

Monday 16, Panel

Embedded Systems and MDA: Do they fit together?

François Terrier

CEA-List
francois.terrier@cea.fr

List

- **Various points of view with strong requirements**
 - functional, real-time, security, fault-tolerance
- **Target implementation options vary widely:**
 - Different execution models
 - Deployment on various material platforms
- **Performance is a "sensitive" issue**
 - Optimisation and encapsulation are generally not compatible
 - Design space exploration is complex
- **Critical to testing and validation**
 - require complete and accurate specifications
 - intensive use of system analysis techniques
- **Require very skilled developers in the various activities**
 - specification, design, implementation, validation, integration

How MDE could help RTES development?

⇒ Managing complexity

- ✓ (Graphic) Modelling rather than writing code
- ✓ Using views and separation of concerns

⇒ Reducing time to market on evolutions

- ✓ Using model transformations
for code generation, validation, traceability...

⇒ Managing reuse, evolutions, maintenance, product series

- ✓ Reduce dependency between specification, design and code
- ✓ Publishing dedicated languages definition (meta-models)
- ✓ Capture and generalize company know-how

Modeling languages are essentials: *Domain Specific Language or Language Profiling?*

- **DSL meta-modeling via a “meta-meta-model” (MOF):**
 - Freedom to define exactly what you want
 - *Less control for compatibility with legacy or for maintenance*
 - **UML meta-model profiling:**
 - Do not change, just enrich!
 - *Favor dissemination of a common language basis*
- ➔ ***Use UML as back bone to define a family of languages through intensive use of Profiling...***

Profiling is to:

- Define a domain specific terminology and notation
- Define semantics rule for variation points, ambiguous definition
- Add usage constraints of the UML Meta-Model

Tooling and formalization key points...

❑ Open the tools and ease interoperation

- ... Eclipse, EMF, UML2 MM, GMF, etc.
- UML profile editor & plugin generator...
- Efficient DSL modellers (including UML)...
- Public Meta-models of main formalisms...

❑ Semantic foundations

- Explicit modelling of the MoC with founded semantics...

*A dream: automatic generation of transformations
among Models using different MoCs*

- ✓ Not forget dev. of MDE tools is not a RT programming tech.
Not for current developers → better for specialized team

Embedded Systems and MDA: Do they fit together?

→ *Definitively YES !*