Ontologies as a Way of Automating MDE Processes

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EUROCON 2005 - The International Conference on "Computer as a tool"

Belgrad, 21-24 November 2005

Contents

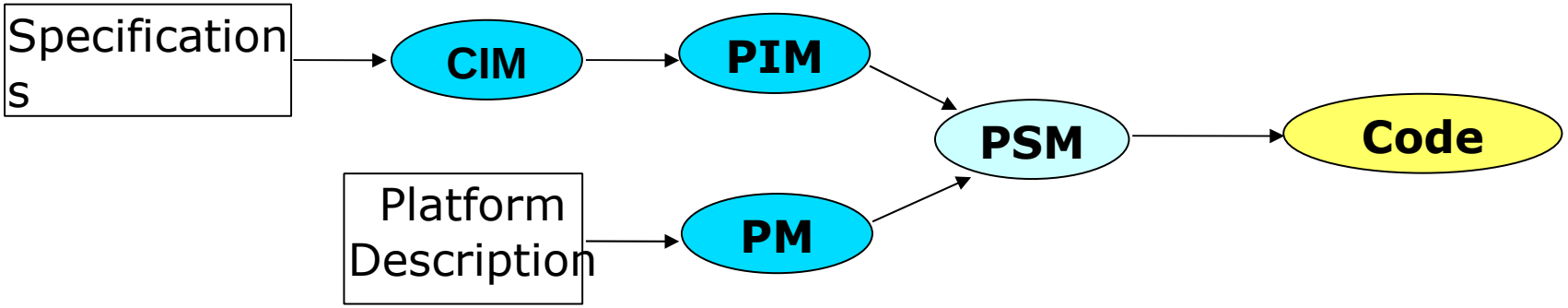
- **Context**
  - **Ontologies, Models**
- Proposition
  - KMDE Engine – Knowledge-based Model Driven Engineering
- Perspectives

Ontologies

- What they are [Gruber93]
  - 'Explicit Specification of a Formalisation'
  - 'The set of Object that can be represented is called the Universe of the Discourse'
- Two kinds
  - Upper ontologies
    - Tool : OpenCyc (IEEE SUO WG)
  - Pragmatic ontologies
    - Tool : Protégé

