

CFP Meeting

2026/06/24: 8:00 AM PDT/3:00 PM UTC

[Please submit proposed changes to these minutes to Jerome or to the group. Revision changes appear at the bottom.]

Attendees and introductions

Rajan Bhakta, Jerome Coonen, Damian McGuckin, Joshua Cranmer, Ariel Burton, Tue Ly, Fred Tydeman

Agenda

<https://cfp-wiki.esi.com.au/pub/CFP/WebHome/n3898.pdf>

These notes track the flow (and links) in the agenda.

Previous meeting notes

<https://cfp-wiki.esi.com.au/pub/CFP/WebHome/n3897.pdf> - 2026/05/13 Minutes

Study group logistics

Next meeting: 22 July 2026, 8:00 AM PDT/3:00 PM UTC

ISO Zoom teleconference

C documents

The latest C2Y draft is N3886 2026/05/24: <https://www.open-std.org/jtc1/sc22/wg14/www/docs/n3886.pdf>

C23 has been published ISO/IEC 9899, available for purchase. <https://www.iso.org/standard/82075.html>

IEEE 754 update

Damian: Meetings are moving back to Mondays. Still looking at NaN payloads, especially decimal.

Jerome: Sent email to both 754 and CFP with Prof. Kahan's slides from a talk for the late Pete Stewart's 70th birthday. Lots of old 754 lore.

WG14 update

Rajan: The next meeting is 17-21 Aug in Ottawa.

C++ liaison

Joshua: Committee mtg 2 weeks ago, including discussion of papers brought up in recent CFP meetings. There is a proposal for an Annex F kind doc in C++. The current trend is to support rounding modes via a class with member functions to tweak. Modes will be static in the sense that they are known at compile time. One paper discussed floating values in the sense of core language semantics. The table of different levels of representation in 754 has been helpful.

Damian: In a chat with Guy Davidson, we discussed different ways to improve floating point usage in C++. A sample issue is dealing with constant expressions.

Ariel: Is there a mandate to require IEEE 754?

Joshua & Jerome & group: No, but it's the case that many members don't know any other kind of arithmetic. This is a new era, 46 years after 754 became a de facto standard.

Ariel: Will features like rounding modes percolate out into the general body of the language?

Joshua & Jerome: The body of standard deals with general concepts. After all these years, rounding modes have become a general concept. We might think of the family of 754 directions, but there are other possibilities. In the same way, the body of the C standard allows for arithmetics that have unsigned (projective) infinity or even signed infinity with semantics other than IEEE.

Fred & Joshua: Will there be floating decimal support? Eventually.

TS-4 and TS-5 revisions

No update.

News

See 754 update.

Carryover action items from last meeting

None

Action items from last meeting

Jerome: Sort out the alleged issues with nexttoward and nextafter. Report to CFP with CC to originator of the topic.

Progress, but carry over.

Fred: Please provide Jerome and Damian a brief background on nexttoward.

Done, passed to Jerome.

Rajan & Jerome: Propose improved wording in H.11.4.1

Carry over.

Group: For the June meeting, make a CONCERTED EFFORT to read and ponder Damian's reports on Annex F.

<https://cfp-wiki.esi.com.au/pub/CFP/WebHome/C2Y-F-Introduction-20260401.pdf>

<https://cfp-wiki.esi.com.au/pub/CFP/WebHome/C2Y-F-SpecialCases-20260401.pdf>

Done

Damian: Suggest modification F.3#1 to tighten the language of "operations" and related terms.

Done

Ariel: Find a footnote or other language re. FLT_RADIX not being an operation.

Carry over with re-send of lost mail.

Damian: Incorporate Ariel's language about FLT_RADIX (in the action above) into the Annex F introduction.

Carry over.

Fred: Add discussion of conversion of floating types in 6.3.2.5, as an open issue.

<https://mailman.oakapple.net/pipermail/cfp-interest/2026-April/003915.html>

Carry over.

Rajan: Mention study in email 3903 to WG14.

<https://mailman.oakapple.net/pipermail/cfp-interest/2026-April/003919.html>

Done

Rajan & Jerome: Review the range bounds proposal with attention to the typography of the imaginary unit i , and submit the proposal to WG14.

Done. N3896.

Damian: Propagate Rajan's "and" suggestion through the parallel cases to the total order case in the discussion. Also, use the 754 wording "total ordering".

Done.

Discussion of issues

- **C2Y and signalling NaNs:** [cfp-interest 3965, 3964, 3962, 3960, 3958, 3956]

Rajan: Issue is with semantics of signaling NaNs.

Joshua: Is a flag to force signals.

Rajan: Will close, pending further discussion on 3965.

- **Weird casting error:** [cfp-interest 3961, 3959, 3957, 3952-3946]

Damian: Casting a negative float to an unsigned integer type gets "absolute rubbish". Really a 754 issue. Got useful answers in long email thread.

