Multi-Paradigm Modeling

Using MDA in the Real World

Stefan Tilkov
stefan.tilkov@innoq.com

What I'll Talk About

- How *I* define MDA

- What a typical tool chain looks like

- Real-world examples

- How UML/MOD, EMF, and DSLs relate

- What alternatives exist for modeling

- What all of this might mean for you

innoQ

What is MDA?

- A development methodology

- A hype

- Lots of theory

- Much skepticism

- No silver bullet

Stefan Tilkov, September 26, 2005
http://www.innoq.com/blog/st/

innoQ

Pragmatic MDA

In essence, MDA is about

- creating one or more formal, machine-readable models,

- transforming them into other models and code

- with the goal of automating development.

innoQ

MDA/MDD Bottom-up

- Developers hate doing boring stuff

- Redundancy is bad

- Repeatability is good

- Flexibility is awesome

- Good developers automate their work

- *That's* what MDA is about

innoQ

You've been doing it

- Chances are, you have been doing MDA (or at least MDD) all along

- "Model" is just an abstraction – your model might have been a text file

- Laziness is an asset

- Key is repeatability

innoQ

MDA & Code Generation

- Typically, code is generated directly from a UML model

- Model-to-model transformation is not (yet) mainstream

- Strict forward-engineering approach

  - No wizard-like "generate once"

  - No roundtrip engineering
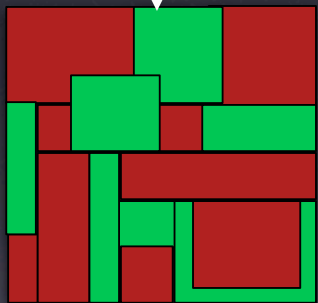
  - But always repeatable

