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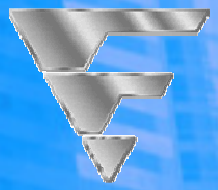
Introduction to Model-Driven Development (MDD)



The Virtual Enterprise (VE)

September 18, 2008

Agenda

- Introduction
- Evolution of Abstraction
- Model Driven Development
- The Virtual Enterprise
- Demo
- Conclusions
- Q & A

Introduction

- Speaker
  - Ashok Nare, CTO, Intelliun Corporation
- Company Overview
  - Intelliun, founded in 1999, is a leading innovator in the area of Model Driven Development
  - Intelliun's Model Driven Development platform, *The Virtual Enterprise*, facilitates the development of web-based agile business solutions by capturing the business logic in technology independent, UML based visual models
  - Intelliun Services Group provides a comprehensive set of services for the development of custom web-based applications using Intelliun's MDD platform.

Evolution of Abstraction

- Abstraction is concentration on relevant aspects of the problem and ignoring those that are not important
- Evolution of programming languages
  - Machine language to Assembly language to higher level languages such as C++, Java, C#, Scripting, etc.
  - More time was spent on understanding “how” to solve the problem in early languages (understand the language)
  - Each language raised the level of abstraction by hiding low level details
- Evolution of tools, frameworks and application servers
  - Abstraction and reuse of common services
- Focus on solution to the problem by working with concepts and terms that are familiar to the problem space and ignoring the low level details
- Abstraction is the key to building complex software

Model Driven Development (MDD)

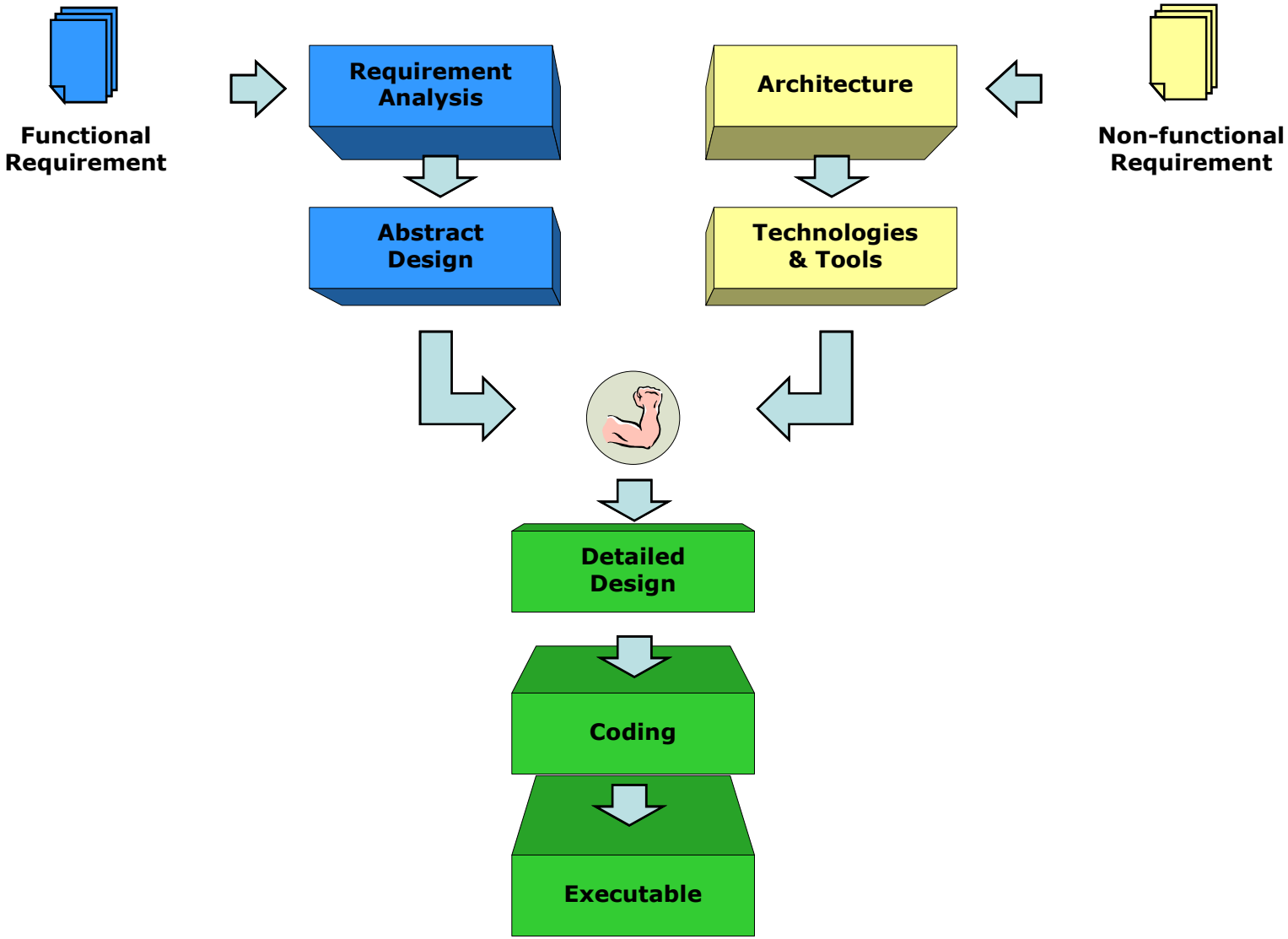
- What is MDD?
  - A software development approach that uses models to capture application logic during the development of end-to-end enterprise applications
  - Forrester's Definition:

    "An iterative approach to software development where models are the source of program execution with or without code generation."
- MDD Objectives
  - Raise the level of abstraction for application development
  - Reduce development time
  - Improve application quality while reducing testing time
  - Reduce maintenance cost and Total Cost of Ownership of enterprise applications

Model Driven Development (MDD)

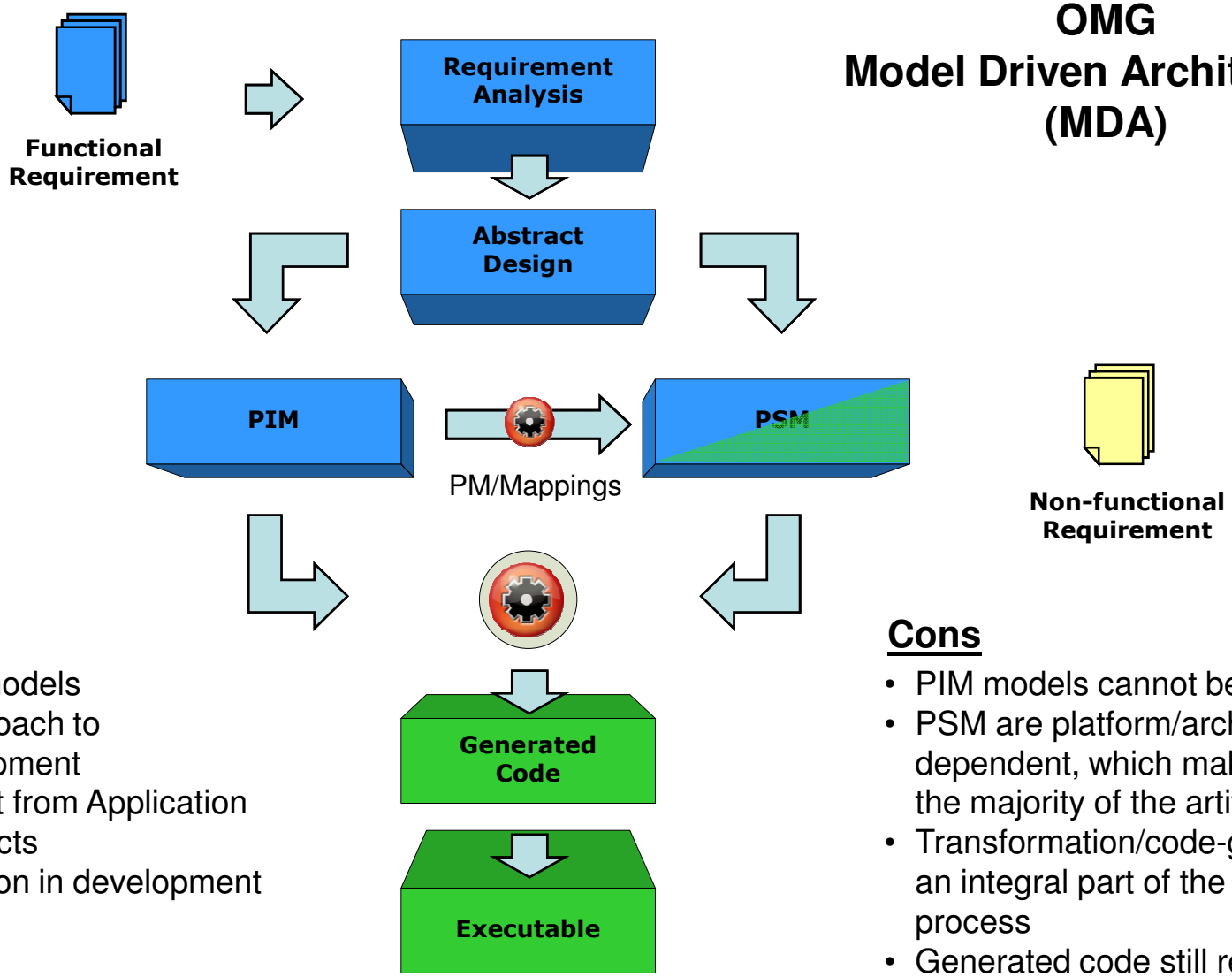
- How
  - Use models to implement application logic
  - The domain model (in Abstract Design) is the implementation model
  - Use automation to generate executables from the implementation model in runtime or build time
- Approaches
  - OMG Model-Driven Architecture (MDA)
  - Executable Models

