The Web of Mathematical Models: A Schema-based, Wiki-like, Interactive Platform

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Outline

- Introduction

    - Motivation

    - Definition of Model

    - Goals / Vision for the "Web of Models"

- Current State

    - Demonstration

    - Architecture

    - XModel Schema

- Outlook

Introduction

What is a Model?

A mathematical model is "a representation of the essential aspects of an existing system (or a system to be constructed) which presents knowledge of that system in usable form".

Pieter Eykhoff (1974)

What is a Model?

- Descriptive models
  - Explain aspects of existing systems
  - Physical, sociological, or economical systems
- Constructive models
  - Describe systems to be constructed as part of engineering tasks or processes
- Abstract models
  - Model a certain class of phenomena
  - Not (yet) applied to a specific system
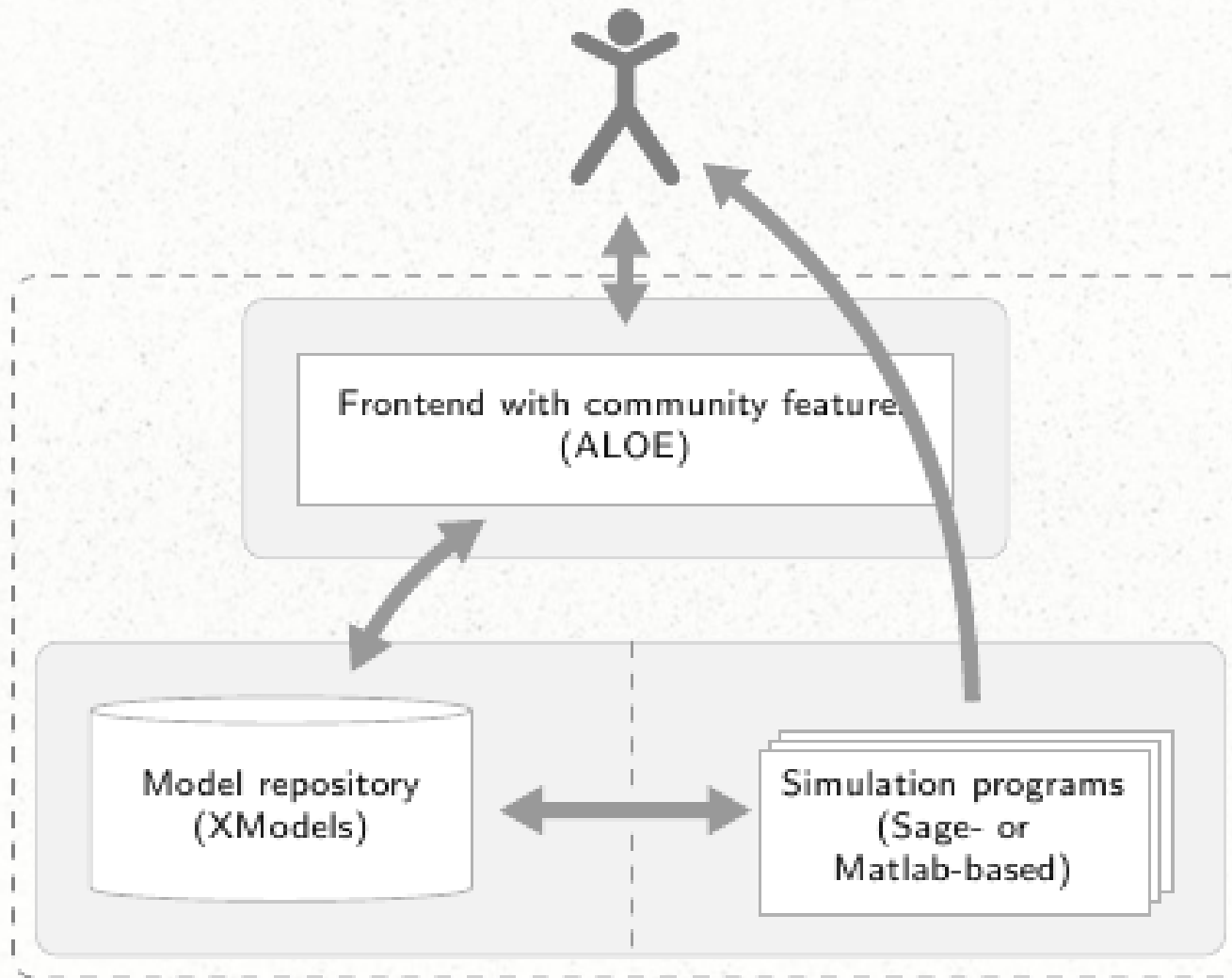
Goals and Vision