MDE Processes

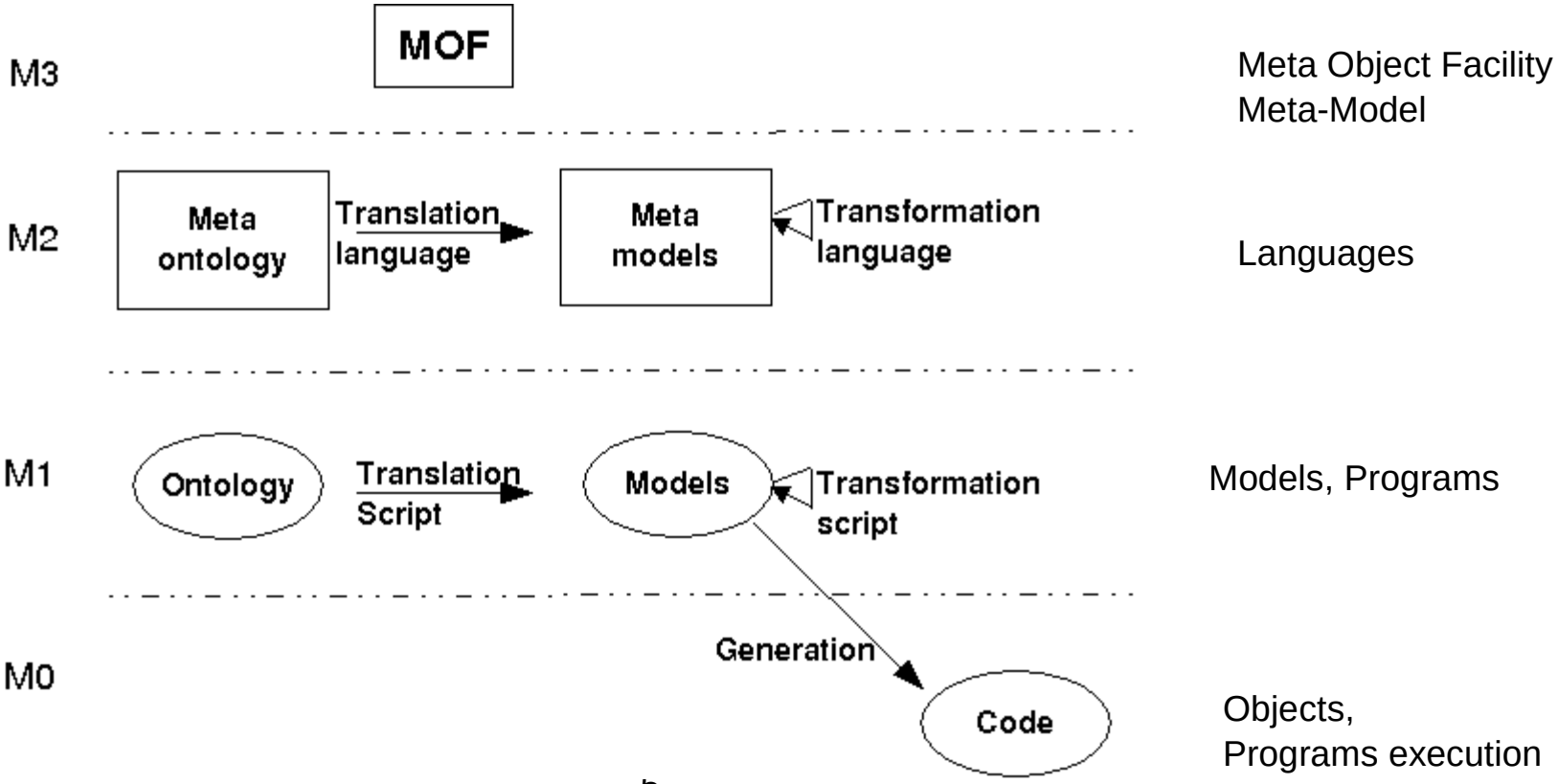
- Model Driven Engineering
  - Standardized by the Object Management Group : MDA



CIM Computational independent Model
PIM Platform independent Model
PM Platform Model
PSM Platform Specific Model

