ISO/IEC JTC1/SC22/WG9 N 607

Draft Meeting Minutes

Meeting #78 of ISO/IEC JTC 1/SC 22/WG 9

Friday 12 June 2020

In accordance with Resolution 77-2, meeting #78 of WG 9 was held Friday, 12 June 2020. Per ISO guidance the meeting was strictly virtual due to the COVID-19 pandemic. The meeting began at 14:00 UTC.

The detailed agenda was distributed as N606.

Remote access to the conference was available via WebEx.

AGENDA

Opening Orders, Meeting Convenor

Introductions and Reports

Liaison Reports and Introductions (as needed)

- Ada Europe: Dirk Craeynest
- SIGAda: Drew Hamilton
- WG 23: Erhard Ploedereder
- Fortran: Van Snyder

Convenor's Report

Project Editor Reports (as needed)

- IS 8652: Jeff Cousins, Ed Schonberg, and Randy Brukardt
- IS 15291: Bill Thomas and Greg Gicca
- TR 15942: Ben Brosgol
- IS 18009: Erhard Ploedereder
- TR 24772-2: Joyce Tokar

Rapporteur Group Reports (as needed)

- Report of Ada Rapporteur Group: Steve Baird, Chair
- Report of Annex H Rapporteur Group: Joyce Tokar, Chair

Review of Open Action Items and Unimplemented Resolutions

Committee as a Whole

Unfinished Business

New Business

Scheduling of Future Meetings

Review of New Action Items

Final Consideration of Resolutions

Recess

Opening Orders

Call to Order

Appointment of Meeting Secretary

Welcome and Administrative Arrangements

ISO Code of Conduct (CoC)

> Excluding the last section's bullet points re: communication and copyright
>
> URL: https://www.iso.org/publication/PUB100397.html

Approval of the Agenda

Approval of N604: Meeting #77 Minutes.

Reports and Introductions

Canada – Brad Moore (HOD)

Italy – Tullio Vardanega (HOD)

Portugal – Luis Miguel Pinho (HOD)

Spain – Juan Antonio de la Puente (HOD)

The Spanish NB Ada group is now part of the UNE Technical Committee on Enabling Digital Technologies. The full reference is UNE CTN71/SC22/GT9.

Alejandro Mosteo has replaced Juan Antonio de la Puente as convenor of this group.

The Spanish delegation for this meeting of WG 9 is Juan Antonio de la Puente (HOD) and Alejandro Mosteo.

Switzerland – Nicholas Kaethner (HOD)

UK – Jeff Cousins (HOD)

Activity of the UK NB's Ada Panel remains restricted to the convenor (myself) distributing a progress report every few months, plus the occasional e-mail.

Our fixed-point expert expressed his support for AI-0362-1 "Floor and other rounding attributes for fixed point types".

The UK delegation is Jeff Cousins and John Barnes for this (virtual) meeting of WG 9.

USA – Tucker Taft (HOD)

Guests – ?

AGENDA

Liaison Reports and Introductions

Ada Europe – Dirk Craeynest

Ada-Europe would like to inform the WG9 convener that it will send a 2-person Ada-Europe liaison delegation to virtual Meeting #78 (originally planned to be held in Santander, Spain), on Friday 12 June 2020.

The delegation consists of:

- Erhard Ploedereder
- Dirk Craeynest (presenter)

Due to the containment measures put in place on a world scale against the COVID-19 pandemic, Ada-Europe and the organizing committee were forced to postpone the Ada-Europe International Conference 2020 (AEiC 2020) [1], scheduled to be held this week 8-12 June 2020, in Santander, Spain.

Santander, Spain, will be the venue of next year's Ada-Europe conference: it will be held in the week of June 07-11, 2021, and we reconfirm our usual hospitality agreement for WG9, ARG and HRG, as well as for WG23. A new Call for Papers and an updated conference web site will be available later.

The 2021 edition of our conference will continue the major revamp in the registration fees, redesigned to extend participation and to reward contributors.

[1] http://www.ada-europe.org/conference2020

We reconfirm our willingness to support the Ada standardization and related activities.

Ada-Europe acknowledges the difference of views that emerged between the ARG as a whole and the implementation team at AdaCore on some of the AIs that the ARG developed following the mandate entrusted to it by WG9. Without entering the technical background of that divergence, Ada-Europe urges WG9 to reflect on the role, function and composition of the ARG, and to discuss in earnest the scope of present and future action of WG9 given the reality of language technology at the present time.

