deliver ROI
  - We must make models first class development artifacts. Tools must support all aspects of this.
- Code generation is currently biggest focus
- Profiles, transformations, etc.
  - Less perceived value, less understood
  - No metrics to determine relative importance

Conclusion

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- No one tool does it all!
- Enterprises have different requirements
- Integration and customization important
- Standards and tools are critical to MDA success
- Lot's of advancements in the future
  - Action Semantics, MOF 2.0, CWM, RT Engineering
- The market is still young. Expect…
- Continued expansion of MDA tools…
- … and then contraction of market

What's Wrong with ROI?

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- Latest buzzword
- Gimmicky "calculator" on web site
- Encourages short term measurement, within the scope of a single project
- IT value needs to be measured based on total cost of ownership (TCO) and less tangible measures such as efficiency, strategic impact, risk, etc.

Return on Assets

- Return On Assets is a *strategic* alternative which focuses on building value by increasing productivity of assets
- IT focus shifts from improved transaction capability to improved business processes to improved strategic initiatives
- Focus shifts from costs containment to opportunity capture

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Questions