Software Development



Flavors of MDD

OMG Model Driven Architecture (MDA)



OMG
Model Driven Architecture (MDA)

Pros

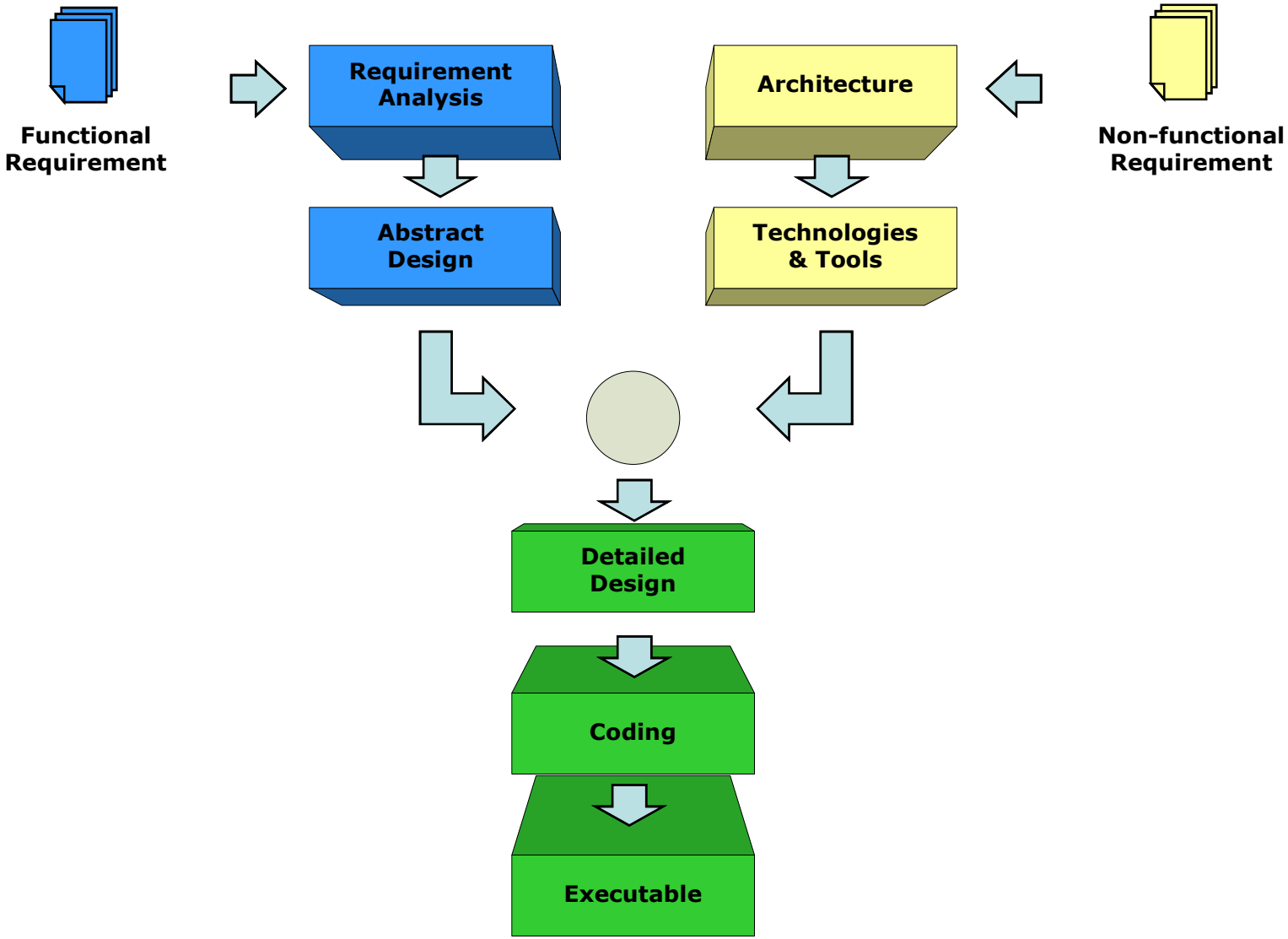
- Reusable PIM models
- Methodical approach to software development
- More direct input from Application Analysts/Architects
- Marginal reduction in development time

Cons

- PIM models cannot be validated
- PSM are platform/architecture dependent, which makes up for the majority of the artifacts
- Transformation/code-generation is an integral part of the development process
- Generated code still require further development

