WG21 2024-03 Admin telecon minutes

SC22/WG21 pre-meeting telecon
Convener: Herb Sutter
Dates: Monday 2024-03-04
Time: 08:00 N.Am. Pacific Time (San Francisco)

1 Opening and introductions

Herb Sutter opens the meeting at 08:04 N.Am. Pacific Time

1.1 Roll call of participants

Herb Sutter
John Spicer
Billy Baker
Erich Keane
Tom Honermann
Hans Boehm
Olivier Giroux
Bjarne Stroustrup
Howard Hinnant
Barry Revzin
Nathan Owen
Roger Orr
Nina Ranns
J Daniel Garcia
Inbal Levi
Detlef Vollmann
Jonathan Wakely
Hana Dusíková
Jens Maurer
Michael Wong
Daveed Vandevoorde

1.2 Adopt agenda

No objections.

Agenda adopted

1.5 Review of project editor and liaison assignments

[Status page](#)

Status page is up to date.

2. Status reports

2.0 Advisory subgroup status reports

• **AG**, Admin group: Nevin Liber

We've had three mailings since Kona, and are currently in discussions on the mailing list on how we want to proceed with mailings and access to papers in the future.

• **DG**, Direction group: Howard Hinnant

We don't have sufficient new material to update P2000, but we have been looking at safety, pattern matching, and senders/receivers that might lead to updates.

We plan to review the Government security document just published:

https://www.whitehouse.gov/oncd/briefing-room/2024/02/26/press-release-technical-report/
https://www.whitehouse.gov/wp-content/uploads/2024/02/Final-ONCD-Technical-Report.pdf

This press release has already led to some public discussion such as:

https://www.infoworld.com/article/3713203/white-house-urges-developers-to-dump-c-and-c.html

We do not believe this report reflects the dramatic evolution C++ has undergone since its initial specification in 1998. Each of C++11, C++14, C++17, C++20 and C++23 has added significant enhancements not only to memory safety, but to **resource** safety. That is, any resource, be it memory, file handles, the ownership of mutex lock states, thread handles, etc. must be handled safely. Modern C++ is uniquely equipped to meet this challenge, and with a clean migration path from older versions of C++, and even from C.

• **ARG**, ABI review group: Daveed Vandevoorde, Jason Merrill

Since the pre-Kona meeting, ARG responded to one inquiry regarding the impact of constant string encodings on the ABI (when said strings appear in template arguments).

There was no other activity.

Herb Sutter : I'm seeing more and more discussion of ABI and safety issues. It's quite likely that DG and ARG will become busier. If ABI questions come up in subgroups, please remember to include ARG.

2.1 Pipeline stage 1 groups: Specialist subgroup status reports (Sgs)

SGs 2, 3, 5, 8, 11, 12, and 13 are currently dormant and handled in the main subgroups. The active SGs are:

• **SG1**, Concurrency: Olivier Giroux, Hans Boehm

SG1 does not meet between F2F meetings and will meet in Tokyo. There will be a basic schedule by week's end.

Herb Sutter : Thank you for clarifying the question that came up recently, Olivier. Even SG1 sends its work through EWG and CWG.

• **SG4**, Networking: Jeff Snyder, Gašper Ažman

No report.

Jens Maurer : at some point, SG4 will need to deal with Senders/Receivers based networking, but I don't know if that's going to be this time or at the next meeting.
Herb Sutter : is that still in LEWG or is it still in SG4 ?
Inbal Levi : Dietmar had a paper that got a lot of support. The way that networking group sees this is that we want Senders/Receivers finalized because networking is based on that. I believe SG4 is not planning to look at this, so probably not going to target C++26.

• **SG6**, Numerics: Matthias Kretz, Lisa Lippincott, John McFarlane

SG6 has not met since Kona. There are several papers to be reviewed in Tokyo.
I will not be in Tokyo, but I hope to coordinate with either co-chairs or other volunteers to run the room while I will attend as much as is possible from 8h away. SG6 might need one full day or more to process its inbox, TBD.

