October 26, 2006

o3neida Workgroup on Execution Models of IEC 61499 Function Block Applications

Introduction

Following the initiative of o3neida members and supported by the Board of Directors, o3neida is announcing a new activity on the development of Compliance Profiles on Execution Models of IEC 61499 Applications.

The IEC 61499 function block standard has been finally adopted and published by the International Electrotechnical Commission. However, early attempts of implementation by industry and numerous research works in academia have revealed a number of 'semantic loopholes' – i.e. incomplete definitions of how function blocks must be interpreted during their execution. This creates a room for multiple interpretations, which, in turn, shrinks the portability potential of IEC 61499 applications and hinders IEC 61499 adoption by industry.

The IEC 61499 standard has a built-in mechanism of answering such 'incompleteness' problems known as 'Compliance profiles' which, according to the Part 4 of IEC 61499, specify the features of IEC 61499-1 and 61499-2 to be implemented in order to promote the following *attributes* of IEC 61499-based *systems, devices* and *software tools*:

- *interoperability* of *devices* from multiple suppliers;
- *portability* of *software* between *software tools* of multiple suppliers; and
- *configurability* of devices from multiple vendors by software tools of multiple suppliers.

Several compliance profiles may be necessary to provide for implementations. At this stage the following issues seem to be necessary to address in such a compliance profile:

1) Execution of a basic function block; Algorithms.
2) Execution of a composite function block;
3) Scheduling of function blocks in resource and of resources in a device;
4) Execution of Service Interface Function Blocks;

Workgroup

Currently the workgroup is being formed from o3neida members and invited experts which will investigate the completeness of the IEC 61499 execution model, will develop complete models and will propose them as compliance profile (s).

The workgroup will consist from two parts:

- The group of document developers, working on the regular basis on the documents' development;
- The group of evaluators and assessors, providing feedback on the periodically released drafts;

O3neida members are encouraged to volunteer to either of these groups!

The list of the group members will be published after receiving volunteering replies of o3neida members. So far the following individuals have volunteered: Georg Frey, University of Kaiserslautern (Germany) , Luca Ferrarini, Politecnico di Milano (Italy), Kleanthis Thramboulidis, University of Patras (Greece), Valeriy Vyatkin, University of Auckland (New Zealand), Christoph Sünder, Technical University of Vienna (Austria), Bernardo Wagner and Nils Hagge, University of Hannover (Germany), Andrei Lobov, Tampere University of Technology (Finland) Antonio Valentini, o3neida – CRIT, (Italy), Jim Christensen, HOLOBLOC, (USA), Hans-Michael Hanisch – Martin Luther University of Halle (Germany)

Work timeline and workgroup management

The following milestones are seen at the moment of this document creation:

- Step 1. Collection of information: collect published and unpublished materials on execution model of function blocks;
- Step 2. Classify problems;
- Step 3. Develop compliance profile structure;
- Step 4. Propose solutions addressing the problems;

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- Step 5. Vote for the most appropriate solutions and release compliance profile drafts for assessment by industrial supporters;
- Step 6. Release version one of the compliance profile.
- Step 7. Revise and update the compliance profile as needed;

The first version release can be expected by mid-2007.

The Workgroup's activity will be coordinated by two coordinators rotating once in several months. The role of coordinators will be to accomplish the tasks of the work plan. The coordinators for the initial period of the workgroup's operation are:

- Valeriy Vyatkin, The University of Auckland v.vyatkin@auckland.ac.nz
- Christoph Sünder, Technical University of Vienna, suender@acin.tuwien.ac.at

Communication between taskforce members will be via:

a) e-mail correspondence and Skype;

b) data exchange through o3neida FTP server;

c) meetings;

Special session at INDIN 2007

A special session on the IEC61499 Execution Models at the 5th IEEE Conference on Industrial Informatics (INDIN 2007, July 23027, 2007, Vienna) is seen as an important contribution for achieving the goals of the work plan. The session will be structured according to well-focused topics to be early allocated among the taskforce members. Several contributions on the same topic will be encouraged, and a research group can co-author more papers. Hopefully the overall contributions will be balanced among the various contributors.
The conference deadlines (draft submission, reviewing, final submission and presentation) will help to structure the taskforce work and integrate it to the academic and research routine, thus not asking for extra resources.

Business model

The participants of the meeting realize that the work on the compliance profile development is time consuming and is not funded by any existing project. The proposed model of operation is to contribute the efforts and resources of organizations represented by taskforce members. O3neida will be the official owner of the work result. O3neida management will propose a business model on commercialisation of this work results and on rewarding the involved parties. Please contact current group coordinators if you wish to participate in the workgroup or if you require more information. The coordinators' contacts are:

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