Ada-Europe expects that WG9 will ensure that ISO respects the existing copyright of Ada-Europe in the Ada Standard and will ensure the free availability of future editions of the Ada Standard. Beyond that, we would appreciate the moral support of WG9 for the free availability of the Ada Part of the Guidance to avoiding vulnerabilities in programming languages (ISO/IEC TR 24772-2:2020).

Ada-Europe is happy to report a continued healthy situation with the Ada User Journal (AUJ) [2]. Four issues are published each year.

The Journal continues printing material from the industrial track and technical presentations of the Ada-Europe conference, as well as reports of the International Real-Time Ada Workshops. The Journal provided the proceedings of the Workshop on Challenges and New Approaches for Dependable and Cyber-Physical Systems Engineering (DeCPS 2019), co-located with Ada-Europe 2019, and plans to publish this year submissions that were accepted for the Ada-Europe 2020 conference and the 2020 International Real-Time Ada Workshop (both postponed). Furthermore, the plan is also to commemorate the 40th anniversary of the AUJ by preparing a special issue composed of a few invited papers to highlight relevant events that occurred over the past decade. The AUJ also continues with its traditional Quarterly News Digest, Conference Calendar and Forthcoming Events sections.

The Ada User Journal is also continuing and reinforcing collaboration with Ada Letters, with the goal to increase cross-sharing as well as simultaneous publication of contents in both magazines.

[2] http://www.ada-europe.org/auj

SIGAda – Drew Hamilton

Plan to have a workshop in the fall, in Chicago or cyberspace, in affiliation with SPLASH 2020, scheduled for November 15-16. Focus on widening the availability of languages and tool for safe parallel and distributed applications. Likely virtual.

WG 23 – Erhard Ploedereder

Since the last WG9 meeting in Lexington, three work items of WG23 have been completed: ISO/IEC TR 24772-1:2019 (Part 1: language-independent guidelines), ISO/IEC TR 24772-2:2020 (Part 2: Ada), and ISO/IEC TR 24772-3:2020 (Part 3: C). **These Technical Reports are now official ISO documents.** WG23 thanks WG9 for its help in producing these documents. Unfortunately, they can only be obtained through the sales outlets of ISO for a significant price per copy. An application by the WG23 chair is underway to make them available for free. At the same time, ISO is building up pressure to convert these Technical Reports into International Standards.

Since October 2019, WG23 held three physical meetings:

1. November 6-9, 2019, in Belfast, UK, jointly with WG21/SG12 (C++), progressing the C++ Part,
2. and again on February 10-12, 2020, in Prague, Czech Republic (which I was unable to attend);
3. February 23-24, 2020, in Las Vegas, USA, jointly with INCITS Fortran; the meeting initiated the revision of the Fortran Annex to become Part 8 of TR24772 and made significant progress in producing this document.

Seven national bodies have participated in the WG 23 meetings in the past 12 months: Austria, Canada, China, Italy, Korea, UK, and the USA, as well as liaisons.

Then Covid-19 caused cancellation of all subsequent in-person meetings in 2020.

Instead WG23 started an industrious sequence of online meetings to progress the work on the three Parts (C++, Java, Python) that have been in production before the cancellation of physical meetings. Since the beginning of March, 12 weekly 2-hour video conferences took place alternating between the Parts; this ambitious schedule extends over the next months as well.

At this time that status of the three parts is roughly as follows (my optimistic view; a more cautious schedule is being presented by the Convener's report to SC22):

- Java: The second review of the full document is in progress. I expect submission to ISO later in 2020.
- Python: A full document is available. Its first overall review is in progress. I expect submission to ISO in 2021.
- C++: As of very recently, all sections of the document are filled. The document is now being polished for a review of the complete document and a wider circulation within WG21 for its approval. The publication date will depend mainly on the outcome of this review.

As mentioned earlier, a Fortran Part is in its early stages.

Regrettably, all attempts to get representatives of SPARK to the table either in the U.S.A. or in Europe to initiate the update of the existing, now 10 years old SPARK Annex, have failed. In December 2019, the SPARK Annex lost its status as an active ISO document, since the revised TR 24772 Part 1 subsumes the old TR 24772 which contained the SPARK Annex. It is a pity to see SPARK no longer present among the ISO documents. WG23 urges WG9 as the ISO home of SPARK to assist in this endeavor to update the SPARK document.

