Session summary: Conclusions and Plans for next IRTAW

Chair: Juan A. de la Puente
Rapporteur: Santiago Urueña

1. Introduction

The final session summarized the main conclusions of the workshop and addressed some open issues. Another objective was to decide whether a new IRTAW is needed, and, if so, the location and time frame.

2. Language Issues

The conclusions of the first session were summarized. Alan Burns stated that an Ada Issue should be created and submitted to the ARG to correct the current definition of the EDF protocol because the standard is wrong [1]. The proposal was accepted unanimously by the 18 participants, and he will be in charge to write the AI.

With respect the omission of the requeue statement in object oriented programming [2], the consensus was that the requeue is a useful primitive in combination with interfaces, and that Ada should be consistent in this point. Alan Burns reminded that the ARG explicitly asked the workshop to study this problem, and the participants approved (17 yes, 0 no, 1 abstention) to further investigate this topic, that a static solution (a pragma) is an effective mechanism but the implementation costs must be investigated.

Finally, the workshop agreed that a Ravenscar profile for distributed systems [3] is very interesting, and that research should proceed on it. First the requirements should be defined and then the restrictions should be developed.

3. Programming Patterns and Libraries

Andy Wellings said that a set of real-time programming patterns [4, 6] for Ada is interesting, and that the work will continue in a future workshop thanks to the ARTIST project. The University of York will hold a full-day meeting in October. The addition of servers [5] to the framework will also be discussed in the meeting.

Jorge Real asked when the source code will be available, but Andy Wellings replied that currently there is not a full Ada 2005 implementation, so the patterns must be first tested.

4. Implementation Experience with Ada 2005

The rapporteur of the third session [7, 8] summarized that the conclusions were first to investigate a better means of execution-time accounting, including a better model for interrupt handling; to reaffirm the workshop support of user-defined scheduling; and that there is not a consensus on whether those execution-time timing mechanisms should be added to Ravenscar.

Juan A. de la Puente then presented a slide to further explain this last open issue, explaining the use envisaged: a task can have a static execution-time timer which is armed in each activation. If in a rare event the task consumes more CPU time than its assigned WCET the handler of the execution-time timer will awake a monitoring task. This monitoring task can make a system-dependent recuperation procedure like mode change or safe stop, avoiding the faulty task to disrupt other tasks.

He reminded that this was discussed in past IRTAWs, and it had the support of the workshop at that time. Andy Wellings said that there is no need to add CPU timers because a monitoring task can check the correct behavior of the rest. Tullio Vardanega then stated that CPU timers are needed to allow multiple Ravenscar partitions to coexist. In the opinion of Alan Burns, that cannot be considered a change to Ravenscar, but a new profile. The final consensus was that the workshop encouraged further investigation on this topic.

5. Beyond Ada 2005

Jorge Real, as the chair of the fourth session, expressed that there was not enough time to finish the discussion, but that the workshop reached some consensuses. The first one was that Ada needs more standardized support for multiprocessor systems, like the ability to specify the affinity of a task to specific processors [9]. Andy Wellings proposed to continue the discussion in the next meeting, and to set up a consortium for Ada and the upcoming hardware architectures. Michael González Harbour and Juan A. de la Puente were also interested.

Then the workshop continued with the topic about

stream-based parallel systems [10]. Neil Audsley stated that this is a potential future direction for Ada, as there is no competitor. For example, the C language is not as strong as Ada with respect to the memory footprint and energy savings. Finally, Juan Zamorano said that the proposal made by Santiago Urueña is a candidate for the distribution model of a future Distributed Ravenscar. Tullio Vardanega suggested that this will be discussed in the next workshop, and Santiago Urueña expressed that he will investigate this issue.

6. Ada and Other Standards

Mario Aldea started the session talking about the discussion about the bindings to POSIX [11]. The consensus was that the standard should be updated with the minimum number of changes. Stephen Michell expressed that anyone interested in participating can contact him by e-mail and subscribe to the mailing list.

This was followed by a summary and discussion about RTSJ, and Juan A. de la Puente stated that the Ada real-time community should continue following the progress of other languages like Real-Time Java, opening new proposals to include in Ada. Ben Brosgol suggested several candidates for consideration including garbage collection, mixed Priority Inheritance, and the Priority Ceiling protocol.

7. Future Plans

Alan Burns proposed to post the session reports on the web page of the workshop, so the ARTIST web site can link to them. Stephen Michell further suggested to have a permanent IRTAW web site so the pages of all workshops are always available. Ben Brosgol agreed to have this permanent web site on the web site of the Ada Resource Association.

Finally, it was discussed whether another IRTAW should be held in the future. Tullio Vardanega felt that it would be desirable, and Jorge Real stated that there are a lot of open issues. The unanimous decision was that another workshop is needed and should be planned for approximately 18 months from now, namely in September 2008. Tullio Vardanega said that he would be happy to hold the next IRTAW in Italy, while Neil Audsley volunteered to be the Program Chair.

References

[1] Zerzelidis, A., Burns, A., Wellings, A.J. *Correcting the EDF protocol in Ada 2005.* In Ada-Letters (this issue).

[2] Wellings, A.J., Burns, A. *Integrating OOP and Tasking — The missing requeue.* In Ada-Letters (this issue)

[3] Urueña, S., Zamorano, J. *Building High-Integrity Distributed Systems with Ravenscar Restrictions.* In Ada-Letters (this issue)

[4] Wellings,A.J., Burns, A. *A Framework for Real-Time Utilities for Ada 2005.* In Ada-Letters (this issue).

[5] Burns, A., Wellings, A.J. *Programming Execution-Time Servers in Ada 2005.* In Ada-Letters (this issue).

[6] Pulido, J., de la Puente, J.A., Bordin, M., Vardanega, T., Hugues, J. *Ada 2005 Code Patterns for Metamodel-Based Code Generation.* In Ada-Letters (this issue).

[7] Urueña, S., Pulido, J., Redondo, J., Zamorano, J. *Implementing the New Ada 2005 Real-Time Features on a Bare Board Kernel.* In Ada-Letters (this issue).

[8] Aldea, M., González Harbour, M. *Operating System Support for Execution Time Budgets for Thread Groups.* In Ada-Letters (this issue).

[9] Burns, A., Wellings, A.J. *Beyond Ada 2005: Allocating Tasks to Processors in SMP Systems.* In Ada-Letters (this issue).

[10] Ward, M., Audsley, N.C. *Suggestions for Stream Based Parallel Systems in Ada.* In Ada-Letters (this issue).

[11] Michell, S. *Interfacing Ada to Operating Systems.* In Ada-Letters (this issue).