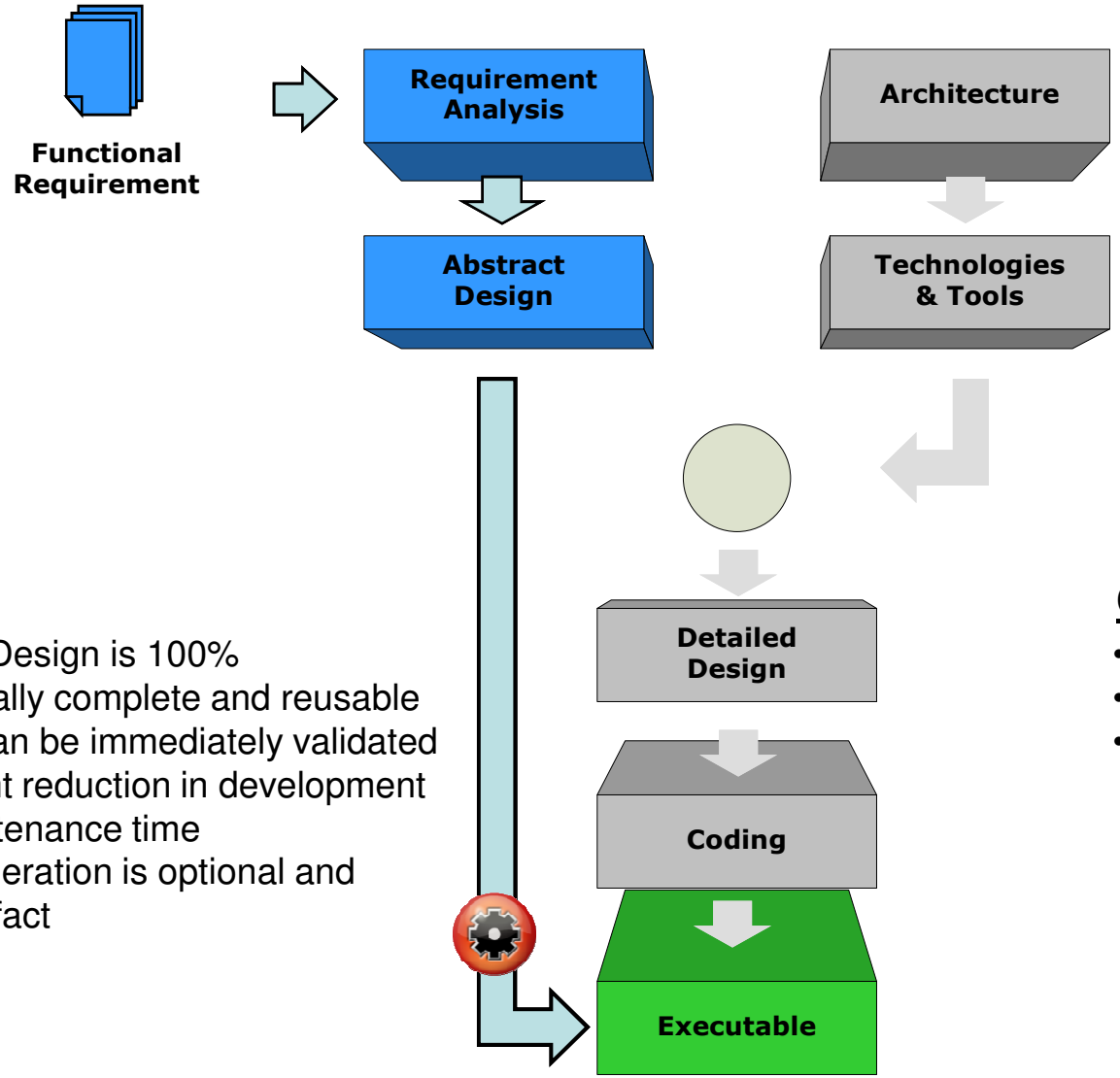
Flavors of MDD

Executable Models



Flavors of MDD

Executable Models



Executable Models

Pros

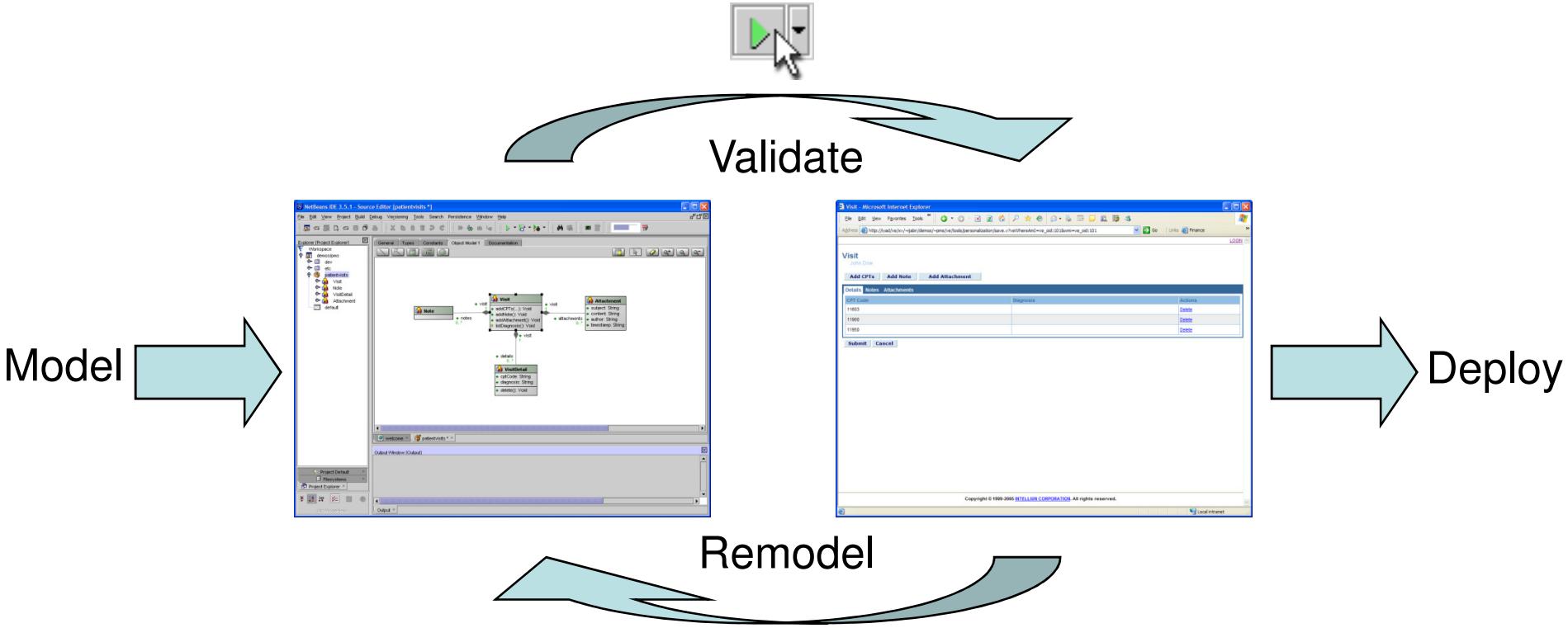
- Abstract Design is 100% semantically complete and reusable
- Models can be immediately validated
- Significant reduction in development and maintenance time
- Code generation is optional and after-the-fact