• **SG7**, Compile-time programming: Hana Dusíková, Daveed Vandevoorde

SG7 didn't meet since Kona meeting. There are only a few papers addressed to SG7:

1. P3095R0: ABI comparison with reflection
2. P3096R0: Function Parameter Reflection in Reflection for C++26
3. P3157R0: Generative Extensions for Reflection
4. P3037R0: constexpr std::shared_ptr

EWG has reserved one full day for discussion about P2996R2: Reflection for C++26 and I hope there will be some progress, as R2 contains wording.

We will meet in Tokyo, possibly for only one session.

• **SG9**, Ranges : Daisy Hollman, Jonathan Müller

SG9 hasn't met since Kona. We plan to see 9 papers in Tokyo:

- P3136R0 — Retiring niebloids
- P2022R0 — Rangified version of lexicographical_compare_three_way

- P3138R0 — views::cache_last
- P3137R0 — views::to_input
- P3117R0 — Extending Conditionally Borrowed
- P3060R1 — Add std::views::upto(n)
- P3052R1 — view_interface::at()
- P3059R0 — Making user-defined constructors of view iterators/sentinels private

I will post a basic schedule on the wiki by the end of this week, pending room assignments and author availability.

Herb Sutter : there is a new assistant chair. Casey Carter has stepped down - we thank Casey for his service. Jonathan Müller is the new assistant chair.

• **SG10**, Feature test: Barry Revzin, Jonathan Wakely

We plan to not meet for the foreseeable future. There was one question about retroactively adding feature test macros. Unclear what the answer is there. I will try to update the feature test macro document for Tokyo.

Herb Sutter : it sounds like we want to go back and add some feature test macros we forgot for C++20 . Should this be seen by EWG ?
John SPicer : as a former SG10 chair, I suggest the question goes out to the SG10 reflector. If we think the paper needs to go anywhere, we can do that.
Herb Sutter : when I hear fixing something that should have been done in the past, I think DR, and that's usually done by CWG and/or EWG.

• **SG14**, Low latency: Michael Wong + **SG19**, Machine learning: Michael Wong, Vincent Reverdy

SG14 does not plan to meet. SG19 plans to meet to discuss the Graph algorithm paper.

P3126R0	Graph Library: Overview	Phil Ratzloff, Andrew Lumsdaine	SG14 Low Latency,SG19 Machine Learning,LEWG Library Evolution
P3127R0	Graph Library: Background and Terminology	Phil Ratzloff, Andrew Lumsdaine	SG14 Low Latency,SG19 Machine Learning,LEWG Library Evolution
P3128R0	Graph Library: Algorithms	Phil Ratzloff, Andrew Lumsdaine	SG14 Low Latency,SG19 Machine Learning,LEWG Library Evolution
P3129R0	Graph Library: Views	Phil Ratzloff, Andrew Lumsdaine	SG14 Low Latency,SG19 Machine Learning,LEWG Library Evolution
P3130R0	Graph Library: Graph Container Interface	Phil Ratzloff, Andrew Lumsdaine	SG6 Numerics,SG14 Low Latency,SG19 Machine Learning,LEWG Library Evolution

[P3131R0](#)	Graph Library: Graph Containers	Phil Ratzloff, Andrew Lumsdaine	SG6 Numerics,SG14 Low Latency,SG19 Machine Learning,LEWG Library Evolution

• **SG15**, Tooling: Michael Spencer, Ben Boeckel

Tom Honermann : I don't recall SG15 having met recently.

John Spicer : my second-hand information is that SG15 is continuing work.

• **SG16**, Unicode: Tom Honermann, Steve Downey

Summaries of recent SG16 meetings will soon be available as [P3174R0 (SG16: Unicode meeting summaries 2023-10-11 through 2024-02-21)](#). This paper was not included in the February mailing because I intended to include it in the March mailing and did not anticipate its cancellation.

