Context of the experimentation
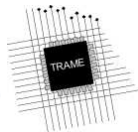Experimentation : AADL to OSEK/VDX compliant code
Conclusion and current work

Source code generation from AADL to a RTOS :
an experimentation feedback on the use of model transformation

Matthias BRUN[1], Jérôme DELATOUR[1] and Yvon TRINQUET[2]

[1]TRAME team, Groupe ESEO.

[2]Real-Time Systems group, IRCCyN.

Context of the experimentation
Experimentation : AADL to OSEK/VDX compliant code
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Outline

1. Context of the experimentation

2. Experimentation : AADL to OSEK/VDX compliant code

3. Conclusion and current work

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Source code generation
Model Driven Architecture

Source code generation

To automate part of the translation of high-level descriptions into correct executable code.

- limits the possibility of introducing errors,
- reduces the time required for system development,
- prevents designers from fastidious repetitive basic code translations.

However :

- generally, only treat a subset of semantics,
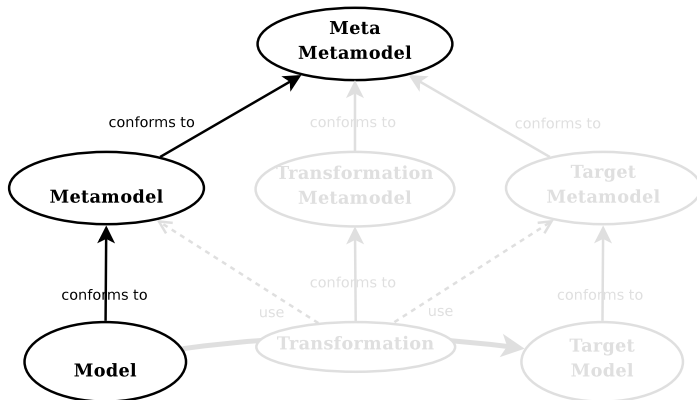- often *black boxes*, difficult to customize.

Conflict with the development of RTES :

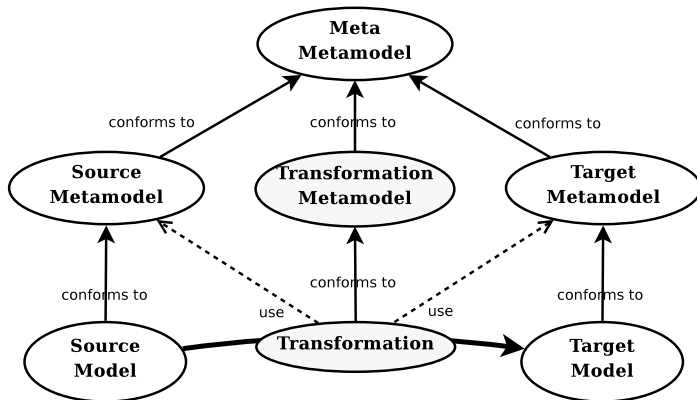- different code generation strategies could be involved.

$\rightarrow$ How to improve source code generation ?
$\rightarrow$ How MDA tools could be a help ?

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Source code generation
Model Driven Architecture

Model Driven Architecture (MDA)

Context of the experimentation
Experimentation : AADL to OSEK/VDX compliant code
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Source code generation
Model Driven Architecture

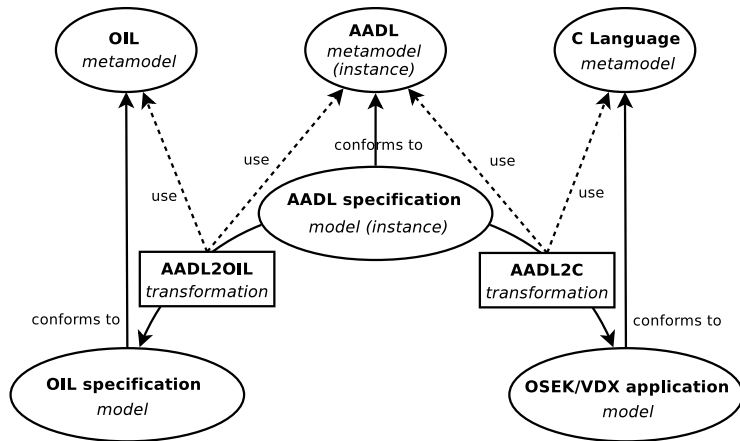# Model Driven Architecture (MDA)