Cons

- Supports a single architecture
- Depends on runtime environment
- No access to generated code

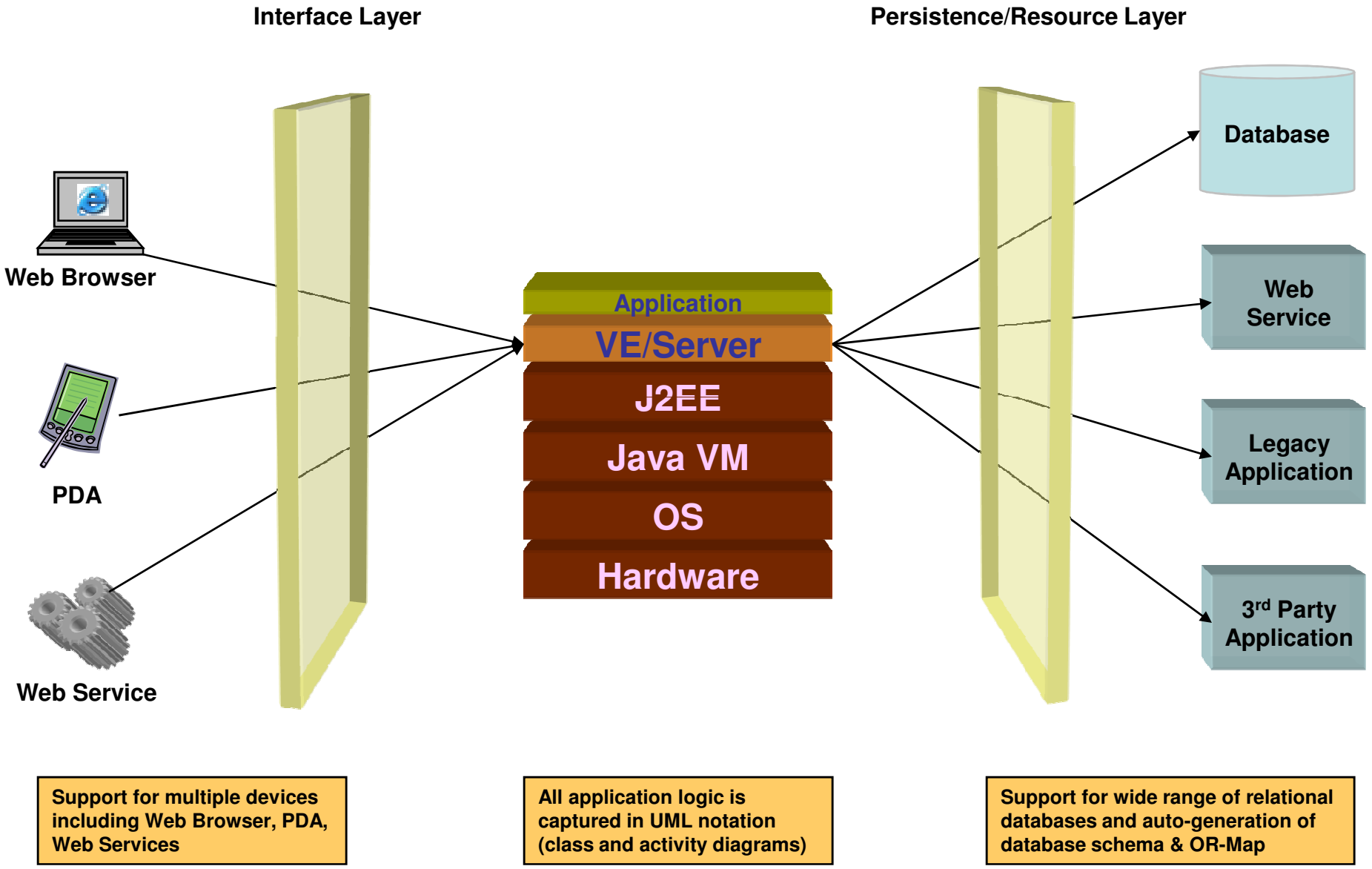
The Virtual Enterprise (VE)