Ontologies and Models

- Ontologies in the OMG MOF Classification
  - Generaly used to build Ontologies from Models



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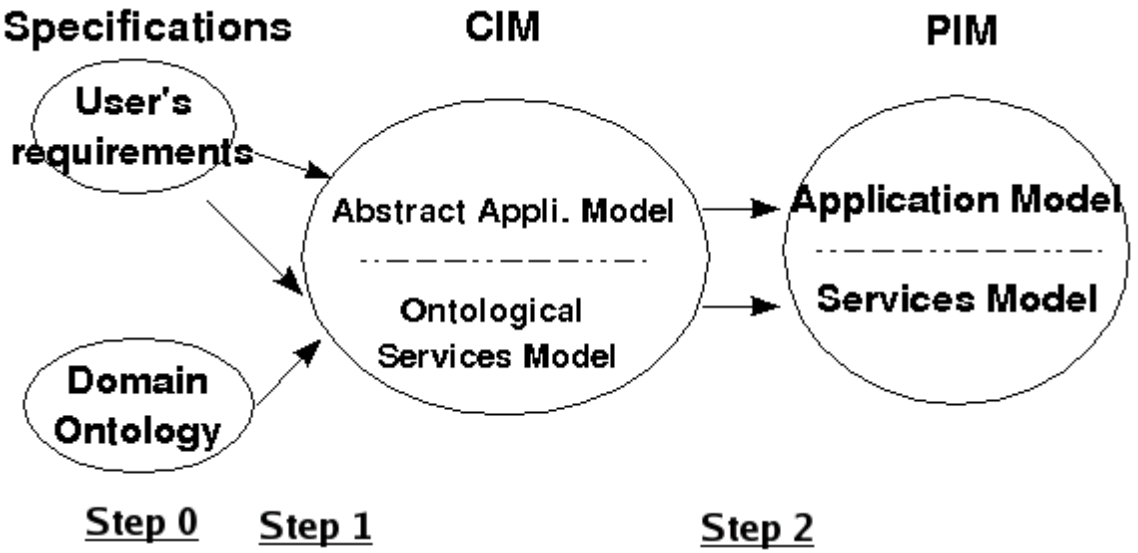
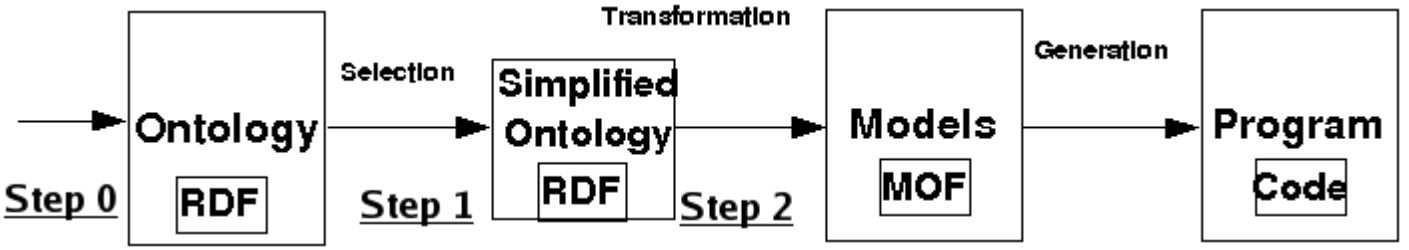
Domain knowledge