Fortran, INCITS/PL22.3 – Van Snyder

AGENDA

Convenor's Report
Activities since the Last Session

SC 22 has been told to ensure its Working Groups have all their official "N" documents in the recently released "ISO Documents" online repository. WG 9 has been called out specifically. I have been working with the SC 22 Chair and Committee Manager to see how to move our existing files over. However, the new repository has no means of making the documents publicly available so the SC 22 Chair has said we can all wait.

On a related note, Clyde Roby has decided to retire from his position as maintainer of the current document online database.

AGENDA

Project Editor Reports (as needed)

Convenor's Note: both TRs 15942 and 24718 are in the list of documents and standards to be reviewed by JTC 1 subcommittees [1]. This review determines whether the document should be kept available. The review is to be finalized by Sept 1st.

- For TR 15942 : we don't yet have a new edition.
- For TR 24718 : the new edition is in the pipeline.

[1] ISO/IEC JTC 1 N14794 "Request to JTC 1 Subcommittees to Review the List of Publicly Available JTC 1 Standards".

Re: TRs versus Standards [Stephen Michell] ISO is pushing to have TRs become standards and not having TRs freely available. JTC 1 has appealed, status unknown. Get your free copies now, while you can. We need have a plan B in case they become unavailable. Perhaps all new TRs should be published externally prior to being submitted to ISO (like 24718) so that they can remain freely available.

IS 8652 (Information Technology--Programming Languages - Ada) (Jeff Cousins, Randy Brukardt)

TR 15942 (Guidance for the Use of Ada in High Integrity Systems) (Ben Brosgol)

Juan and Tullio have found a valid candidate (Alejandro Mosteo), from Spain, who expressed willingness to take this project up. Juan and I have offered help. The actual work, however, has barely started. A little monetary grant from Ada-Europe might help. Draft planned for next WG 9 meeting.

[If we want to keep this TR, NB representatives should respond to the review in the affirmative.]

IS 18009 (Conformity Assessment of an Ada Language Processor) (Erhard Ploedereder)

No comments received and no activities to be reported.

TR 24718 (Guide for the Use of the Ravenscar Profile in High Integrity Systems) (Alan Burns)

Convenor's note: the new edition is ready for DTR (Draft Technical Report) ballot. See https://www.iso.org/standard/74526.html. If we want to keep the previous edition of the TR, NB representatives should respond to the review in the affirmative.

TR 24772 (Guidance to avoiding vulnerabilities in programming languages – Vulnerability descriptions for the programming language Ada) (Joyce Tokar)

See WG 23 Liaison Report.

AGENDA

Rapporteur Group Reports (as needed)

Rapporteur Report ARG

Since the last report (October 2019), the ARG has met 4 times: once in person (October 2019 in Massachusetts) and 3 electronic meetings.

At those 4 meetings, 28 AIs (Ada Issues) were approved by the ARG:

AI12-0079-3/03 Global-in and global-out annotations
AI12-0205-1/04 Defaults for generic formal types
AI12-0280-2/05 Making ‘Old more flexible
AI12-0282-1/05 Atomic, Volatile, and Independent generic formal types
AI12-0302-1/03 Default Global aspect for language-defined units
AI12-0312-1/07 Examples for Ada 202x
AI12-0340-1/01 Put_Image should use a Text_Buffer
AI12-0342-1/03 Various issues with user-defined literals (part 2)
AI12-0343-1/02 Return Statement Checks
AI12-0345-1/02 Dynamic accessibility of explicitly aliased parameters
AI12-0347-1/04 Presentation issues
AI12-0348-1/01 Remove Combiners from Reduction Expressions
AI12-0350-1/01 Swap for Indefinite_Holders
AI12-0351-1/01 Matching for actuals for formal derived types
AI12-0352-1/01 Early derivation and equality of untagged types
AI12-0356-1/01 Root_Storage_Type_With_Subpools should have Preelaborate_Initialization
AI12-0359-1/01 Calls to subprograms declared in shared passive units
AI12-0361-1/01 Ada.Streams.Storage packages are still useful
AI12-0364-1/01 Add a modular atomic arithmetic package
AI12-0366-1/02 Changes to Big_Integer and Big_Real
AI12-0367-1/01 Glitches in aspect specifications
AI12-0368-1/02 Declare expression can be static
AI12-0369-1/01 Relaxing barrier restrictions
AI12-0370-1/01 Pattern to use for specifying a precondition
AI12-0371-1/01 Fix-ups for aspects in generic formal parts
AI12-0373-1/05 Bunch ‘o fixes
AI12-0375-1/01 Meaning of Global when there is no mode
AI12-0376-1/01 Representation changes finally allowed for untagged derived types