The Virtual Enterprise (VE) is a comprehensive platform for the rapid development of agile business solutions using Model-Driven Development (MDD). Built on top of J2EE, VE offers a portable execution stack for the delivery of highly scalable business applications and Web services.



The Model is the Executable

Architecture



Features

VE/Designer

- Develop web applications using UML models
- Instant execution of UML models and validation of application logic
- Dynamic generation of the web interface and Web services
- WYSIWYG web personalization
- Dynamic generation of object-relational database mapping
- Formula auto-completion
- Support embedding Java code and JAR files
- Support embedding hand-coded SQL statements/stored procedures
- Unit/remote testing framework

VE/Server

- Runs on any J2EE web and/or application server
- Runs on a any Java supported platform including Unix, Linux, Windows and AS/400
- Supports wide range of relational databases including MS-SQL, Oracle, DB2/UDB, MySQL, Pervasive, and Sybase
- Supports SOAP and WSDL in both client and server scenarios
- Supports REST in both client and server scenarios
- Supports JMS for messaging and events
- Provides full localization

Applications

- VE has been used to build applications in the healthcare, finance, transportation, philanthropy, home-improvement, retail, telecommunication and engineering industries.
- Example Applications:
  - ComplianceSet: Sarbanes-Oxley Compliance ASP
  - Safeguard: Full Public Storage Management System
  - MicroEdge Portico: Grant Management
  - Attorneys Website, Intranet, Bios, and Proposal Management (deployed at some of the largest law firms in the world).
  - TotalChart: Surgeon Practice Management ASP
- Reusable Components:
  - Reporting
  - Discussion Board
  - Scheduling
  - User-customizable Portals
  - Document Management