innoQ

A typical MDA tool-chain
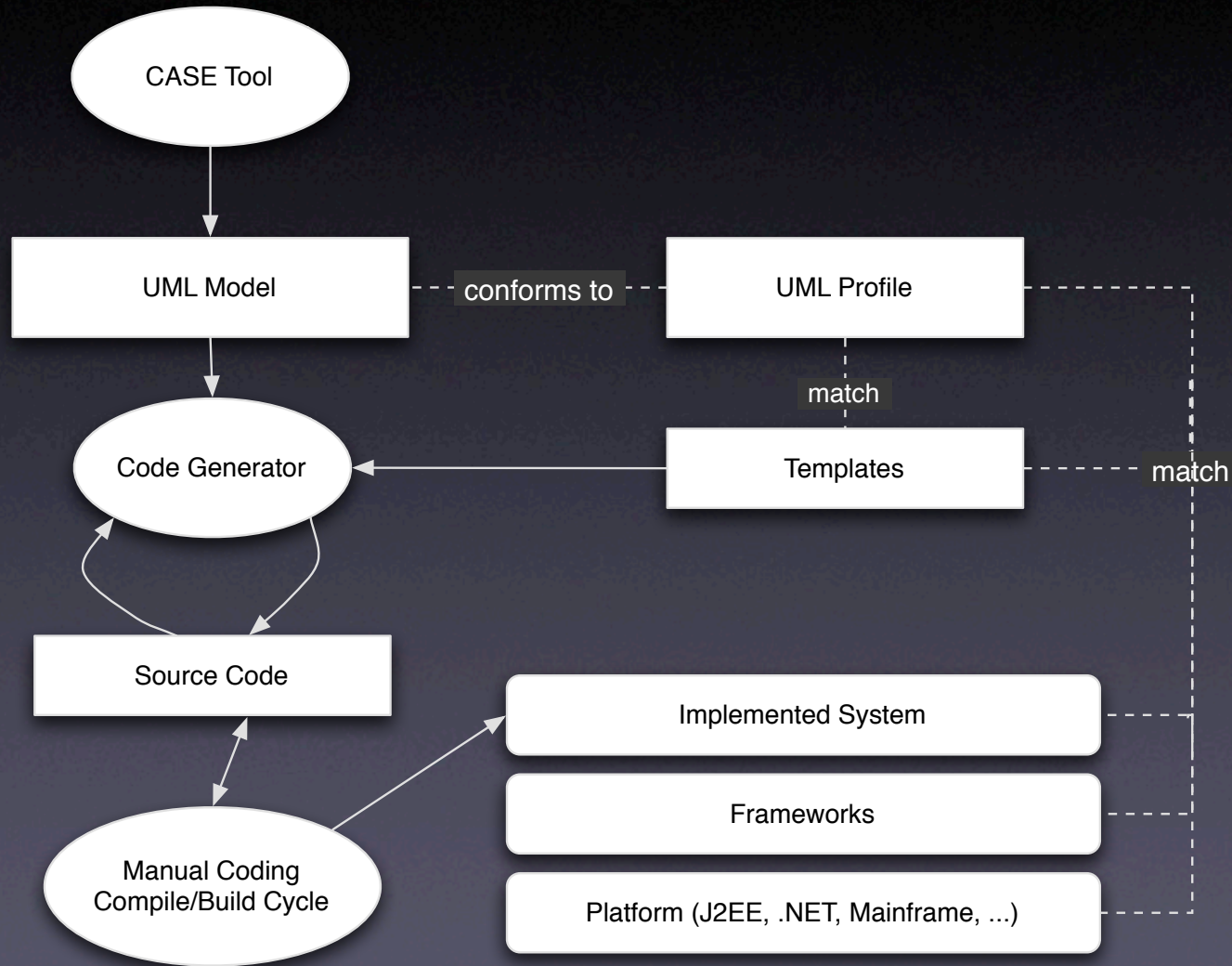
Business Logic

Infrastructure Knowledge

MDA Tool Chain

innoQ

MDA/MDD Value

- Reduced time & effort

- Increased quality

- Maintainability, Evolvability

- Testability

innoQ

MDA/MDD Risks

- Acceptance

- Complexity

- Tool problems