Progress was also mode on other AIs. At the Oct 2019 meeting Michael Klemm, the OpenMP Consortium CEO, gave a presentation on how the proposed Ada 202x support for parallelism could map onto OpenMP. There is interest in the ARG in producing a technical report on the topic of usage of Open MP with Ada; see AI12-0346.

As per the policy discussed at the June 2019 WG 9 meeting, these AIs are not yet being formally delivered to WG 9 for disposition. As usual, the list of all AIs that have been approved by the ARG but not by WG 9 can be found at http://ada-auth.org/ai-files/ARG_AI12.zip .

Coming out of the Oct 2019 WG 9 meeting, there was an action item:

- AI-77-2: Steve Baird will obtain from AdaCore the list of AIs considered “controversial” by AdaCore and send the list to WG 9 and the ARG.

This was done; the message I sent to the two mailing lists on Oct 9 2019 is provided here for the record (and also in part so that WG 9 minutes can refer to it when reviewing the resolution of action items):

> At the latest WG9 meeting I was requested to send messages to the ARG and WG9 mailing lists listing the specific AIs for which AdaCore is requesting further review.
>
> That list is as follows:

> AI12-002
> Fix a distributed systems annex oversight.
> AI12-079
> Introduce the Global aspect.
> AI12-031
> Fix a distributed systems annex oversight.
> AI12-034
> Fix a distributed systems annex oversight.
> AI12-038
> Fix a distributed systems annex oversight.
> AI12-121
> A couple of minor streaming-related fixes.
> AI12-143
> The 'Index attribute is introduced in order to provide a way of
> naming the entry family index in the precondition or postcondition
> of an entry family.
> AI12-302
> Global aspects for predefined units.
> AI12-310 (depends)
> A bugfix related to the Global aspect.
> AI12-058
> An update of B.5, the "Interfacing with Fortran" section.
> AI12-075
> Introduce static expression functions.
> AI12-175
> Relax some restrictions regarding what is allowed in a preelaborated
> unit.
> AI12-076
> Constants declared in Pure packages are really constant.
> AI12-085
> Fix a distributed systems annex oversight.
> AI12-262
> Map-reduce (including the parallel form).
> AI12-003
> A minor enhancement to the Default_Storage_Pool mechanism.
> AI12-119
> Parallel blocks and parallel loops.
> AI12-184
> A minor enhancement regarding interfacing with C.
> AI12-189
> Loop body syntax for iteration involving passing in an
> access to procedure value.
> AI12-250
> Iterator filters.
> AI12-020
> Image attributes for non-scalar types.
> AI12-212
> Container aggregates.
> AI12-021
> Additional Unicode support.
> AI12-213
> A minor syntax change for record type declarations.
> AI12-266
> Parallel iterators for containers.
> AI12-064
> Nonblocking aspect and attribute are defined.

> AI12-090
> Define the interactions between pre/post-condition checking and
> requeue statements.
> AI12-111
> Stable containers.
> AI12-306
> Null array aggregate syntax.
> AI12-128
> Rules for reads of a nonatomic component of an enclosing atomic
> object.
> AI12-242
> Map-Reduce without building up an intermediate value sequence.
> AI12-267
> Data race and non-blocking static checking for parallel constructs.

> -- Steve

In response to this, Randy pointed out (in a message to the ARG list on the same day) that the AIs on this list fall into several different categories, each of which might require different resolution. The following is extracted from that message:

- Some of the AIs on the list are part of the 2016 Corrigendum.
- Some of the AIs on the list are on hold and are not intended to be part of Ada 202x.
- Some of the AIs on the list are Binding Interpretations, which means that they are fixes to errors and omissions in the Standard. For these, not doing anything is not a realistic option.
- Some of the AIs on the list have already been approved by WG9.

It was also pointed out that many of the AIs on that list are related to a relatively small number of topics:

- parallelism
- the Global aspect
- aggregate syntax
- the distributed systems annex

(this was in a message I sent to the WG9 list in response to a question raised by Jeff Cousins).