- Repository of mathematical models
    - Well-structured representation
    - Formally defined
    - Visualizations
    - model-specifc simulations
    - Searchable (by categories, keyword, etc.)
    - Accessible and editable via the Web
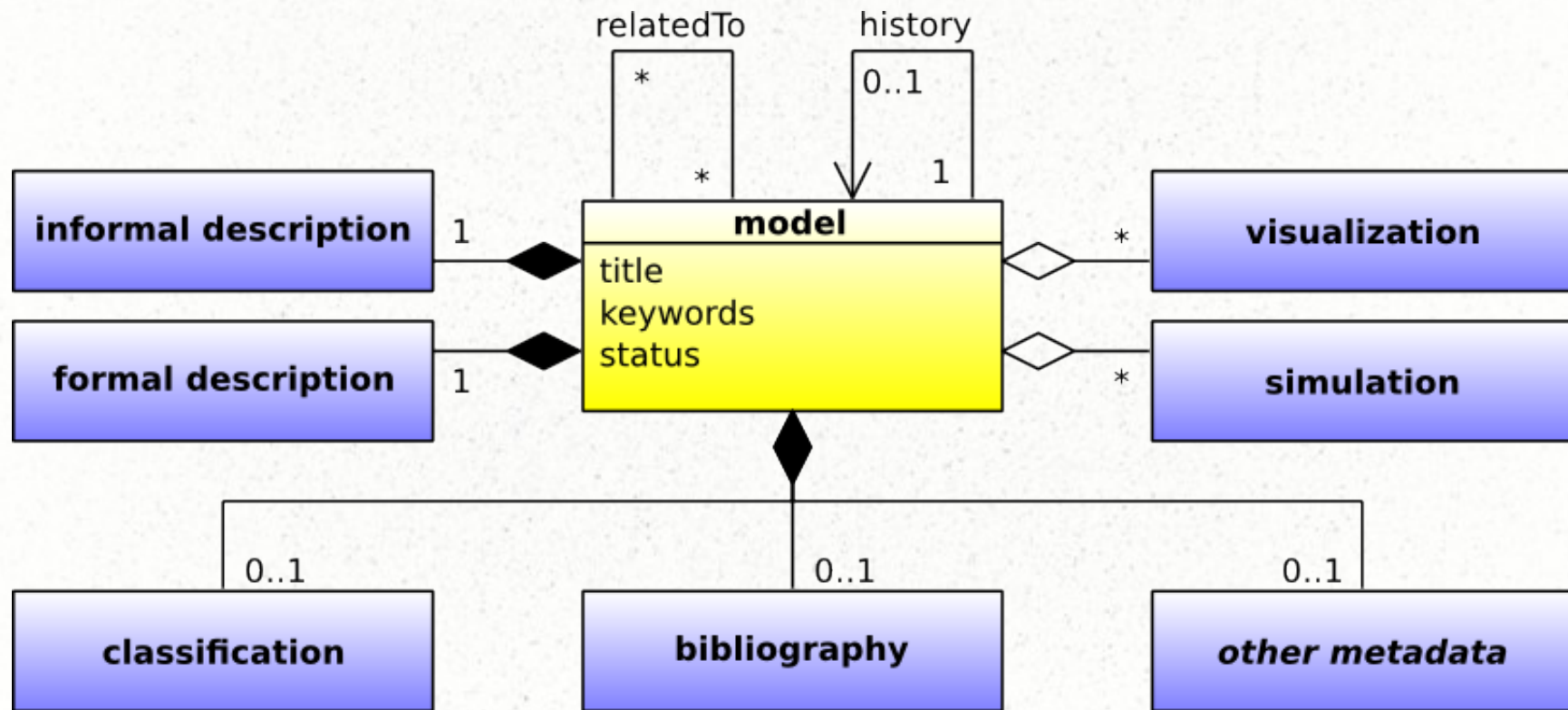   - Composition of models

