Summary of the ARTIST2 workshop at DATE'07

http://www.artist-embedded.org/artist/-ARTIST2-Workshop-at-Date-07-.html
Venue: DATE'07 – 2007-04-20, Nice.

Title:
Towards a Systematic Approach to Embedded Systems Design –
Bringing Leading-Edge Embedded Systems Design Tools to Industrial Users

Organisers:
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Background and aims:
European research is developing leading-edge tools, working towards a *systematic approach* to Embedded Systems Design. Industry has strong needs for design methods and tools. Although significant gaps remain between the underlying technologies - such as modeling languages and analysis techniques-, a system-oriented approach is the long-term objective.

Embedded systems are employed in a wide range of application domains, with differing requirements - leading to different needs in terms of tools. We do however believe that there are many commonalities in dealing with complex embedded systems, such as approaches to architectural design, analysis and testing. The workshop was directed towards industry representatives and researchers wishing to interact about applications and needs for leading-edge embedded systems design tools.

The workshop had the following aims:

- Increase awareness for potential industrial users about existing leading-edge academic embedded systems design tools.

- Report on industrial use of these results and tools, through specific cases presented by industrial users.

- Present and discuss industrial needs and challenges to systematic Embedded Systems Design and development.

- Discuss measures for improving accessibility and transfer of academic results.

Summary of workshop:
The workshop was divided into three parts:

- ARTIST2 speakers and industrial applications, featuring presentations of tools and their industrial usage/case studies representing four of the ARTIST2 clusters.

- Invited speakers, Janos Sztipanovits and Alberto Sangiovanni Vincentelli, providing perspectives on Systematic Approaches to Embedded Systems Design

- A panel discussion involving all speakers.

The workshop can overall be characterized as highly intensive, interesting and successful.

The majority of the workshop goals were met, although it was at the same time clear that the area is huge; the discussions could have continued for much longer. Some of the interesting topics discussed are elaborated in the following.

The topics covered spanned different modelling formalisms, analysis techniques, application domains, case studies/work experiences and assessment of needs and trends.

Some central topics brought up during presentations and discussions included:

- Needs and drivers for systematic approaches[1].
    - o The embedded systems landscape is changing, with new applications demanding more functionality, increased quality and flexibility, resulting in more complex systems
    - o At the same time the platforms/technologies are changing and industries are facing more competition
    - o As a result, the landscape of tool vendors, system integrators, subsystem suppliers and electronics providers are changing.
- A key challenge for systematic approaches is how to deal with the multifaceted aspects of embedded systems, resulting in multiple disciplines and technical approaches.
    - o Several speakers addressed related concerns of model integration and management including needs for systematic
        - ▪ information exchange between design and analysis models, and in general information management integrating all necessary kinds of domain specific views
        - ▪ definitions of common semantic models, providing underlying unifying models that support the usage of multiple views, refinement and platform based design
        - ▪ approaches to synthesis encompassing application and platform functionality, and optimization of these given system constraints.
    - o Methodologies providing insight into how the diverse set of techniques (operations theory, timed automata, queuing theory and modelling formalisms) can/should be combined and applied given different application domains.

A further topic that we did not find the time to discuss was that of "measures for improving accessibility and transfer of academic results" – or phrased another way, how to stimulate synergetic cooperation between industry and academia.

Further discussions and meetings are clearly motivated along the lines of this workshop. We feel that it is important that such interactions involve several academic disciplines and industrial representatives!

In particular, there will be a follow-up workshop associated with the CAV conference on Computer-Aided Verification[2], in which we intend to intensify the exchanges with the formal verification and the embedded systems research communities.

Another forthcoming workshop is the MARTES workshop (http://www.martes.org) taking place as a satellite event of the UML/Models conference with the aim to tighten the interactions between the software engineering and the embedded systems research communities.

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[1] The organization of the Design chain was proclaimed as the single most important point in meeting these challenges (ASV).

[2] See http://www.artist-embedded.org/artist/-Tool-platforms-for-modelling-.html