In subsequent presentations at the January 2020 and March 2020 ARG meetings, AdaCore notified the ARG that the following AIs were considered by AdaCore to be in need of more prototyping and maturation:

- AI12-0214-2 (a special kind of boolean case selection that was subsequently voted No_Action)
- AI12-0208 (big numbers - these issues were later resolved in AI12-0366)
- AI12-0079 (Global aspect - these issues have since been largely resolved or are in the process of being resolve in a version 3 of this AI)
- AI12-0119 (parallel loops, parallel blocks)
- AI12-0242 and AI12-0262 (Reduce and Parallel_Reduce aspects)
- AI12-0251 (parallel loop chunking)
- AI12-0266 (parallel container iterators)
- AI12-0189 (procedural iterators and the Allows_Exit aspect)
- AI12-0286 (specifying Allows_Exit for language-defined subprograms)

In various cases, AdaCore has identified issues that the ARG agreed to investigate further, and this feedback has resulted in updates to the proposals, and at recent ARG meetings these updates have been approved. AdaCore has not at this point committed to implementing any of the AIs in this latter list, except for Big_Numbers. AIs from the prior list which are not on this newer list are scheduled for eventual implementation as far as we know.

Some of the areas where feedback has been incorporated:

- Global annotations, in particular to achieve better interoperability between SPARK and Ada 202x;
- Put_Image aspect, where we have incorporated support for indentation that should ease defining Image for composite types;
- Big_Numbers, where a revised model for handling uninitialized variables is now easier for SPARK to map to “mathematical” integers;
- Atomic_Operations, where a prototype implementation helped to refine some of the details;
- The Yield aspect, where we found a way to minimize the overhead in target environments where it might not be relevant;
- Certain proposals that produced unanticipated incompatibilities, where small refinements eliminated the impact on customer code examples;
- Implementation permissions that allowed compilers to support more fixed-point attributes in environments where fixed-point is becoming more important.

This list is not intended to be exhaustive.

Going forward, the ARG plans to convene virtually on Saturday, June 13th, and then every six weeks or so until we have finished the remaining “open” AIs. We will then partition the proposed Ada 202X manual up for detailed, line-by-line review by ARG members, with a hope to have a finished product by the end of 2020, or early in 2021.

The next ARG report will include the ARG-approved AIs for consideration by WG 9.

Rapporteur Report HRG

AGENDA

Open Action Items and Unimplemented Resolutions

This is the "To Do" list for WG 9. Some are informal action items assigned to various participants. Some are formal resolutions, which are not yet implemented. Some items are simply in suspense awaiting action by other groups.

AI-76-1: Tullio and Juan to contact volunteers for work on TR 15942 (Guide for the use of the Ada programming language in high integrity systems). Pat will verify final possibility of support within AdaCore.

Status: Closed. See Project Editor report above.

AI-76-2: Pat to initiate pursuit of new national body members from vendors and users.

Status: Closed. This email went out on 22 May 2020. A person from Finland will be joining. A Parisian AdaCore employee may be joining, representing France. Richard Wai may be joining, representing Canada. I will notify WG 9 of any other responses received.

AI-77-1: Pat will send an email to AdaCore requesting insights into the plan and schedule for the prototyping efforts.

Status: Closed. AdaCore indicated that review effort for Ada 202X has concluded and that they did not intend to implement the parallelism functionality.

AI-77-2: Steve Baird will obtain from AdaCore the list of AIs considered “controversial” by AdaCore and send the list to WG 9 and the ARG.

Status: Closed. See the ARG report for the result.

AI-77-3: Tucker and Richard Wai will discuss the possible place and date for meeting #79 in terms of co-locating it with a conference and will inform WG 9 once determined. (The default location is the AdaCore offices in Lexington.)

Status: Closed. ISO has mandated virtual meetings for the next several months and other organizations are following the same approach. The next SIGAda workshop is to be "co-located" with SPLASH 2020 in Chicago in November, but chances are it will be "co-located" in cyberspace.

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Committee as a Whole

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Unfinished Business

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New Business

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Scheduling of Future Meetings

Meeting #79 will be held (probably virtually) in November 2020, one of the two weeks starting the 14th or 21st.

Meeting #80 will be held in January 2021.

