Information Society
Technologies

ARTIST2 – Year 1 Review

Grenoble, October 3rd-4th, 2005

Activity   *Joint Programme of Integration Activities*

Development of UML
for Real-time Embedded Systems

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Outline of the Presentation

Industrial Needs and Experience

Year 1 Activities

- Brief state of the art

- Achievements & Ongoing Work

- Interaction and Building Excellence Between Partners

- Management Perspective

18 Month Perspectives

- Work planned for the next 18 months

- Significant events or achievements expected

Industrial Needs and Experience

❖ Artist2 Interactions with Industry

➢ Requirements for the MARTE RFP have been collected via close interactions with industry, specially Thales BU.

➢ Ongoing work within the ProMARTE consortium (led by CEA) is done including close interactions with industrial end users.

e.g. Thales and Alcatel.

➢ Many other industrials have expressed interest in MARTE

e.g. Volvo, Daimler Chrysler, Schneider.

❖ Industrial Needs

➢ A real standard for UML-based modeling of RT/E systems

❖ Possible Global Impacts of Research Results

➢ MARTE will provide standard means for modeling RT/E systems

➢ MARTE will provide standard means for annotating models for analysis purpose

e.g. schedulability and performance analysis.

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Brief state of the art

❖ Previous standard, SPT, provided first constructs for RT modeling:

➢ A generic framework for modeling Resources and their QoS.

➢ A powerful means to model metric time and general concurrence.

➢ Two specific analysis frameworks (Schedulability & Performance).

❖ But, some lacks were reported since its adoption, such as:

➢ Incoherencies within the profile architecture.

➢ Drawbacks exist to model more complex systems.

➢ SPT does not support state machine-based analysis.

➔ **The RFP for a UML profile for MARTE**

❖ Broader scope covered by MARTE than by SPT, such as:

➢ Integrated modeling of both software and hardware aspects.

➢ Modeling of platform, platform-independent, and their allocation viewpoints in a MDA approach.

➢ Specification of not only RT constraints but also embedded QoS characteristics such as power consumption and memory size.

➢ Modeling of embedded, reactive, control/command, and intensive data flow computational systems.

➢ Component-based architectures modeling and analysis.

Year 1 activities
Achievements & Ongoing Work (seq.)

❖ Achievements in Year 1

➢ RFP preparation and standardization

➢ Building of a solid consortium to answer the RFP:

  Lead by CEA

  Based on a consistent set of academics, end user and tool provider

  *ProMARTE consortium: **http://www.promarte.org***

➢ Start of work to build the standard itself

  Definition of the profile architecture

  Proposition of a basic mechanism to define easily and in a modular manner RT features

❖ Ongoing works

➢ Consolidation of the consortium

  Current discussion with AADL related people

➢ Initial submission is due mid of November

  Consolidation of the profile architecture

  Contributions to parts of the architecture, such as:

  – Time, Concurrency and Resource modelling

  – Software and hardware platform modellling

  – Generic analysis framework

Year 1 activities
Interaction & Building Excellence

❖ Thales – CEA – INRIA – Artisan have close collaboration around MARTE
  ➢ They are at the origin of the MARTE RFP
  ➢ They are among main active actors within ProMARTE

❖ CEA - Verimag have close collaboration around possible formal foundations of MARTE:
  ➢ How to integrate the event-based framework defined in the OMEGA project within the MARTE profile?

❖ CEA- Cantabria university are working together on the analysis part
  ➢ Common paper to the Workshops MARTES held within the Models 2005 conference.

❖ CEA-INRIA are collaborating on executable UML which concerns MARTE for its requirements on MoC modelling.

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Year 1 activities
Management Perspectives

❖ What worked well
  ➢ Thales – CEA – INRIA – Artisan – Cantabria university collaboration
    RFP standardization + ProMARTE
  ➢ CEA – Verimag collaboration with external partners
    MARTES workshop organization within the Models'2005 conference.

❖ Difficulties encountered
  ➢ Interest from other ARTIST partners but active participation requires more important financing.

❖ Structural changes in the activity
  ➢ *Find a very concrete research issue*
    Two main research have been already identified as good candidates:
    – *How to describe MoC?*
    – *How to define basic framework for RTF modeling on top of which higher level constructs may be defined?*
  ➢ *Focus the ongoing work on at least one of this very concrete subject*

18 Month Perspectives

❖Work Planned for the next 18 months

➢ Consolidate and validate the MARTE profile architecture

➢ Continue work MARTE standard definition

➢ Continue to disseminate results within Artist2

➢ Possible specific action of this Artist2 activity:

Adoption of the OMEGA timing framework within MARTE

➢ Implement an Eclipse plug-in supporting the standard

❖Significant Events or Achievements Expected

➢ Initial submission due to mid of November 2005

➢ Final submission due to September 2006