

Business Plan and Convener's Report

ISO/IEC JTC 1/SC 22/WG 14 (The Programming Language C)

PERIOD COVERED:

August 2019 – August 2020

SUBMITTED BY:

Convener

David Keaton

Keaton Consulting

848 N. Rainbow Blvd. #4499

Las Vegas, NV 89107

USA

Phone: +1 702 518 8192

E-mail: dmk@dmk.com

1. MANAGEMENT SUMMARY

1.1. JTC 1/SC 22/WG 14 STATEMENT OF SCOPE

Development and maintenance of ISO/IEC Standards related to the programming language C.

1.2. PROJECT REPORT

1.2.1. COMPLETED PROJECTS

JTC 1.22.20.01 – Programming Language C (Minor Revision of ISO/IEC 9899:2011), this project was delivered by the publishing of ISO/IEC 9899:2018.

JTC 1 NP 18037, Extensions for the programming language C to support embedded processors. This is a Technical Report type II.

JTC 1 NP 19769, Specification for Additional Character Data Types to the Programming Language C. This is a Technical Report type II.

JTC 1 NP 24731, Extensions to the C Library, — Part I: Bounds-checking interfaces. This is a Technical Report type II.

JTC 1 NP 24731, Extensions to the C Library — Part 2: Dynamic Allocation Functions. This is a Technical Report type II.

JTC 1 NP 24732, Extensions for the programming language C to support decimal floating point arithmetic. This is a Technical Report type II.

JTC 1 NP 24747, Extensions for the C Standard Library to Support Mathematical Special Functions. This is an International Standard.

JTC 1 NP 17961, *C Secure Coding Rules*. This is a Technical Specification.

JTC 1 NP 18661-1, *Floating-point extensions for C – Part 1: Binary floating-point arithmetic*. This is a Technical Specification.

JTC 1 NP 18661-2, *Floating-point extensions for C – Part 2: Decimal floating-point arithmetic*. This is a Technical Specification.

JTC 1 NP 18661-3, *Floating-point extensions for C – Part 3: Interchange and extended types*. This is a Technical Specification.

JTC 1 NP 18661-4, *Floating-point extensions for C – Part 4: Supplementary functions*. This is a Technical Specification.

JTC 1 NP 18661-5, *Floating-point extensions for C – Part 5: Supplementary attributes*. This is a Technical Specification.

JTC 1 TS 17961:2013/COR 1, *C Secure Coding Rules*. This is a Technical Corrigendum for a Technical Specification.

1.2.2. PROJECTS UNDERWAY

Study groups studying the possibility of future revisions to IS 9899, TS 17961, and TS 18661. A study group studying the possibility of a TS on pointer provenance.

1.2.3. CANCELLED PROJECTS

None over this period.

1.2.4. COOPERATION and COMPETITION

Where appropriate, WG 14 has established active liaisons with other SC 22 working groups. A category C liaison has been established with the MISRA C working group. There is no apparent direct competition with any other current SC 22 working group.

2. PERIOD REVIEW

2.1. MARKET REQUIREMENTS

WG 14 is responding to the C user community concerns and to the C implementers' issues. The ISO/IEC 9899:2011 standard was updated in 2018. The ISO/IEC 9899:2018 standard answered many requests for interpretation and keeps the International Standard for the C programming language current. WG 14 is studying how best to incorporate additional external input.

The maintenance of TS 17961 addresses important security issues that affect the entire C community. The document is in active use in the industry, and resulting valuable feedback has led to a Technical Corrigendum. WG 14 has a Study Group to investigate further updating this document based on feedback from the community.

The WG 14 Floating Point Study Group is working on incorporating key features of TS 18661, a C binding to the 2008 IEEE Floating-point standard, into a future edition of the C standard. The group is also studying the possibility of updating TS 18661 to the 2019 IEEE Floating-point standard.

WG 14 has a Study Group to investigate an update to the C memory object model.

