ISO/IEC JTC 1/SC 22/WG 9 N0478

24 December 2006

Contribution from SIGAda, Clyde Roby: Notes of Birds-of-a-Feather session on POSIX-Ada Binding, conducted at SIGAda 2006, November 15, 2006, Albuquerque, NM, USA

The notes reference three other documents:

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<td>2 Ada POSIX Bindings Questionnaire: Input collection for potentially forming a POSIX Rapporteur Group</td>
<td>Appended to this document</td>
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<td>3 Slides of presentation by Steve Michell</td>
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POSIX/Ada Binding

Birds-of-a-Feather
SIGAda 2006
November 15, 2006
Albuquerque, NM, USA

Coordinator: Steve Michell (stephen.michell@maurya.on.ca)
Supported by Brad Moore (brad.moore@gdcanada.com)
Third author of handouts (not present): Luke Wong (luke.wong@CMCElectronics.ca)

Steve and Brad distributed two handouts:
2. Ada POSIX Bindings Questionnaire: Input collection for potentially forming a POSIX Rapporteur Group

Steve then presented his slides (information from selected slides included below):

- **State of the binding**
  - IS 14519:1999 POSIX Binding to the Ada programming language
  - Based on:
    - IS 9945:1996 POSIX (2 updates old, one major revision) + real-time stuff (5b, 5g)
    - IS 8652:1995 Ada (2 updates old, one major revision)
  - Reconfirmed, but needs update
  - Sep 2006 SC22 gave IS 14519 to WG9 Ada

- **POSIX revision**: about 1000 functions, 1700 pages in part 2, including complete C library, significant threads and networking. May add “bounded” (aka “safe”) C functions.

- **Ada 2005 revision**: directories, containers, environment variables, real-time paradigms.

- **Canadian Study**: Luke Wong, Brad Moore, and Steve Michell performed a 2-pass review of changes, to identify new functions, and to identify changes to existing functions.

- **Conclusion**: Existing interfaces are stable, some additions of “restrict” qualifications, changes to “errno”s (new exceptions?), some semantic changes – some things have become “thread oriented.”

- **Some areas not done in the 1990’s**: logging, RT, ... Should we try that now?

- **Other areas are now addressed by Ada 2005**, so we can remove or obsolesce existing Ada-POSIX bindings. Should we do that? By using Ada 2005 features instead, we get better integration with other Ada features.

- **Identified 150 new/uncovered POSIX functions**. Probably about 20-50 functions to be created.

- **Alternative ways to do an update**: reconfirm, new project, corrigendum, amendment, revision.
• “Austin” group will be maintaining the POSIX group, and bring the work to ISO when done. IEEE still holds the original copyright. The Austin group is 3-way combination of IEEE, ISO-SC22, and X/Open.

• Preferred Approach: Canada has made a proposal to create a WG9 Rapporteur Group with Ted Baker (baker@cs.fsu.edu) as the project’s editor (but he is currently not funded). We are looking for members. The final work mode is still undecided.

• Canada proposed Luke Wong as a possible Rapporteur Chair; he is from CMC Electronics, Canada.

• Process? Make it a national body project, an IEEE project, or an Open Group project? Can we “Fast Track” it? It should be made a freely available version – but who owns the copyright?

• Timeline:
  o Ask WG9 to create Rapporteur Group (this week)
  o Start working on the “how to”
  o Parallel work on technical issues
  o Ask IRTAW 2007 (April) to dedicate some time to POSIX
    ▪ To what extent does Ada 2005 supplant POSIX Real-Time functionality (e.g., Sporadic server)
    ▪ Meet 3 or 4 times per year until 2008 (6 to 12 people)
    ▪ In 2008 take draft to WG9 for ISO processing
    ▪ Possibly a completed standard in 2009

• Is there any way to get money to Ted Baker to help pay for travel, etc.? Ted will host a meeting in Tallahassee in February.

After Steve made his presentation (there was some discussion during the presentation of some of his slides), further discussion ensued.