- Project Specifications
  - User's requirement and domain knowledge



Model Generation

- The Process

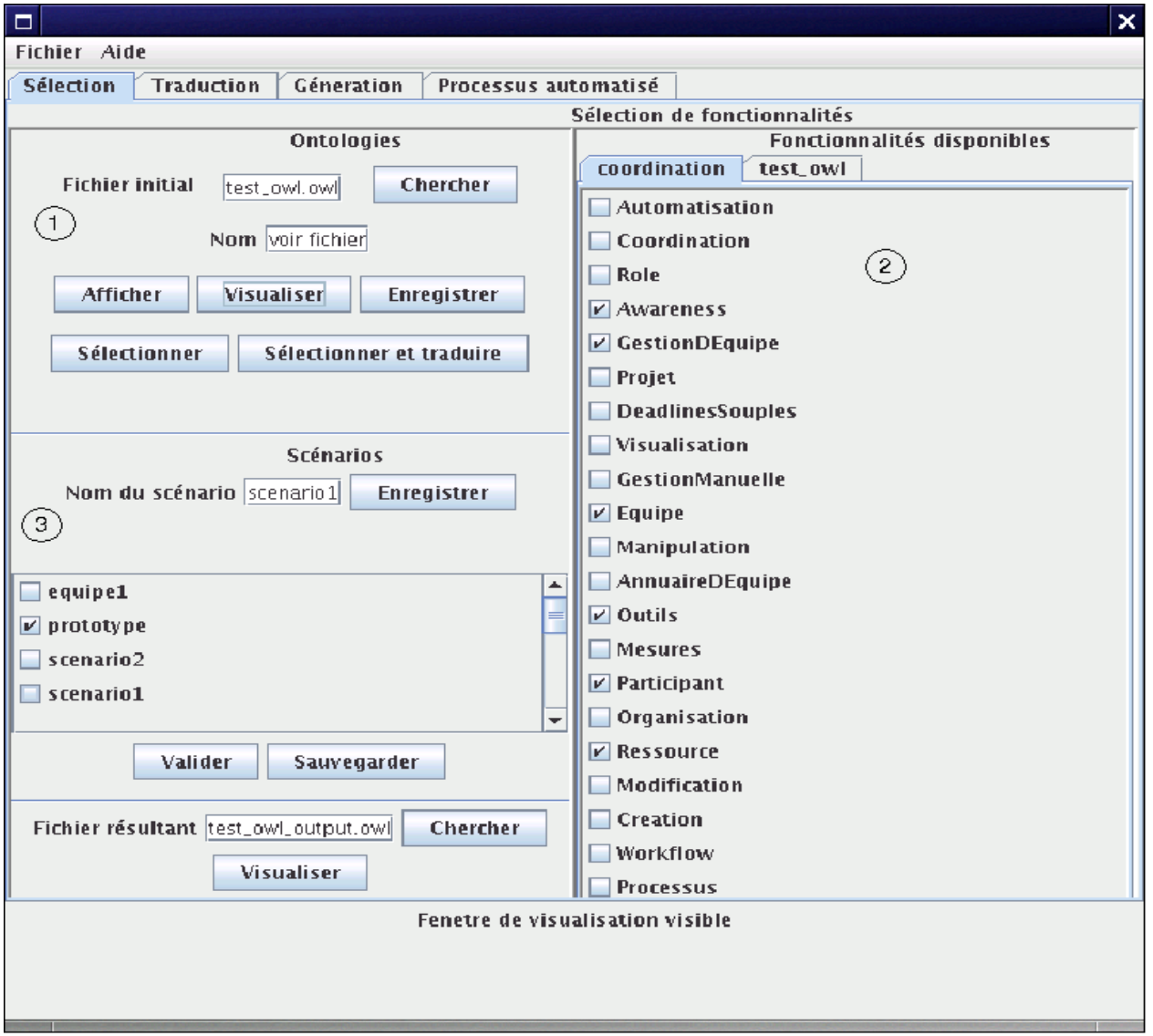


- Tools
  - Protégé, for building Ontologies, Step 0
  - KMDE, our tool, Step 1
  - ATL (Atlas Transformation Language, INRIA Rennes), Step 2
    - Managed by KMDE engine

Fonctionnal Ontologies vs. Data Ontologies

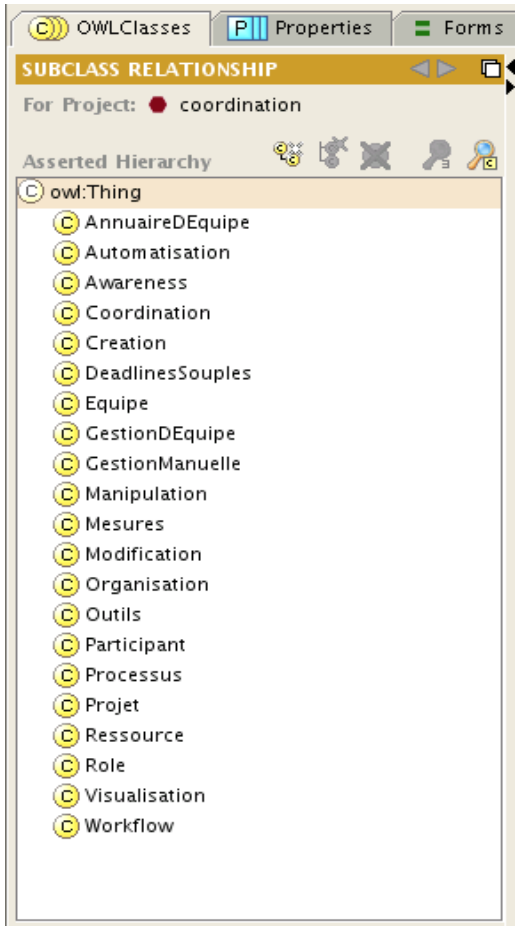
- What it is
  - Suitable for describing semantics about software
    - And not Data (Artificial Intelligence)
  - Relationship of composition between Entities
    - And not Inheritance
- Strengths
  - Easy mapping to models
- Weakness
  - Lack of tools (due to the shift of perspective)