- Process problems

innoQ

UML and Alternatives

- A model-driven development (MDD) approach can be done based on

    - MOF, EMF/ECORE

    - UML

    - DSLs/Software Factories

    - Many other technologies

- From a 10,000m view, this is irrelevant
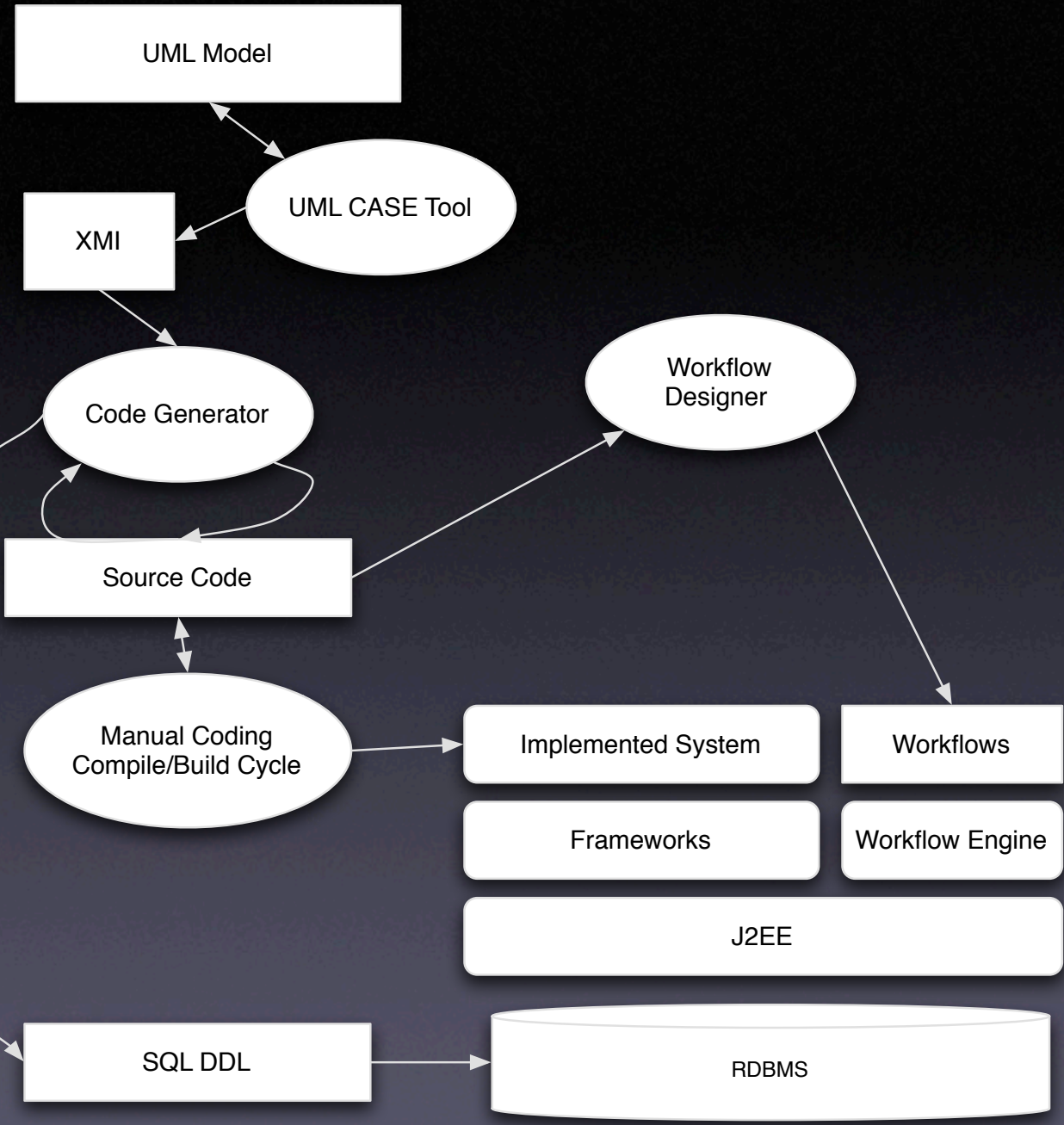
innoQ