SG16 has met 7 times since the prior SG16 report and has reviewed the following papers, CWG issues, and LWG issues.

- Forwarded to LEWG:
  - [P2845R6](#): Formatting of std::filesystem::path
  - [P3070R0](#): Formatting enums
- Soon to be forwarded to LWG (once I publish minutes for the most recent SG16 meeting):
  - [LWG 4043](#): "ASCII" is not a registered character encoding
  - [LWG 4044](#): Confusing requirements for std::print on POSIX platforms
- Under review awaiting further updates:
  - [P3045R0](#): Quantities and units library
  - [CWG 2843](#): Undated reference to Unicode makes C++ a moving target
    The proposed resolution is awaiting some minor editorial updates.
- Awaiting further action from me:
  - [P2873R0](#): Remove Deprecated Locale Category Facets For Unicode from C++26
  - [LWG 3767](#): codecvt<charN_t, char8_t, mbstate_t> incorrectly added to locale
  - [LWG 2959](#): char_traits<char16_t>::eof is a valid UTF-16 code unit
  - [SG16 33](#): A correct codecvt facet that works with basic_filebuf can't do UTF conversions

SG16 will not meet in Tokyo since it is difficult to attain quorum at in-person meetings due to contention with the WGs and other SGs.

SG16 will continue to meet at its regular twice monthly cadence.

• **SG17**, EWG incubator: Erich Keane

SG17, EWGI, has not met since Kona, though we intend to meet for an entire day (Thursday) in Tokyo. Schedule is currently pending, but should be up shortly.

Herb Sutter : originally, incubator subgroups have been created to help with the bandwidth of EWG and LEWG. For example,if EWG can look at all the papers, there wouldn't be a need for an SG17 session. Is that still the case ?

Erich Keane : that's the idea, although we pick up more R0 papers anyway. JF sometimes holds open-mic periods when EWGI papers get pulled in and picked up by EWG.

• **SG18**, LEWG incubator: Billy Baker, Nevin Liber

SG18 LEWGI had two telecons since Kona.
1. [P3016R1](#): Resolve inconsistencies in begin/end for valarray and braced initializer lists
2. [P3091R0](#): Better lookups for map and unordered_map

LEWGI is planning to meet in Tokyo.

• **SG20**, Education: JC van Winkel

SG20 will not meet in Tokyo. SG20 has met a whole just last Friday and subgroups (of SG20) meet more often in work sessions, one in US-and one in EMEA friendly timezones. There we write drafts of the topics for our education guidelines which we then vote on in our plenary" SG20 meetings. Our github repository can be found at https://github.com/cplusplus/SG20. We want to continue to steadily keep adding more guidelines.

We are also thinking about changing how we present our topics and dependencies of topics to teach. There will still be one large document, but we're also working on different "learning paths" for people with different interests (e.g. a learning path for beginning embedded programmers versus for scientific programmers).

• **SG21**, Contracts: John Spicer, Timur Doumler

SG21 forwarded our MVP paper P2900R6 (https://isocpp.org/files/papers/P2900R6.pdf) to LEWG and EWG for review in Tokyo.
The MVP is the "minimal viable product" for contracts. This is what SG21 considers the set of features needed to address an important subset of the eventual full contract support.

Importantly, a design goal is to not close off, as much as possible, future directions that might be considered.

We expect that issues will come up from the review in Tokyo, and we will be meeting for two half days to address those, and also address other post-MVP issues.

We expect to get the MVP into C++26 and also to get a number of other additions to the MVP into C++26. As an example, we are currently discussing how to best handle contracts on virtual functions.

We have had 9 telecons since Kona, and plan one more before Tokyo.

At our remaining telecon for Tokyo we will discuss and MVP issue that came up on the reflectors, and continue discussion of virtual function

We plan to make ourselves available for LEWG and EWG questions, and we will meet for 2 half days at the end of the week.