Fred & group: Per 754, should get FP_INVALID, but some compilers don't do it. Different HW, like ARM, offers instructions that behave correctly, but compilers don't use them.

Rajan Closed, non-CFP issue.

- **Range errors and rounding modes:** [cfp-interest 3953 and chain]

Fred: One issue here is the subtle case of an intermediate value just above the maximum representable finite value that rounds (correctly) down to that maximum value. The question in email is whether this is overflow.

Ly: Cases of huge * huge $\rightarrow$ max_value or inf, depending on rounding mode. And in libraries, exceptions can be raised artificially through basic arithmetic, which can be thwarted if the exception is suppressed.

Rajan: For now, Fred will add to open issues.

- **__STDC_IEC_60559_BFP__ value in ISO C23:** [cfp-interest 3945]

Rajan & Fred: Issues seem to be tied to the compiler supporting out-of-date status macros, or not supporting the latest versions. Action for Fred.

- **New issue #1068: Standard pragmas after labels:** [cfp-interest 3944]

Rajan: Closed, no action for CFP here. This was an FYI nit about how a label can appear before a pragma.

- **fdim and deferring to history:** [cfp-interest 3939]

Damian: How "fdim" got its name. The question remains whether anyone who doesn't know floating point from before 754 might know about the concept of "diminishing" two arguments, dating back to Fortran II

in the 1950s? Closed.

- **WG14: nexttoward has no exception to conversion:** [\[cfp-interest 3924, 3938, 3936\]](#) FW: [\[SC22WG14.36462\]](#) *nexttoward wording does not establish exception to conversion required by nextafter* RAJAN BHAKTA
Fred: Herbert Tong is correct that nexttoward should convert its arguments to the types of parameters, not the return type. Action.
- **WG14: Annex H and non-arithmetic interchange formats:** [\[cfp-interest 3925\]](#) FW: [\[SC22WG14.36469\]](#) *Annex H and non-arithmetic interchange formats* RAJAN BHAKTA
Rajan: This is tied to the carryover item in H.4.1. Action to have Fred add it to the list of open items.
- **Annex F Introduction:** [\[cfp-interest 3865\]](#) *Comments re Annex F Introduction* Jim Thomas
Damian: Implemented Jim's earlier suggestions, then moved on to Jerome's.
Rajan: Need to improve language of "cast of fromfp".
Group: "cast of" was approved recently but will get fixed in this Introduction effort. Action
Group: Lots of chat about the transcendental meaning of "full" support for signaling NaNs, per 754. The matter is complicated by compiler machinations that can interfere with NaN behavior. The basic case is "1.0 * x" which compilers feel free to optimize to "x" but which violates the spirit of not propagating signaling NaNs.
Fred: Points out that F.9.3 is a laundry list of interesting expression equivalents, including "1.0 * x".
Joshua: Calls our FE_SNANS_ALWAYS_SIGNAL in F.2.2p1 as a means to request what we might call "full" support for signaling NaNs. Makes a very cogent comment about SNAN semantics, and then agrees to an action to put the few sentences in email.
Joshua: Points to 5.3.5.3.3p19 for discussion of the "range of representable values". Action

Other issues

None

Adjournment

10:00 AM PDT

Action items to be carried over

Jerome: Sort out the alleged issues with nexttoward and nextafter. Report to CFP with CC to originator of the topic.

Rajan & Jerome: Propose improved wording in H.11.4.1

Ariel: Find a footnote or other language re. FLT_RADIX not being an operation.

Damian: Incorporate Ariel's language about FLT_RADIX (in the action above) into the Annex F introduction.

New action items

Fred: Add to open issues list: Range errors and rounding mode. Include the issue revealed in Fred's email update.

Fred: Reply to Vincent about C macros in 3945.

Fred: Create a proposal to fix the language of nexttoward.

Fred: Add to open items list the issue in 3928 from Trevor regarding the awkward language in H.4.1 regarding whether or not functions need to be supported, based on what types are supported..

Damian: (a) Fix the language to "cast of result of..." in Table F.1; (b) Keep the rounding direction language in step with current 754, not what is anticipated for 754-2029;. (c) Delete the colloquial "MIA: comment, as recommended; (d)

Joshua: Send a paragraph to the group about SNaN semantics, as might be helpful in the Annex F Intro.

Group: Look at the notion of "range of representable values". Can we tighten up this usage?

Carryover discussion items

- **Editorial issues in 6.3.2.5:** [\[cfp-interest 3899\] Converison Between Real Floating Types - 6.3.2.5](#) *Damian McGuckin*
- **Totalorder changes:** [\[cfp-interest 3914\] Changes to totalorder/totalordermag](#) *Damian McGuckin*
- **Fromfp quantum exponent:** [\[cfp-interest 3915\] Quantum exponent from fromfp functions](#) *Fred J. Tydeman*
- **Editorial issues F.10.1:** [\[cfp-interest 3880\] Special Cases in F.10.1](#) *Damian McGuckin*

Signoff

Respectfully submitted.

-Jerome Coonen