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Review of New Action Items

AI-78-1: The ARG will propose meeting dates to WG 9 consistent with receiving the standard and completing the WG 9 review process. [Steve Baird]

AI-78-2: Pat to contact AdaCore yet again re: SPARK Part of TR 24772.

AI-78-3: WG 9 members should individually prepare to discuss WG 9 work items after delivery of Ada 202x. Examples could include: additional activities for the HRG along reliability and security lines; co-joining efforts with the real-time workshops in order to produce standards-related documents; adoption of SPARK and its environments into the WG9 scope.

AGENDA

Final Consideration of Resolutions

Resolution 78-1: The meeting minutes of meeting #77 are approved.

This resolution passed unanimously.

Resolution 78-2: The next meeting of WG 9 will be held virtually in the late Fall 2020.

This resolution passed unanimously.

Resolution 78-3: WG 9 recommends the ARG carry on following their prior instructions from WG 9, keeping their technical specification work separate from, but respectful of, the language implementers' policies.

This resolution passed unanimously.

Resolution 78-4:

ISO/IEC JTC 1/SC 22/WG 9 continues the Ada High-Integrity Rapporteur Group (HRG) until the next plenary meeting and expresses its grateful appreciation to the Rapporteur and the members for their continuing service.

Joyce Tokar is continued as Rapporteur.

The membership of the HRG is designated to be: Steve Baird, John Barnes, Ben Brosgol, Alan Burns, Rod Chapman, Gary Dismukes, Bob Duff, Michael Gonzalez Harbour, Stephen Michell, Brad Moore, Miguel Pinho, Erhard Ploedereder, Juan Antonio de la Puente, George Romanski, Jean-Pierre Rosen, S. Tucker Taft, Joyce Tokar, and Tullio Vardanega.

The Convenor of WG 9 is authorized to act for WG 9 between meetings in appointing additional members of the HRG. In doing so, he shall consult with the Rapporteur and the National Body or Liaison Organization nominating the member.

Rapporteurs are permitted to allow other individuals to observe the deliberations of the Rapporteur Group. The admission of observers and the extent of participation permitted to observers are at the discretion of the Rapporteur with the concurrence of the membership of the Rapporteur Group.

This resolution passed unanimously.

Resolution 78-5:

ISO/IEC JTC 1/SC 22/WG 9 continues its Ada Issues Rapporteur Group (ARG) until the next plenary meeting and expresses its grateful appreciation to the Rapporteur and the members for their continuing service.

Steve Baird is continued as Rapporteur.

The membership of the ARG is designated to be: Raphaël Amiard, Steve Baird, John Barnes, Randy Brukardt, Alan Burns, Arnaud Charlet, Jeff Cousins, Gary Dismukes, Claire Dross, Robert Duff, Edward Fish, Pascal Leroy, Brad Moore, Jean-Pierre Rosen, Ed Schonberg, Justin Squirek, Tucker Taft, Tullio Vardanega, and Richard Wai.

Note that Arnaud Charlet and Edward Fish are new members.

The Convenor of WG 9 is authorized to act for WG 9 between meetings in appointing additional members of the ARG. In doing so, he shall consult with the Rapporteur and the National Body or Liaison Organization nominating the member.

Rapporteurs are permitted to allow other individuals to observe the deliberations of the Rapporteur Group. The admission of observers and the extent of participation permitted to observers are at the discretion of the Rapporteur with the concurrence of the membership of the Rapporteur Group.

This resolution passed unanimously.

Resolution 78-6:

ISO/IEC JTC 1/SC 22/WG 9 expresses its grateful appreciation to Alok Srivastava for acting as secretary for Meeting #78.

This resolution passed unanimously.

Resolution 78-7: ISO/IEC JTC 1/SC 22/WG 9 expresses its grateful appreciation to Juan Antonio de la Puente for his many years of dedicated service to WG 9. Welcome to Alejandro Mosteo.

This resolution passed unanimously.

Resolution 78-8: ISO/IEC JTC 1/SC 22/WG 9 expresses its grateful appreciation to Clyde Roby for his many years of service in maintaining the document list page.

This resolution passed unanimously.

Resolution 78-9: ISO/IEC JTC 1/SC 22/WG 9 expresses its grateful appreciation to the Convenor, Pat Rogers.

This resolution passed unanimously.

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References

See http://www.open-std.org/jtc1/sc22/wg9/documents.htm for the WG 9 Document Log, including the ability to download the documents.