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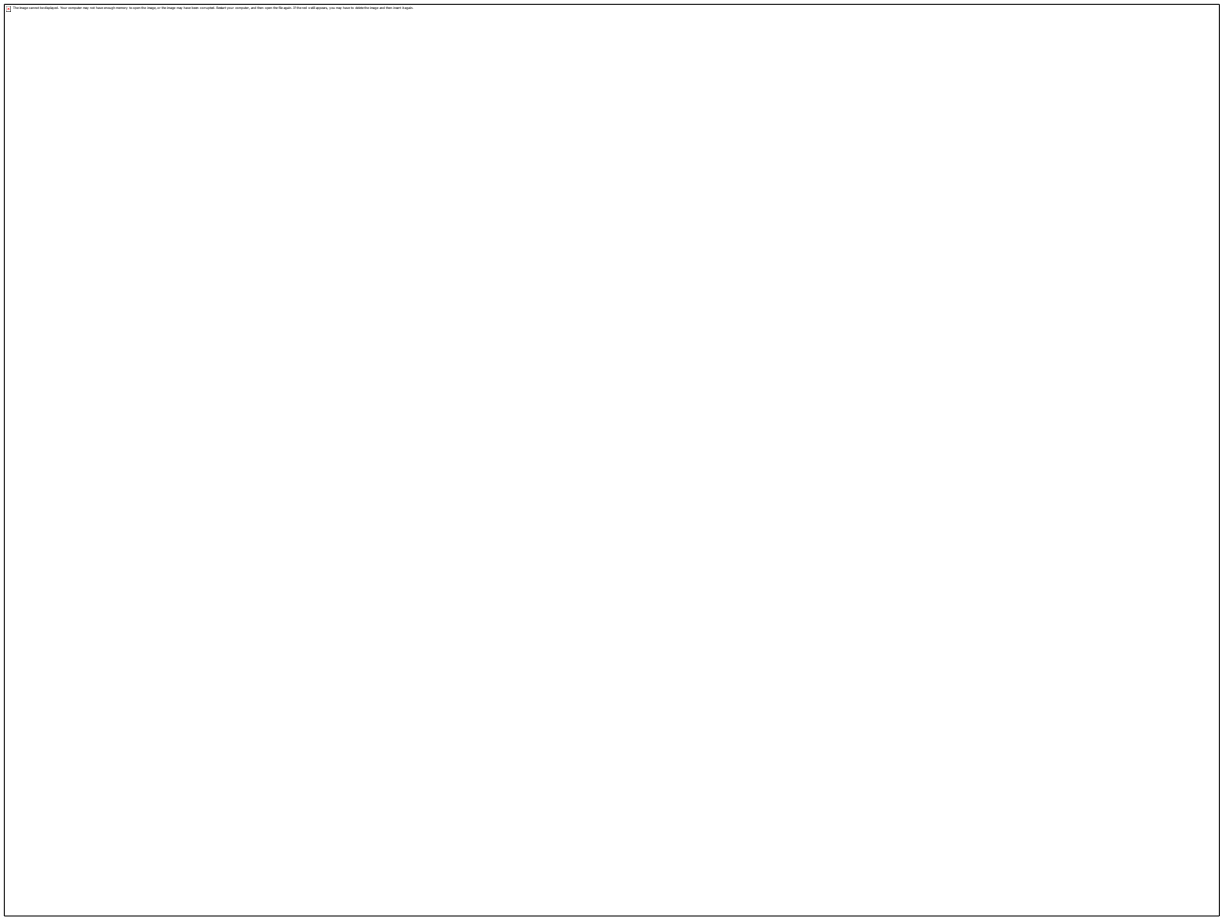
DEMO

Case Study – Self Storage Management System



- **Key Modules**
  - Corporate Administration
  - Regional Administration
  - Point of Sale
  - Product Catalog
  - Inventory Management
  - Pricing
  - Customer Management
  - Call Center Integration
  - Online Sales
- **Key Metrics**
  - # of Packages = 66
  - # of Objects = 609
  - # of Database Tables = 200
  - # of Integration Points = 6

Approach Summary

- Application logic is captured in platform independent UML models
- Models are immediately executable as they're developed (no code generation, compilation, and deployment required)
- The development focus is always on the domain model, where interface and persistence is auto generated and can be later customized
- Code generation is optional and after-the-fact
- Code generation is done via templates that can be customized to control language, coding style, design patterns, and technology choices

Advantages of MDD

- Captures application logic in platform independent UML models
- Simplifies web development by reducing the number of required skills in the underlying technologies, specifications and standards
- Provides Immediate validation of business requirements
- Improves communication among stake holders
- Protects business IP investments from evolving technologies
- Radically reduces the development, time, cost and effort of business applications and Web Services
- Increases application agility to better align with continuously changing business needs
- Reduces QA time while improving application quality

Questions

Thank You

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