DSLs and UML Profiles

- A DSL is a Domain Specific Language

- Two options for doing DSLs with MDA:

    - Create custom meta-model with MOF

    - Use UML Profiles instead

- In many cases, UML hits the sweet spot

- Microsoft's DSLs and MOF-based MDA are not that different
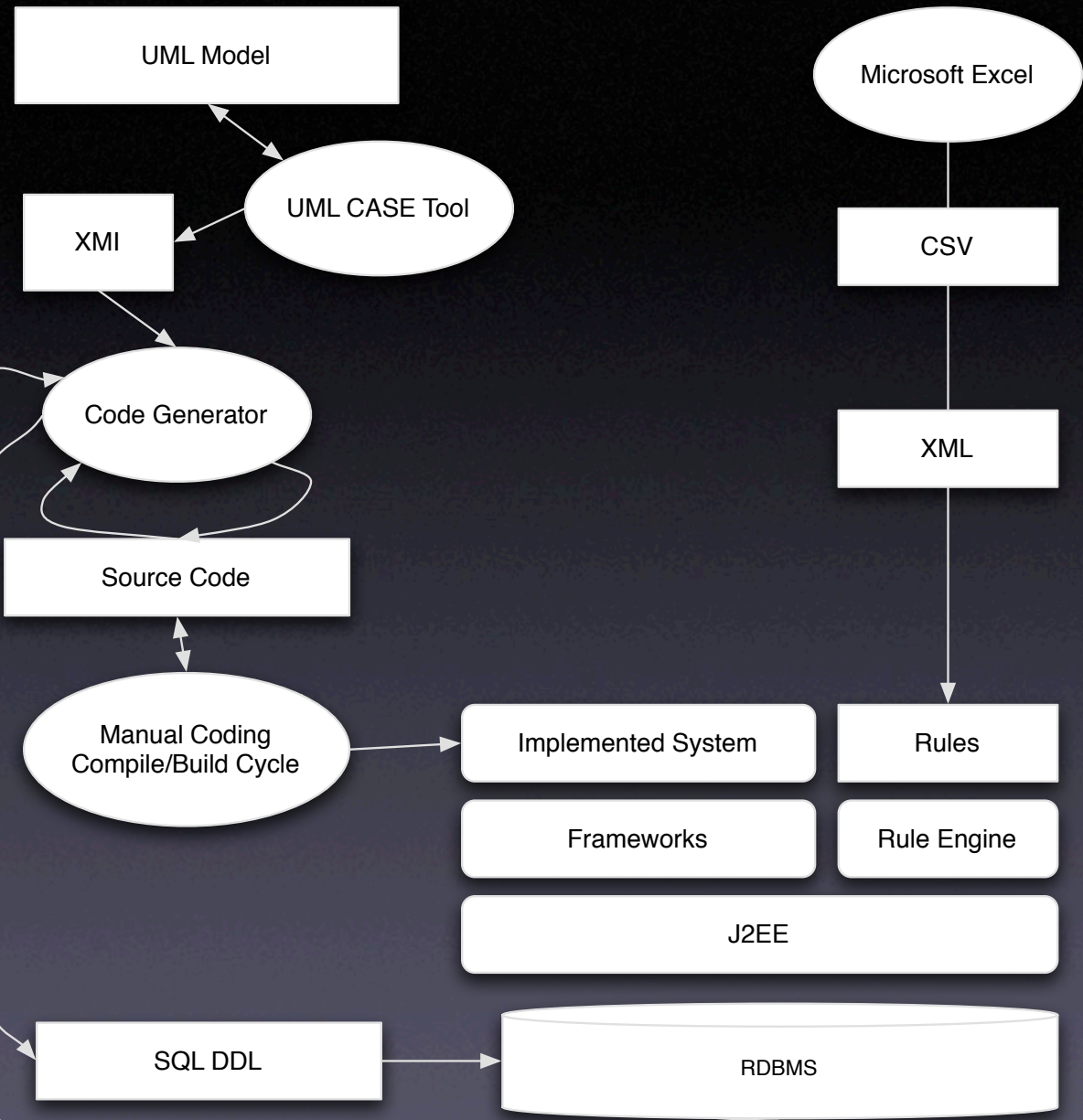
innoQ