2.2. ACHIEVEMENTS

- WG 14 processed requests for interpretation of IS 9899:2011 and TS 18661 parts 1-5.
- WG 14 has a Study Group to investigate incorporating TS 18861 into a future edition of the C standard, and investigate updating TS 18661 to the 2019 IEEE Floating-point standard.
- WG 14 has a Study Group to investigate updating TS 17961 based on community feedback.
- WG 14 has a Study Group to study possible adjustments to the C memory object model.

2.3. RESOURCES

WG 14 meets in co-located technical sessions with the [US Task Group INCITS PL22.11](#). There are normally two face-to-face meetings per year, but during the coronavirus pandemic, each face-to-face meeting has been replaced with two virtual meetings of half the length.

WG 14 would like to thank ISO for the Web conferencing support, which is especially helpful in this time of increasing restrictions on international travel.

During this reporting period, the following countries have participated in meetings: Canada, France, Germany, Italy, Netherlands, UK, US.

WG 14 liaison appointments are:

Group	Name/Type	Person(s) assigned
WG 21	C++	Group liaison assigned ¹
FSG	Free Standard Group	Nick Stoughton
WG 23	Vulnerabilities	Clive Pygott
MISRA-C	Category-C Liaison	Andrew Banks

¹ Flexible liaison consisting of all experts present at a given meeting who attend both groups.

3. FOCUS NEXT WORK PERIOD

WG 14 will focus on:

- A TS for a provenance-aware memory object model for C.
- A revision of the C standard to incorporate feature updates and clarifications.
- Studying possible updates to TS 17961.

3.1. DELIVERABLES

None terminating in this period.

3.2. STRATEGIES

WG 14 believes that routine handling will suffice to complete the progress desired.

3.3. RISKS

- Meeting planning is difficult due to not having a sufficiently long plan for the virtual meeting mandate. This also creates a burden on hosts who have too short notice for canceling their face-to-face meeting.
- Glitches in the new ISO Documents system as noted in section 4.3 below have caused delays in document processing.

3.4. OPPORTUNITIES

Virtual meetings have given us a chance to improve our remote meeting skills, which will improve the quality of mixed-mode meetings when they return.

3.5. WORK PROGRAM PRIORITIES

WG 14 will work on improvements to floating-point, security, and the memory object model.

4. OTHER ITEMS

4.1. POSSIBLE ACTION REQUESTS AT FORTHCOMING PLENARY

- After outstanding service as project editor of IS 9899 for 22 years, Larry Jones has experienced a change in job direction and is unable to continue. He has resigned and we would like to request SC 22 confirmation of the following people as co-editors:
JeanHeyd Meneide (NL) -- primary
Freek Wiedijk (US)
David Keaton (Convenor, US)
- We intend to submit a new work item proposal for a TS tentatively titled "A provenance-aware memory object model for C." We would like to request an 8-week NP ballot instead of a 12-week NP ballot.
- We would like to create a new revision of the C standard with a final publication date of August 31, 2023.

4.2. PROJECT EDITORS

The following individuals have been appointed project editors and backup project editors:

JTC 1.22.20.01, *Programming Language C (Revision of ISO/IEC 9899:2018)*
JeanHeyd Meneide (proposed Project Editor), Freek Wiedijk (proposed Backup Project Editor), David Keaton (proposed Alternate Backup Project Editor)

JTC 1 NP 18037, *Extensions for the programming language C to support embedded processors.*

Willem Wakker (Project Editor)²

JTC 1 NP 19769, *Specification for Additional Character Data Types to the Programming Language C.*

None. Incorporated into the C standard and not intended to be maintained.

JTC 1 NP 24731, *Extensions to the C Library – Part I: Bounds-checking interfaces*

None. Incorporated into the C standard and not intended to be maintained.

JTC 1 NP 24731, *Extensions to the C Library – Part 2: Dynamic Allocation Functions.*

David Keaton (Project Editor)

JTC 1 NP 24732, *Extensions for the programming language C to support decimal floating point arithmetic*

None. Incorporated into TS 18661 and not intended to be maintained.