Goals and Vision

- Support for
  - Interactive creation, publishing and maintaining of models
  - Building a community
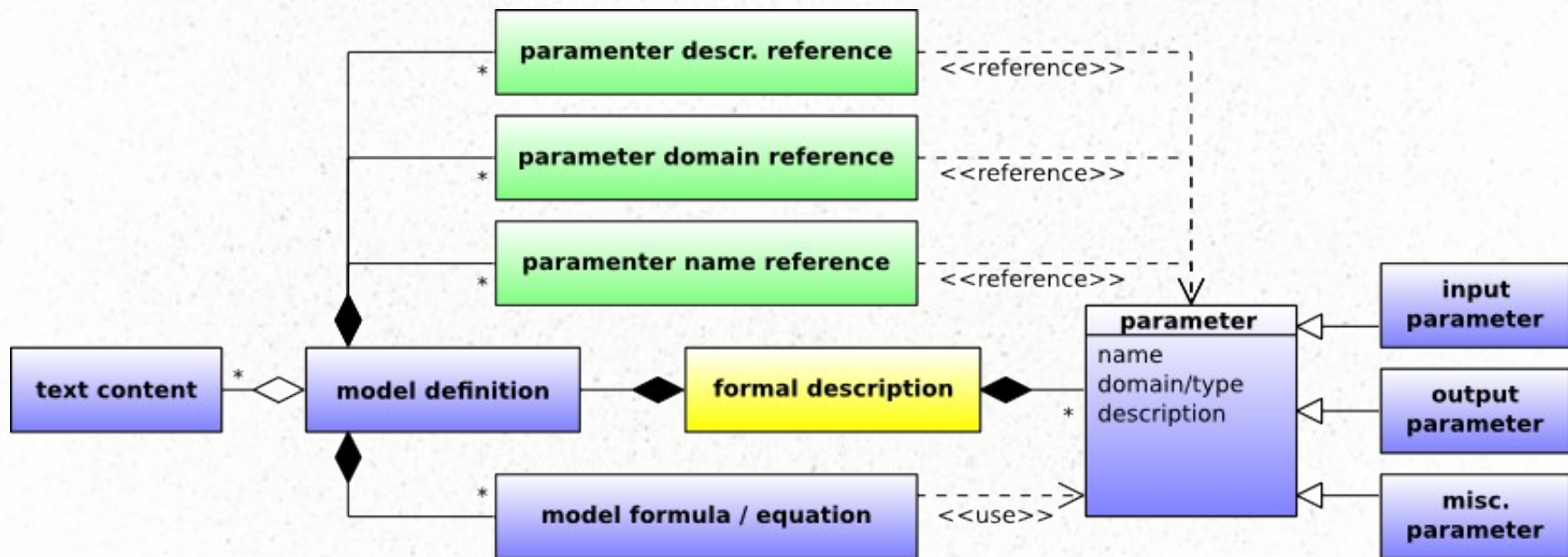 - Quality evaluation of models
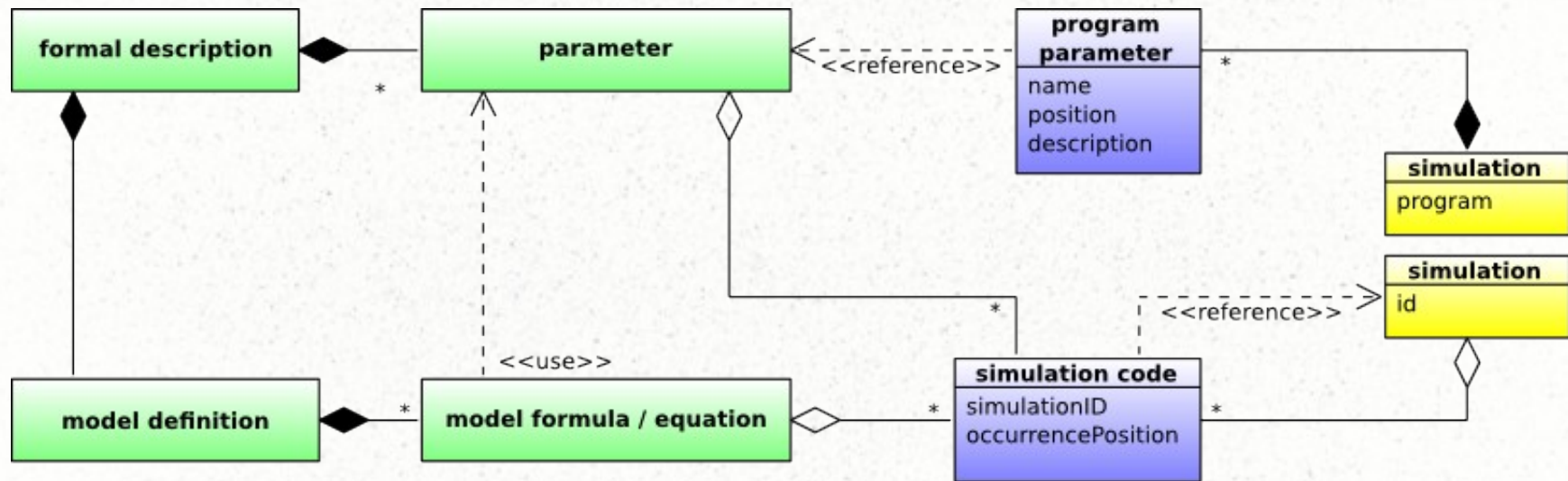
Current State

