On the Equivalence between Reference Architectures and Metamodels

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Agenda

- Introduction

- Background

- Similarity analysis
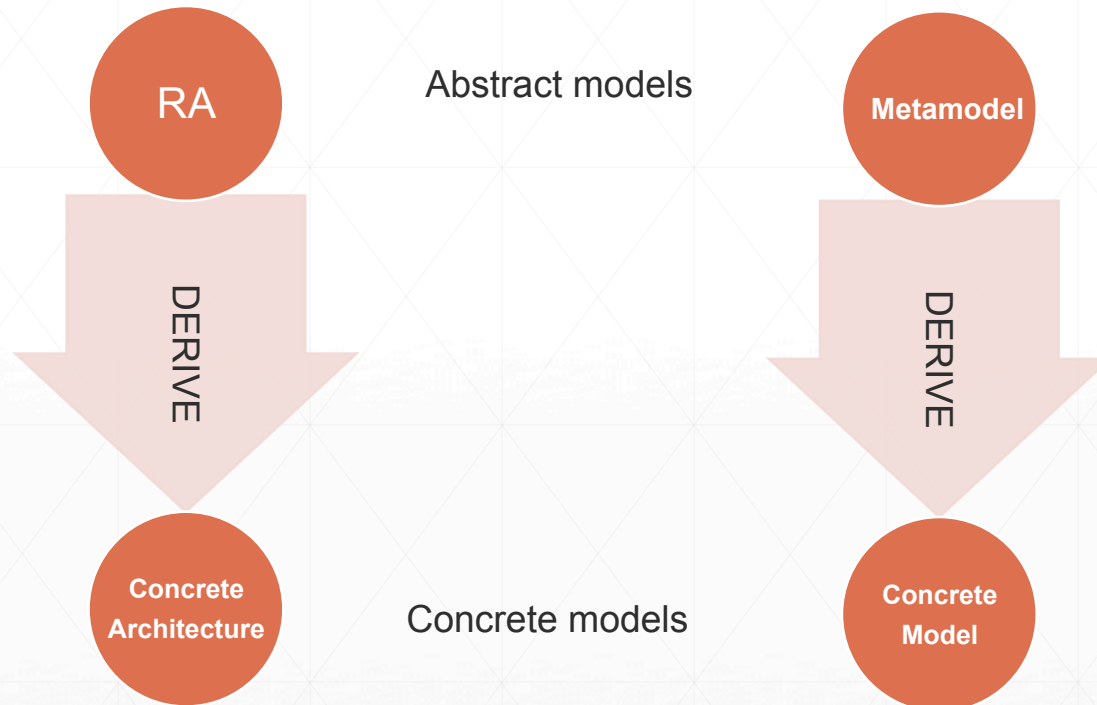
- Discussion

- Final Remarks

Introduction

- Reference Architectures (RA)
  - Special type of software architecture
  - Support for the development of systems
  - Diversity of RA for diverse application domains
  - Lack of approach to instantiate RA
  - Lack of tools to:
    - Manipulate RA models
    - Check conformance of concrete architectures against RA

Introduction

- Model-Driven Development (MDD)
  - Approach based on models and metamodels
  - Models can be derived from metamodels
  - Metamodels
    - Models used to construct other models
    - MDD's essential foundation
    - Models conform to their metamodels
    - Usually structured according to multiple views
      - User Interaction Metamodel
      - Business Process Metamodel
      - Domain Metamodel
      - …

Introduction

RA

Abstract models

Metamodel

DERIVE

DERIVE

Concrete Architecture

Concrete models

Concrete Model

Introduction

- Research hypothesis:

There is an equivalence between <u>reference architectures</u> and <u>metamodels</u>.

Analysis

- Analysis based on literature and experience with RA and MDD
- Criteria to compare RA and metamodels

Criteria	RA	Metamodels
High-level of abstraction	√	√
Represented in views	√	√
Use of diagrams/models for each view	√	√
Crosscutting elements	√	√
Checking on conformance	√	√

Discussion

- Research directions

  - Investigation of metamodel languages (e.g., UML and Ecore) to model RA

  - Investigation of metamodeling techniques/ technologies to the RA management

  - Use of MDD techniques/technologies to the automatic instantiation of RA

    - Using proposals that derive concrete models from metamodels, and

    - Performing architecture automatic refinements, using approaches, such as π-Method.

Discussion

- EMF (Eclipse Modeling Framework)

  - to manipulate the set of metamodels to represent RA and their derived models

  - to check conformance between a concrete architecture and its respective RA

  - to check consistency among architectural views that represent a RA

- Use of RA as basis of metamodels

Final Remarks

- A first effort to unify both RA and MDD areas

- Arguments to sustain the hypothesis that metamodels and RA are quite equivalent

- Advances of the state-of-the-art for both RA and MDD

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