Real-World Examples

Example 1
Telco Customer Care & Billing

- Plain MDA, Swing client, Innovator CASE, Carnot Workflow

- Model CIM/business architecture

- Map to IT architecture, annotate

- Generate EJB + tons of design pattern-driven code

- Include support for Web Services

innoQ

UML Model

UML CASE Tool

XMI

Code Generator

Workflow Designer

Source Code

Manual Coding
Compile/Build Cycle

Implemented System

Workflows

Frameworks

Workflow Engine

J2EE

SQL DDL

RDBMS

innoQ

Example 2:
Large–scale Banking App

- Default MDA based on UML + Excel

- Generate EJB code from UML

- Create formula data and reports from Excel

- Diff against DB

- Implement ETL for Datawarehouse project by using UML & templating

innoQ

UML Model

Microsoft Excel

UML CASE Tool

XMI

CSV

Code Generator

XML

Source Code

Manual Coding
Compile/Build Cycle

Implemented System

Rules

Frameworks

Rule Engine

J2EE

SQL DDL

RDBMS

innoQ

Example 3:
Strategic Meta–data Repository

- Create meta-model using UML (not MOF)

- Generate DDL + access code (Castor JDO) for RDBMS

- Model services using Eclipse-based UI

innoQ
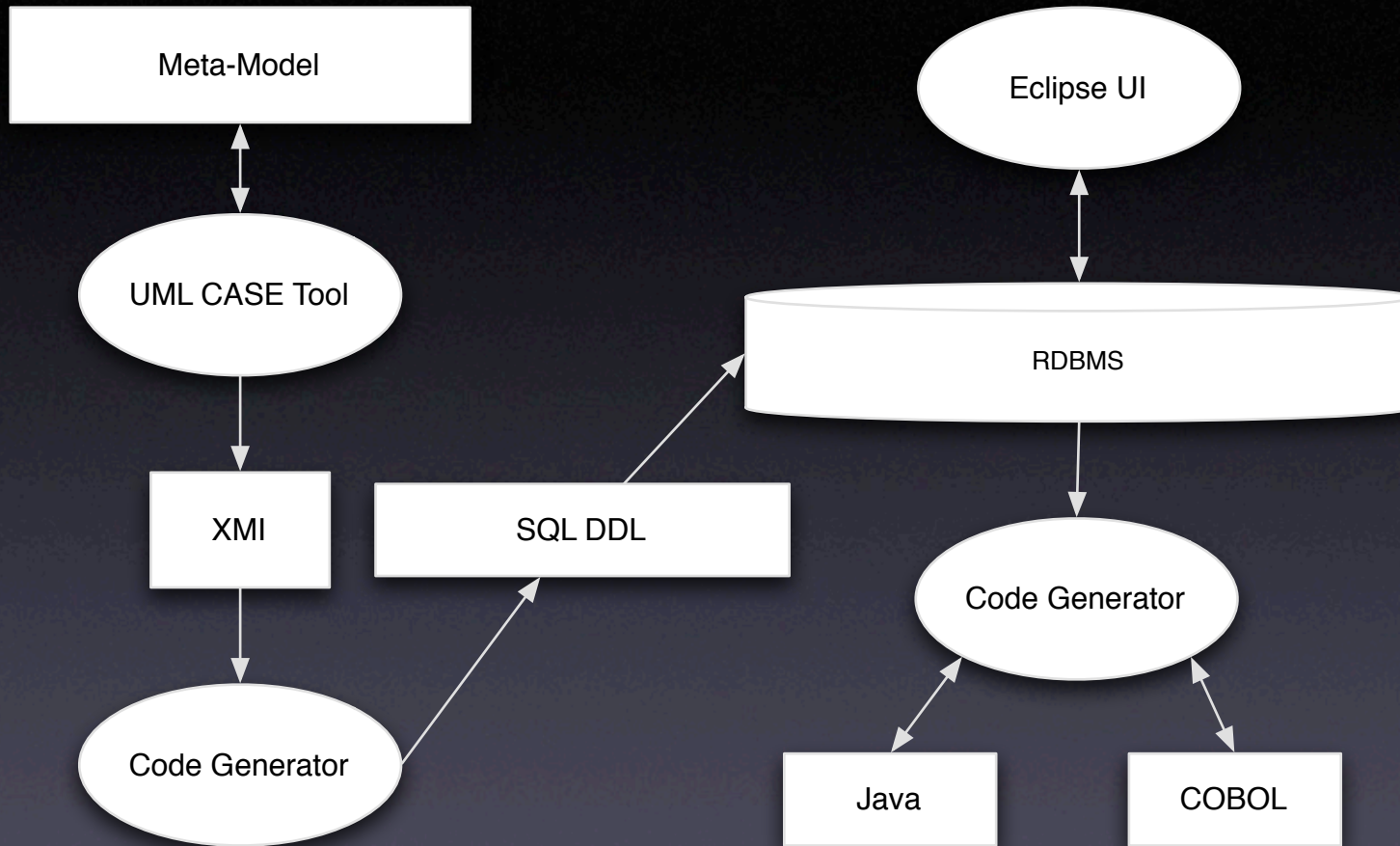
Common Traits

What do all these projects have in common?

- In no case, UML alone was used

- Additional ways to specify modeling information

- Integrated process

inno**Q**

Microsoft's Software Factories

- MS invests heavily in modeling

- MDA is equaled with UML and considered harmful

- Microsoft's MOF-like DSL approach emphasizes *specific* over *generic* solutions

- Expect more and more DSL tools

- Not yet (widely) available

inno**Q**

Eclipse: EMF

- EMF + ECORE as core Eclipse technologies

- Significant amount of tooling available and under development

- Still new

- Issues with platform dependencies

innoQ

UML + Profiles: the Real World

- Sub-optimal in many regards

- Widely supported

- Widely understood

- Applicable for many scenarios

innoQ

More Modeling Alternatives

- XML, XML Schema, WSDL

- Excel, Visio

- Java/C# + Annotations

- Text

innoQ

Harvesting

- Tremendous value is contained in existing systems

- Models do not exist or are incorrect

- Extract business logic information from existing applications

innoQ

Conclusion

- Accepting MDA/MDD is not tied to any particular modeling approach

- Models and standards matter less than you think

- Mix and match paradigms as you see fit

- The key is getting control of your ~~code~~ system

inno**Q**

Contact

innoQ Deutschland GmbH   innoQ Schweiz GmbH
Halskestraße 17   Gewerbestrasse 11
D-40880 Ratingen   CH-6330 Cham

Tel +49 2102 77 1620   Tel +41 41 743 01 11
Fax +49 2102 77 1601   Fax +41 41 743 01 19

Web Sites
innoQ   www.innoq.com
iQgen   www.innoq.com/iqgen

Weblog   www.innoq.com/blog/st/

innoQ