MDA and the Zachman Framework

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Agenda

- Zachman Framework Overview
- MDA and Meta-model Overview
- Zachman and UML Mapping
- Zachman and MDA Mapping
- Another Approach
- Conclusion
Zachman and Architecture

- **Enterprise Architecture** – A set of architectures, which taken together, provide a complete view of an organization.

- **The Zachman Framework**
  - A popular way of conceptualizing how the more specific architectures of an organization can be integrated into a comprehensive picture.
  - An analytic model. It does not describe an implementation process and is independent of specific methodologies.

- “The Framework for Enterprise Architecture is a two dimensional classification scheme for descriptive representations of an Enterprise.”
The Zachman Framework
Framework Overview

- The rows describes the *perspectives* of those who use the models or descriptions.
  - The top row represents the most generic perspective of an organization while lower rows are successively more concrete.

- The columns describes the abstractions that define each perspective.
  - Based on the historical questions that people have asked when they sought understanding.
  - (Who, What, When, Where, Why, How)
Zachman Perspectives

- **SCOPE**: (Contextual)
  - The Planner’s Perspective.

- **BUSINESS MODEL**: (Conceptual)
  - The Owner’s Perspective.

- **SYSTEM MODEL**: (Logical)
  - The Designer’s Perspective.

- **TECHNOLOGY MODEL**: (Physical)
  - The Builder’s Perspective.

- **DETAILED REPRESENTATIONS**: (Out-of-Context)
  - A Sub-Contractor’s Perspective.

- **THE FUNCTIONING ENTERPRISE.**
Zachman Abstractions

- **DATA:** What is it made of?
  - Thing—Relationship—Thing

- **FUNCTION:** How does it work?
  - Process—Input/Output—Process

- **NETWORK:** Where are the elements located relative to one another?
  - Node—Line—Node

- **PEOPLE:** Who does what work?
  - People—Work—People

- **TIME:** When do things happen?
  - Event—Cycle—Event

- **MOTIVATION:** Why do things happen?
  - End—Means—End
# Model Types and Zachman

<table>
<thead>
<tr>
<th>The Zachman Framework</th>
<th>DATA What (Things)</th>
<th>FUNCTION How (Process)</th>
<th>NETWORK Where (Location)</th>
<th>PEOPLE Who (People)</th>
<th>TIME When (Time)</th>
<th>MOTIVATION Why (Motivation)</th>
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- **Computation-Independent Model (CIM)**: List of things important to the business, List of processes the business performs, List of Locations in which the business operates, List of Organizations important to the business, List of Events Significant to the Business, List of Business Goals/Strategies
- **Platform-Specific Model (PSM)**: Logical Data Model, Application Architecture, Distributed System Architecture, Human Interface Architecture, Processing Structure, Business Rule Model

**Key Terms**
- **DATA**: What (Things)
- **FUNCTION**: How (Process)
- **NETWORK**: Where (Location)
- **PEOPLE**: Who (People)
- **TIME**: When (Time)
- **MOTIVATION**: Why (Motivation)

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MDA and Meta-models

- MDA is built on an underlying architectural infrastructure based on MOF
- MOF based meta-models are used to define all MDA models
- Meta-models provide the rules for how to build a correct model for a particular purpose
- UML Profile
  - Provides a targeted subset of UML
  - Standard mechanism for extending UML
  - Supported by UML tools
  - Frequent complement to a meta-model
MDA Metamodels and Profiles

- MOF Meta Meta-model
- Common Warehouse Metamodel (CWM)
- UML Metamodel
- Web Services
- Business Process Metamodel
- Business Rules Metamodel

Profiles
- CORBA Profile
- EJB Profile
- EAI Profile
- EDOC Profile
- Scheduling Profile
- .NET Profile
## MDA Metamodels and Zachman

<table>
<thead>
<tr>
<th>The Zachman Framework</th>
<th>DATA (What Things)</th>
<th>FUNCTION (How Process)</th>
<th>NETWORK (Where Location)</th>
<th>PEOPLE (Who People)</th>
<th>TIME (When Time)</th>
<th>MOTIVATION (Why Motivation)</th>
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<th>Physical Data Model (CWM)</th>
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## UML Models and Zachman Framework

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<td>(Conceptual) Owner</td>
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**Abstractions (Columns)**
- **DATA**
- **FUNCTION**
- **NETWORK**
- **PEOPLE**
- **TIME**
- **MOTIVATION**

**Perspectives (Rows)**
- **SCOPE** (Contextual)
- **BUSINESS MODEL** (Conceptual)
- **SYSTEM MODEL** (Logical)
- **TECHNOLOGY MODEL** (Physical)
- **DETAILED REPRESENTATIONS** (Out-of-Context)
Issues with Zachman

- Zachman Framework cells represent *primitives*. Primitives are reusable and combinable into *composites*.
- Software development is focused on creating composites. For example, a use case is a composite of who and what.
- It is extremely difficult to bridge the gap between EA according to Zachman, and implementation models and artifacts.
MDA Under the Hood

Computation Independent Model

Platform Independent Model

Platform Specific Model

Code

Architectural Standards and Guidelines Enforced in Model Profiles

Enterprise QOS and non-functional requirements implemented in transformations
MDA and Zachman

- MDA can support Zachman explicitly
  - Each cell in the Zachman framework could be described by a formal MOF meta-model.
  - Mappings between cells could be described with QVT descriptions
  - Composite models could be constructed by transforming two (or more) primitive models together
More on Zachman Framework

- Is a classification schema and framework, no more, no less
- Is not a process or methodology
- Does not identify specific deliverables
- Does not support identification or management of dependencies
- Emphasizes traditional dimensions of: application, data, network…
Zachman is a conceptual framework for classification of enterprise concept, best used in the early (classification) phase of EA

MDA is an architecture for defining models (with meta-models) and transformation between models, typically used to automate code generation
Just my opinion…

- Architecture must achieve three primary goals:
  1. Describe a solution to a specific set of problems and requirements
  2. Effectively communicate the solution to all stakeholders
  3. Enable the construction of systems that conform to the architecture

- Zachman is good as a conceptual framework, but is it architecture???
References and Bibliography

Questions

To learn more: Fast Start  www.omg.org/fast-start

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