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AADL to OIL and AADL to C language
AADL periodic thread to OSEK/VDX task
The need for alternative
Results

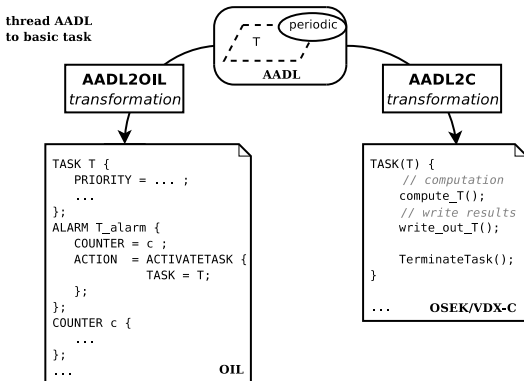## Outline

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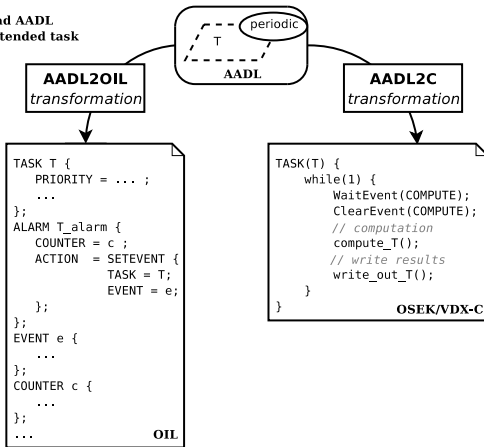Conclusion and current work

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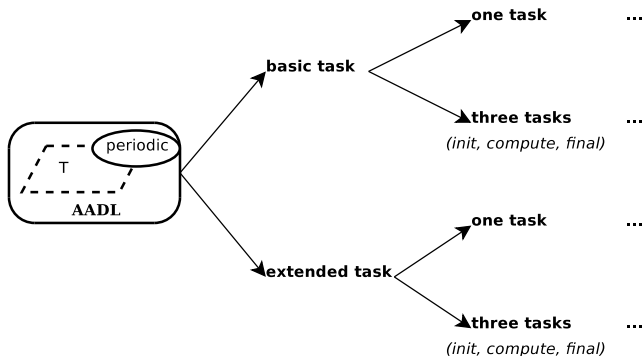AADL to OIL and AADL to C language
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The need for alternative

Control the transformation :

- interactive transformation,
- transformation with parameters.

Capture choices used to define the parameters :

- in the AADL model (*meta-informations*),
- in a dedicated model.

Experimentation :

- AADL *property set* to capture alternatives,
- → AADL *properties* to capture choices,
- application conditions of the ATL rules.

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Results (on AADL periodic threads to OSEK/VDX tasks)

transformation : choice of the number of tasks by thread, choice of basic or extended tasks, and taking into account several entry point declarations.

The experimentation lasted two months :

- 1th month : become familiar with MDA concepts and AMMA tools,

- 15 days : study of the AADL metamodel and
  development of the target metamodels (OIL and C language),

- 15 days : study and development of the ATL transformations.

$\rightarrow$ more time dedicated to think about transformations rules than to implement transformations.

The generated OIL and C codes were compiled and used with Trampoline (an open source OSEK/VDX RTOS developed by IRCCyN).

Outline

1. Context of the experimentation

2. Experimentation : AADL to OSEK/VDX compliant code

3. **Conclusion and current work**

Conclusion and current works

Adequacy of MDA for source code generation :

- ability of MDA tools to manipulate metamodels,
- MDA tools and declarative languages (such as ATL) simplify the expression of mapping between models,
- time-savings.

Experimentation :

- to take into account semantics,
- a need for alternative considerations.

Current works :

- to capture alternatives and choices in dedicated models,
- to assist developer with decision tools.

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