Erhard: [The timeline] sounds too slow for just 20-50 functions.
Steve: We need to go back and look at all existing functions for any changes.

Erhard: Who is conformant to POSIX? Sun, HP; Linux is coming. What about implementation of the binding? Is there a Java binding to POSIX?

Tuck: There are arguments in favor of doing a complete POSIX binding, even if it is redundant.

Erhard: The User wants to be assured that these calls are integrated between different languages.

Ed Schonberg: Just use pragma Import? Isn’t that the zero cost solution? We have gotten rid of variable-argument lists mostly in new POSIX interfaces.

Question: Simplify sockets? Cf. GNAT interface to sockets.

Steve: How long [will the meeting be] in Tallahassee?

Question: What about Windows NT POSIX subsystem?
Steve: I believe it is broken and wasn’t ever filled in?

Straw poll (concerning thick or thin binding):
   Stick with thick binding?  3
   Move to thin binding?  3
   No opinion – many.

Tuck: Establish pragma Import usage for thin binding.

Steve: [Should we] withdraw the binding? Why use the binding?
Answers: Try to achieve operating system independence. There is a Windows-based binding. The package POSIX.Calendar already exists and is known to work, it doesn’t need debugging, and you don’t need to go read the POSIX standard.

To query the community: What *parts* of POSIX are used heavily, e.g., POSIX.Calendar, POSIX.Directories/Files, POSIX.Sockets, POSIX.Processes?

Tuck: Suggestion: Focus on the parts that are used heavily and that are inadequately served by Ada 2005. Obscure pieces can be reached via pragma Import.

Steve: There is a growing importance of multi-core systems and this means that the value of using Ada’s tasking is growing, so it is important to have an interface that we know works well with Ada tasking.
Ada POSIX Bindings

Questionnaire

Input collection
for potentially forming a
POSIX Rapporteur Group
Instructions:

For the following questions please circle the dot that best represents your position.
If you have any comments on a particular question, please feel free to provide them in the area provided.
<table>
<thead>
<tr>
<th></th>
<th>Comments</th>
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<tbody>
<tr>
<td>1.</td>
<td><strong>What area of industry do you associate with?</strong>&lt;br&gt;<code>Eg. Education, Defense, General Business Systems, etc?</code></td>
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<td>2.</td>
<td><strong>What is your role in software?</strong>&lt;br&gt;<code>Eg. Software Engineer, System Engineer, Software Developer, Management, Student</code></td>
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<td>3.</td>
<td><strong>How familiar are you with POSIX?</strong>&lt;br&gt;<code>Least</code> <code>Most</code></td>
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<td>4.</td>
<td><strong>Have you been involved with a project using POSIX in the last 10 years?</strong>&lt;br&gt;<code>No</code> <code>Yes</code></td>
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<td>5.</td>
<td><strong>Have you been involved with a project using POSIX in the last 5 years?</strong>&lt;br&gt;<code>No</code> <code>Yes</code></td>
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<td>6.</td>
<td><strong>Are you currently involved with a project using POSIX?</strong>&lt;br&gt;<code>No</code> <code>Yes</code></td>
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<td>7.</td>
<td><strong>How likely are you become involved with a new project using POSIX in the next 5 years?</strong>&lt;br&gt;<code>Least</code> <code>Most</code></td>
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<td></td>
<td>Question</td>
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<td>8.</td>
<td><strong>How likely are you become involved with a new project using POSIX in the next 10 years?</strong></td>
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<td>9.</td>
<td><strong>Does your organization/company use POSIX functionality?</strong></td>
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<td>10.</td>
<td><strong>How familiar are you with Ada?</strong></td>
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<td>11.</td>
<td><strong>Have you been involved with a project using Ada in the last 10 years? Check all that apply.</strong></td>
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<td>12.</td>
<td><strong>Have you been involved with a project using Ada in the last 5 years? Check all that apply.</strong></td>
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<td>13.</td>
<td><strong>Are you currently involved with a project using Ada? Check all that apply.</strong></td>
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<td>14.</td>
<td><strong>How likely are you become involved with a new project using Ada 83 in the next 5 years?</strong></td>
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<td>15.</td>
<td>How likely are you become involved with a new project using Ada 83 in the next 10 years?</td>
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<td>16.</td>
<td>Does your organization/company use Ada 83?</td>
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<td>17.</td>
<td>How likely are you become involved with a new project using Ada 95 in the next 5 years?</td>
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<td>18.</td>
<td>How likely are you to become involved with a new project using Ada 95 in the next 5 years?</td>
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<td>19.</td>
<td>Does your organization/company use Ada95?</td>
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<td>20.</td>
<td>How likely are you become involved with a new project using Ada 2005 in the next 5 years?</td>
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<tr>
<td>21.</td>
<td>How likely are you become involved with a new project using Ada 2005 in the next 10 years?</td>
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<td></td>
<td>Question</td>
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<td>22.</td>
<td>Is your company/organization already using Ada 2005?</td>
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<td></td>
<td>No  Yes</td>
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<td>23.</td>
<td>Is your company/organization planning to use Ada 2005 in the future?</td>
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<td></td>
<td>No  Yes</td>
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<td>24.</td>
<td>How familiar are you with the Ada POSIX Bindings?</td>
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<td></td>
<td>Least  Most</td>
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<td>25.</td>
<td>Have you been involved with a project using the Ada POSIX bindings in the last 10 years?</td>
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<td>No  Yes</td>
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<td>26.</td>
<td>Have you been involved with a project using the Ada POSIX bindings in the last 5 years?</td>
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<td></td>
<td>No  Yes</td>
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<td>27.</td>
<td>Are you currently involved with a project using Ada POSIX bindings?</td>
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<td></td>
<td>No  Yes</td>
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<td>28.</td>
<td>How likely are you become involved with a new project using Ada POSIX bindings in the next 5 years?</td>
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<td>Least  Most</td>
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<td><strong>Comments</strong></td>
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<td>29.</td>
<td>How likely are you become involved with a new project using Ada POSIX bindings in the next 10 years?</td>
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<td>30.</td>
<td>Describe your level of interest in seeing the Ada POSIX bindings updated to POSIX 2008?</td>
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<td>31.</td>
<td>Describe your level of interest in seeing the Ada POSIX bindings updated to Ada 2005?</td>
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<td>Least</td>
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<td>32.</td>
<td>Describe your level of interest in becoming involved with updating the Ada POSIX bindings?</td>
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<td></td>
<td>Least</td>
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<tr>
<td>33.</td>
<td>Describe your organisation's level of interest in becoming involved with updating the Ada POSIX bindings?</td>
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<td>Least</td>
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<td>34.</td>
<td>Does your company develop/target software for Microsoft Windows?</td>
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<td>No</td>
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<td>35.</td>
<td>Does your company develop/target software for RTOS systems other than POSIX based platforms, such as VxWorks?</td>
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<td>No</td>
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<td></td>
<td>Comments</td>
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</tbody>
</table>
|36. | *If you use the real-time paradigm, would you prefer the POSIX real-time, or would you prefer the Ada real-time calls?*
|   | POSIX  Ada |
|37. | *What do you need/use most in POSIX?*
|   | *File Manipulation (local)?*
|   | *File Manipulation (network)?*
|   | *Socket Operations?*
|   | *POSIX Management operations?*
|   | *POSIX Real Time?*
|   | *POSIX Event management?*
|   | *POSIX Time management?* |

Thank you for taking the time to complete our survey!
Ada POSIX Binding BOF
Nov 15 2006 SIGAda
Albuquerque, NM

- Stephen Michell
  Maurya Software,
  Ottawa, Canada
Meeting Agenda

- Survey
- State of the binding (POSIX, Ada)
- Need for an update
- Canadian Study (summary of our findings)
- Ways to do an update
- Preferred approach?
- Can we speed up process
- Suggested time line
- Other Issues
- Will Volunteer level work?
Survey

