MDA Transformations

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Content

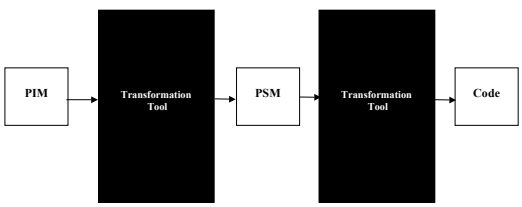
- Context & Methodology
  - Motivations & objectives
  - Methodology
- MDA (Model Driven Architecture)
  - PIM (Plateform Independant Model)
  - PSM (Plateform Specific Model)
- Transformations in Gaspard
  - Metamodels
  - Transformation Engin : ModTransf
  - Rules
- An Example
- Conclusion

Motivations & Objectives

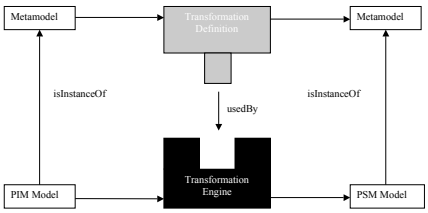
- Two particularities of Embedded Systems.
  - Dedicated to specific tasks.
  - Availability of a wide range of processors and processor architectures.
- Reduce Cost & Time to market.
- How can MDA help in designing Embedded Systems ?

MDA Transformations

MDA Major Steps



MDA Basic Framework



MDA Transformations

In Gaspard Project

Metamodels

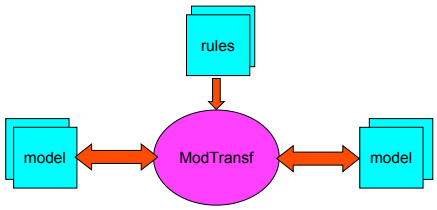
- Definition of a metamodel for:
  - Application
  - Architecture
  - Association
  - TLM Metamodel

  (see Arnaud's presentation)

Transformation Engine : modTransf (1/2)

- Based on the QVT proposals
- Features
  - Multi models as inputs and outputs
  - Different kind of models: MOF and JMI,XML with schema, graph of objects
  - Can be Customized
- Available for free download at: www.lifl.fr/~dumoulin/mdaTransf/

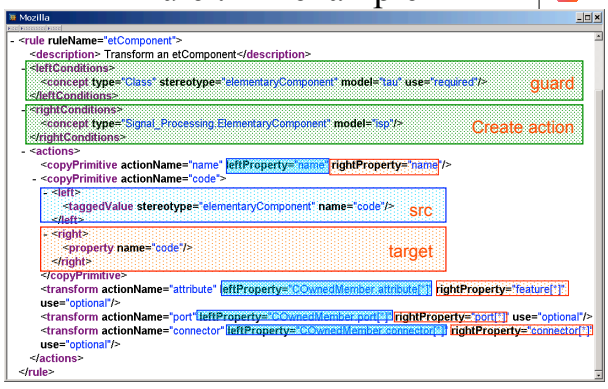
Transformation Engine : modTransf (2/2)



Transformation rules

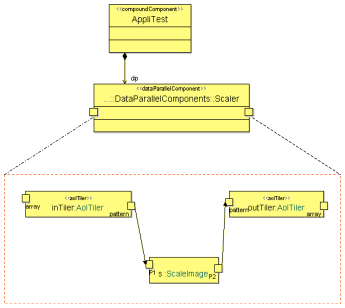
- XML based
- Express how input metamodel concepts are transformed into output metamodel concepts
- Structure of a rule
  - Guard : condition under which the rule is applied
  - Action : describes the transformation

XML Rule : An example

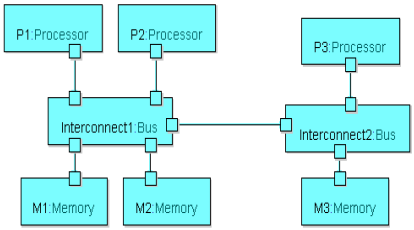


Example

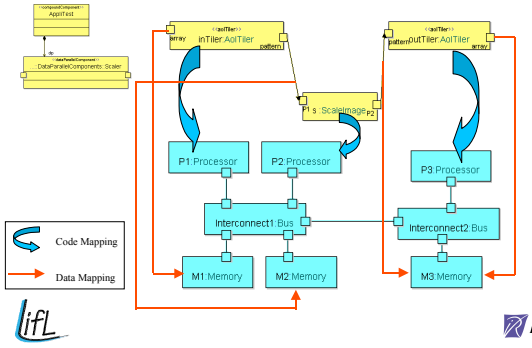
Application model



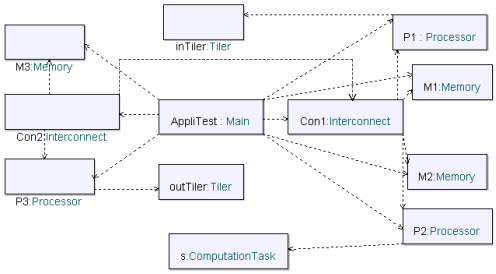
Architecture model



Association



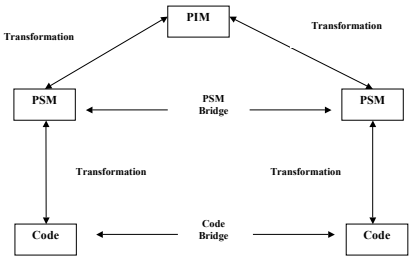
Output SystemC TLM model



What have we gained from the MDA

- Transformations are expressed at the metamodels level
  - Use of the same transformation rules as long as the metamodels remain unchanged
    - Ease of testing differents combinaisons of hardware software
- Multi-plateforms
- Inter-operability

Interoperability



Conclusion

- Our proposal
  - Design the metamodels (domain specific) : both input and output
  - Create the models (instances of metamodels) to transform.
  - Write the rules for transformation
  - Transform with ModTransf

Thank you for your attention