JTC 1 NP 24747, *Extensions for the Standard Library of the Programming Language C to Support Mathematical Special Functions*

David Keaton (Project Editor)

JTC 1 NP 17961, *C Secure Coding Rules*

Robert Seacord (Project Editor)

JTC 1 NP 18661, parts 1-5, *Floating-point extensions for C*

James Thomas (Project Editor)

4.3. ELECTRONIC DOCUMENT DISTRIBUTION

WG 14 has conducted some of its detailed technical discussion using an e-mail reflector provided by the Danish UNIX Users Group, Copenhagen University College of Engineering and Keld Simonsen.

WG 14 also has an ftp and [Web site](#) provided by courtesy of the Copenhagen University College of Engineering, Danish UNIX Users Group and Keld

² Currently not listed in the ISO global directory.

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Simonsen. WG 14 has placed its N documents on the ISO Documents site, and updates the site with each new N document.

WG 14 is providing all the appropriate committee documents on the Committee Web site, eliminating the need for paper mailings.

WG 14 also provides Web conference capabilities at face-to-face meetings allowing technical experts that are not able to travel to participate. In other words, WG 14 has only mixed-mode and virtual meetings.

WG 14 has the following issues with the ISO Documents system. The Working Group keeps the ISO Documents up to date with all N documents that the system will accept and is committed to switching to it once these issues are resolved.

- The ISO Documents system will not allow us to upload some documents that have reserved N numbers.
- All documents in the ISO Documents system are unavailable to the public, requiring us to continue using the e-committee system.
- The URLs of documents in e-committee are neither static nor predictable. The agendas and document log need to point to easily predictable and understandable URLs to keep errors to a minimum. They also need to point to unchanging URLs to prevent bit rot in the committee's records.
- The e-committee documents are not searchable by search engines. The C community has benefited greatly from WG 14 documents being available as search results.
- The document names and descriptions are truncated. On the external WG 14 site, this problem is avoided by having a document log with the description of each document and the name of its submitter. The file names are the N numbers of the documents, making the URLs predictable and simple.

4.4. RECENT MEETINGS

19-23	Apr 2010	Florence, Italy	Università Firenze
01-05	Nov 2010	Batavia, IL, USA	ANSI, Fermi Lab.
14-18	Mar 2011	London, UK	BSI
24-28	Oct 2011	Washington, DC, USA	ANSI, Blue Pilot
13-17	Feb 2012	Kona, HI, USA	ANSI, Bloomberg LP
11-13	Jun 2012	Web Conference	ISO, Blue Pilot
22-26	Oct 2012	Portland, OR, USA	ANSI, Intel
23-26	Apr 2013	Delft, NL	NIN, ACE
30-03	Sep/Oct 2013	Chicago, IL, USA	ANSI, DRW Trading Group
07-11	April 2014	Parma, IT	UNINFO, Univ. of Parma
27-30	Oct 2014	St. Louis, MO, USA	ANSI, Seymour
13-17	April 2015	Lysaker, NO	SN, Cisco
26-30	Oct 2015	Kona, HI, USA	ANSI, Plum Hall
11-14	Apr 2016	London, UK	BSI
17-21	Oct 2016	Pittsburgh, PA, USA	ANSI, CERT
03-06	Apr 2017	Markham, ON, Canada	SCC, IBM
30	Oct-03 Nov 2017	Albuquerque, NM, USA	ANSI, Keaton Consulting
23-26	Apr 2018	Brno, CZ	Red Hat
15-18	Oct 2018	Pittsburgh, PA, USA	ANSI, CERT
29-03	Apr/May 2019	London, UK	BSI
30-04	Sep/Oct 2019	Ithaca, NY, USA	ANSI, GrammaTech
30-03	Mar/Apr 2020	Virtual	
03-07	Aug 2020	Virtual	

4.5. FUTURE MEETINGS

12-16	Oct 2020	Virtual	
30-04	Nov/Dec 2020	Virtual	
TBD	Spring 2021	Strasbourg, FR	AFNOR (tentative)
04-08	Oct 2021	Minneapolis, MN, USA	ANSI, Perforce (tentative)
31-04	Jan/Feb 2022	Portland, OR, USA	ANSI, Intel (tentative)