Architecture

Frontend with community features
(ALOE)

Model repository
(XModels)

Simulation programs
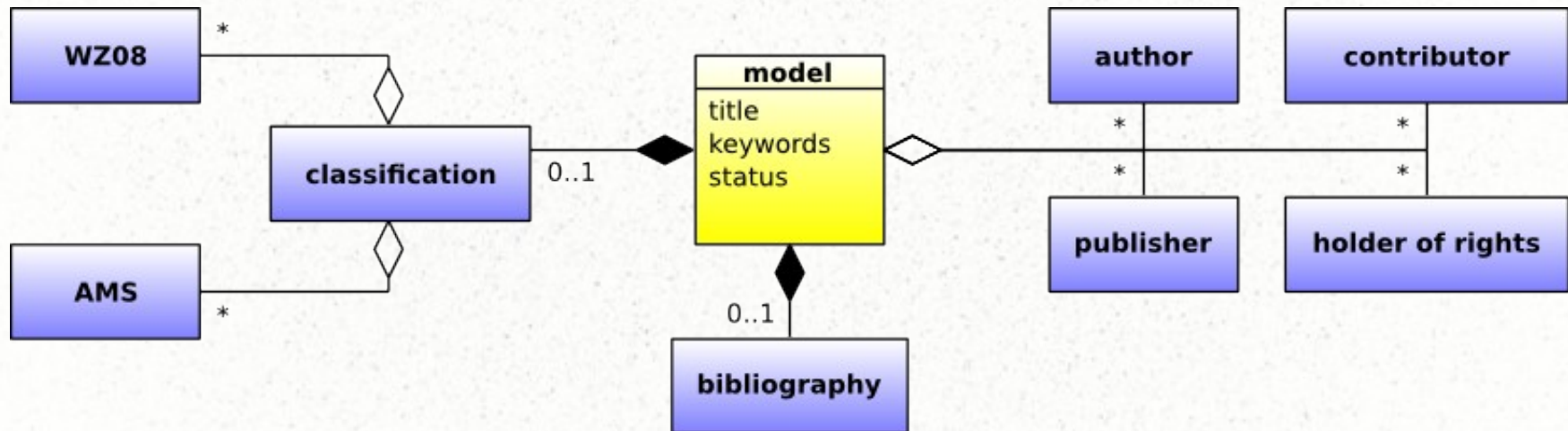(Sage- or
Matlab-based)

The XModel Schema
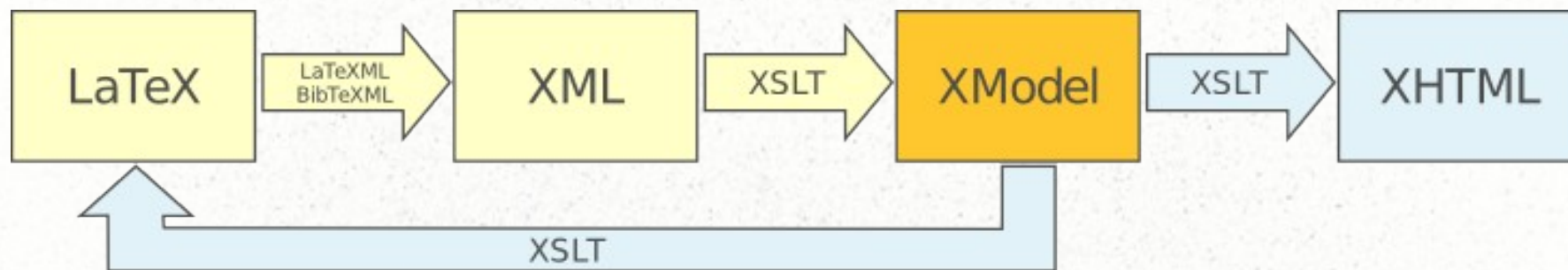
XModel: formal description

XModel: simulation

XModel: metadata

XModel: Processing chain

Outlook

Outlook

- Going online in Oktober 2011
- Building a user community
    - Increase the number of models
- Improve the platform
    - Better integration of simulations
    - Supporting external simulations
- Long term goal:
    - Composition of models

Thanks! Questions?