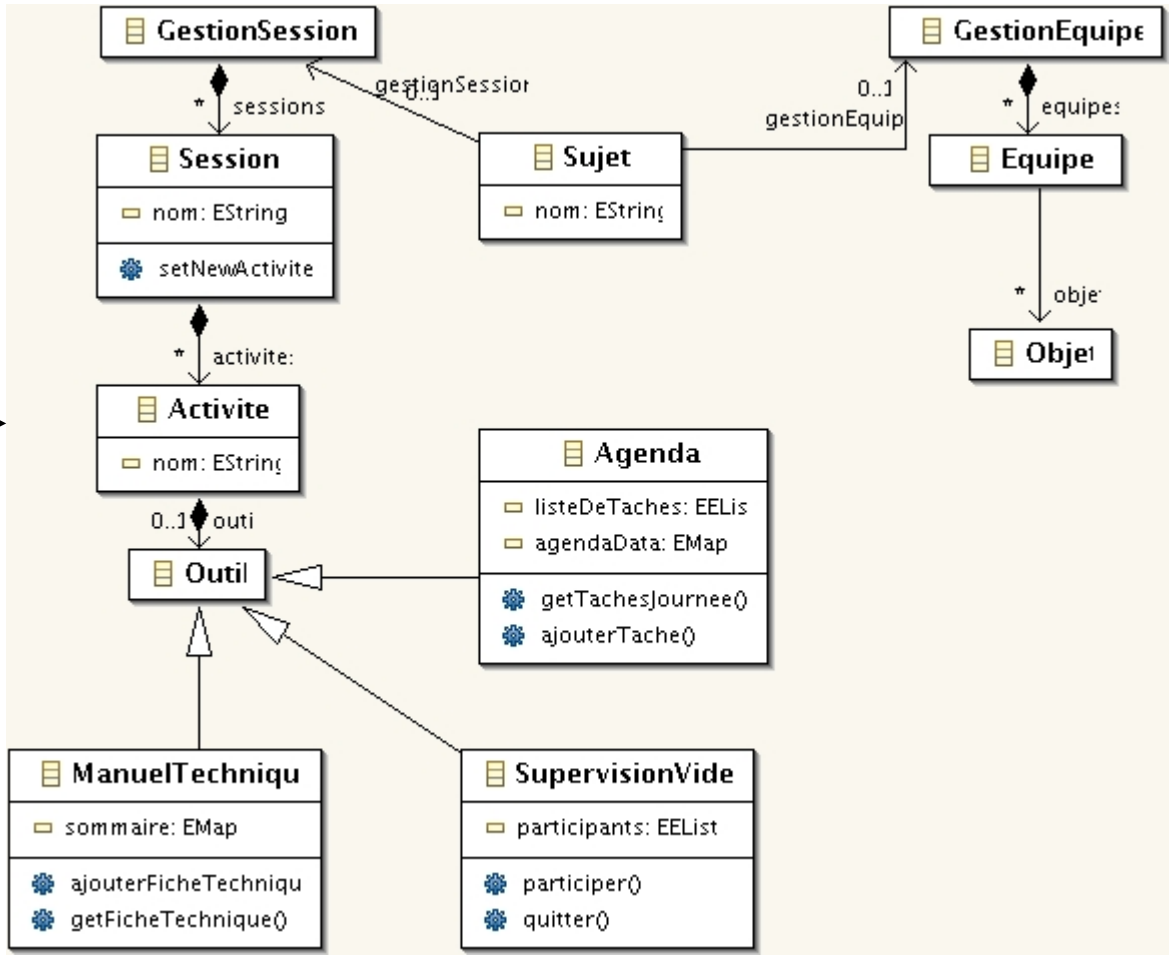
KMDE Tool


Fichier Aide
Sélection
Traduction
Géneration
Processus automatisé
Sélection de fonctionnalités
Ontologies
Fichier initial
test_owl.owl
Chercher
1
Nom
voir fichier
Afficher
Visualiser
Enregistrer
Sélectionner
Sélectionner et traduire
Scénarios
Nom du scénario
scenario1
Enregistrer
3
equipe1
prototype
scenario2
scenario1
Valider
Sauvegarder
Fichier résultant
test_owl_output.owl
Chercher
Visualiser
Fonctionnalités disponibles
coordination
test_owl
Automatisation
Coordination
Role
Awareness
GestionDEquipe
Projet
DeadlinesSouples
Visualisation
GestionManuelle
Equipe
Manipulation
AnnuaireDEquipe
Outils
Mesures
Participant
Organisation
Ressource
Modification
Creation
Workflow
Processus
2
Fenetre de visualisation visible