Please fill out survey – 5 min
State of the binding (POSIX, Ada)

- IS14519:1999 POSIX Binding to the Ada Programming Language

- Based on
  - IS9945:1996 POSIX (2 updates old – one major revision)
  - IS 8652:1995 Ada (2 updates old) – major additions
  - Editor - Ted Baker, FSU

- Reconfirmed but needs update

- SEP 2006 SC22 gives IS14519 to WG9
Need for an update

.rgb(222, 222, 222)

- Major POSIX revision
  - Combining of all major POSIX specs into 1 document set in 4 parts
  - Added complete C libraries
  - Significant updates for threads, networking
  - About 1000 functions & 1700 pages in Pt 2
  - May add Bounded C Functions (supposition)
Need for an update (cont)

ถาม Ada 2005 - Addition of

- Directories
- Containers
- Environment Vars
- Real Time Paradigms
Canadian Study

- Methodology
- Findings
Canadian Study – Methodology

Luke Wong, Brad Moore, Steve Michell

2 pass

- Function identification
  - Compare current IS14519:1999 and implemented fn list to Draft IS 9945:2008 POSIX and 9945:1996, and 1003-5b and 1003-5g.

- Functionality review
  - Reread existing functions
    - Parameter changes
    - Major functionality changes (eg – thread support)
    - ERNNO changes
Canadian Study – Findings

- Existing interface surprisingly stable
  - Most existing functions have little change
  - Addition of *restrict qualification in parameters
  - Addition of new or changed ERRNO's
  - Semantic Changes (affect interface user, not interface)

- Areas not done in 1990's still outstanding: logging, RT, ...
Opportunities in Ada2005 to bring more back into Ada

- Directories
- Environment Variables
- Real Time scheduling paradigms

Needs careful consideration
Canadian Study – Findings (cont)

- Identify about 150 POSIX functions needing consideration
  - Many residual from 1999
- Decide if functionality covered sufficiently in Ada 2005
- Decide if needed in an updated binding
- Estimate – maybe 20-50 new functions
Ways to do an update

➲ Reconfirm
➲ Start new project
➲ Do a Technical Corrigendum (Ada 2001)
➲ Do an Amendment (Ada 2005 was an amendment)
➲ Do a revision
Update Challenges

- POSIX started in IEEE 1003 – IEEE holds original copywrite
- All other POSIX work done by Austin Group as 3-way combination of ISO/SC22, IEEE-SD, Open Group
- How do we serve 3 masters – can we get buy-in or buy-out?
Preferred approach

✿ Canada has made a formal report and proposal to WG9
✿ Make a WG9 RG
✿ Ted Baker still editor – BONUS
✿ Looking for members to help
✿ Final work mode undecided, but RG will be involved
Proposed rapporteur

➲ Luke Wong, CMC Electronics, Canada
➲ Ted Baker, FSU Editor
Can we speed up process

- make it
  - National body project,
  - IEEE project,
  - Open Group project
- Fast Track
Suggested Timeline

➢ Ask WG9 to create RG tomorrow
➢ Start working on the “how to”
➢ Parallel work on technical
➢ Ask IRTAW 2007 (April) to dedicate a day or 2 to POSIX

• Specific question – to what extent can Ada 2005 RT paradigms supplant existing and new POSIX RT functionality?
Suggested Timeline

• Meet 3 or 4 times/year until 2008
• 2008 take draft to WG9 for ISO processing
• Completed std 2009
Other Issues

- RT stuff as Ada Annex D
- most file stuff as Ada Directories and Ada.Environment
Ways to pay for it

- (any brilliant ideas???) - probably volunteer
  - which means cheap.
Future Revisions made easier

Are there ways to make future revisions easier?
Contacts

Stephen Michell -
stephen.michell@maurya.on.ca

Luke Wong – proposed Rapporteur
luke.wong@cmcelectronics.com

Editor Ted Baker - baker@cs.fsu.edu

Canadian HoD – Brad Moore -
brad.moore@gdcanada.ca
Discussion