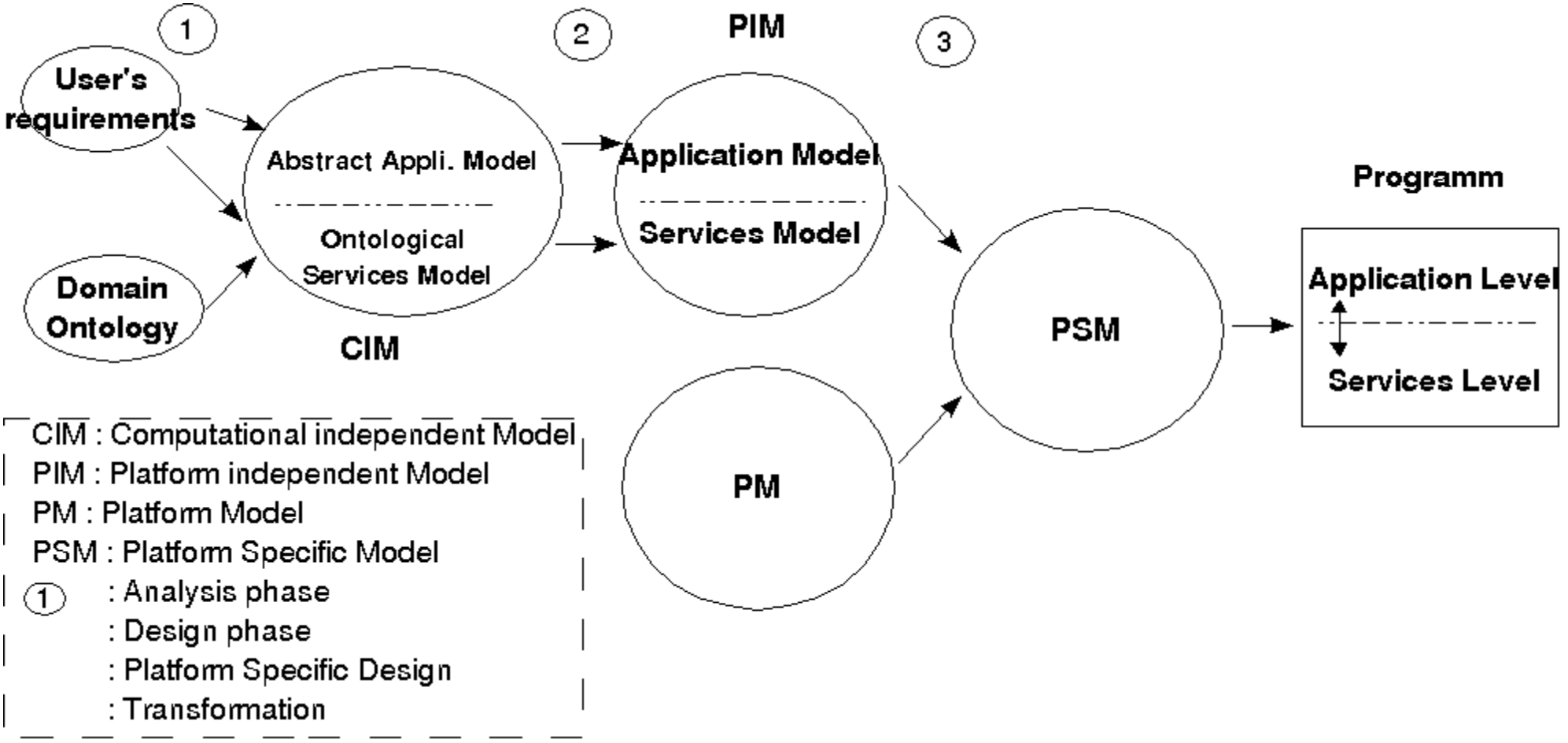
Example

- Ontology to model ... to code





Overview of the Process



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Applications of KMDE

- Generation of Collaborative Applications
  - Services for collaborative applications
  - Together with CAB - Collaborative Application Behaviour Model (O. Delotte, ICTT Lab, Ecole Centrale de Lyon, fr)
- Embedded Component platform
  - Selection of minimal class set for lightweigth systems
  - Together with S. Frenot (CITI Lab, INSA Lyon, fr)

Conclusion

- Strengths
  - Support rapid code generation for recurrent entities
  - Existing part should be integrated with generated code
    - Code
    - Patterns
    - Software Components
  - Ontologies let foresee easy service discovery
- Weakness
  - By now only interfaces generation
  - Integration of existing parts still to be done

Time for Questions

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