• **SG22**, C/C++ liaison: Nina Ranns, JeanHeyd Meneide

SG22 met once since Kona to discuss [P2318](#): A Provenance-aware Memory Object Model for C and [P2434](#): Nondeterministic pointer provenance. A good discussion was had, but the authors of P2318 do not believe that the specification in P2434 is a good fit for the C standard.
SG22 does not plan to meet in Tokyo. We will attempt to schedule a meeting in April to cover some of the open issues. SG22 is currently using a github repo that is separate from the other WG21 study groups and can be found [here](#)
We are looking for volunteers to write a paper that does the rebase of C++ on C23. More details of the work needed can be found in the rebase [github project](#)

WG14 report, courtesy of Robert Seacord :

The C23 DIS ballot was successful and all comments have been resolved. The draft is now in final review before submission.
TS 18661-5 and TS 18661-4 were approved by the committee and are being prepared for publication.
[N3226](#) 2024/03/04 Kleynhans, TS 6010 A Provenance-aware Memory Object Model for C, Revision Draft is being reviewed now in preparation for balloting.
One paper was tentatively accepted, several papers received consensus on opinion polls.
There were multiple papers on operator overloading, none of which had consensus. We had a discussion about the C Charter. One N document version has been published and a second revision is being developed.

John Spicer : Is Thomas Köppe still a co-chair ?
Nina Ranns : He privately told me he would like to step down as co-chair, but I'm not sure if that's been made official.
Herb Sutter : we used to have the project editors as co-chairs, but then we changed to having one chair from each WG. This is a special case where we have a subgroup in each committee

• **SG23**, Safety and Security: Roger Orr, Ben Craig

We had lots of discussion, but very little work in terms of papers to discuss. We have not met. We asked for half a day, and we only have one paper to discuss. I will suggest that SG23 members attend EWG discussion on contracts to see if there are any safety and security concerns

Herb Sutter : is there a paper on profiles form Bjarne in the mailing ?
Bjarne : if there is a paper, it is only a summary on what happened in the previous meeting. I have a note that is not a paper, we can discuss that.
Roger Orr : if there is something to look at, it would be useful to discuss it.
Herb Sutter : I was asking about P3038R0.
Roger Orr : I believe it's the same version as what we've seen in Kona. We will look at it when we have an R1.

2.2 Pipeline stage 2 groups: Design subgroup status reports

• **EWG**, Core evolution: JF Bastien, Erich Keane, Hana Dusíková

EWG had one telecon between Kona and Tokyo meeting, on which we discussed

https://wiki.edg.com/bin/view/Wg21telecons2024/Ewg-january-31

Where we discussed papers:

P3074R1 std::uninitialized
P2747R1 constexpr placement new (forwarded to CWG)
P2758R1 Emitting messages at compile time
P2946R1 A Flexible Solution to the Problems of noexcept

EWG will have dedicated time for Reflection (whole day on Tuesday), Contracts (whole day on Wednesday) and Pattern Matching (half day).

Full schedule is posted on wiki:
https://wiki.edg.com/bin/view/Wg21tokyo2024/EvolutionWorkingGroup

We have 28 papers and 11 issues we need to go thru, 4 papers won't have presenter in-person nor virtual.

• **LEWG**, Library evolution: Inbal Levi, Fabio Fracassi, Ben Craig

LEWG had 15 Telecons since Kona (we will have one more before Tokyo), and saw the following papers and issues:

Telecons:
1. P3019R4: Vocabulary Types for Composite Class Design (R3, R4)
2. P1068R9: Vector API for random number generation
3. P2075R3: Philox as an extension of the C++ RNG engines
4. P2999R3: Sender Algorithm Customization (R2, R3)
5. P2968R1: Make std::ignore a first-class object
6. P2945R0: Additional format specifiers for time_point
7. P3015R0: Rebuttal to Additional format specifiers for time_point
8. P2988R1: std::optional <T&>
9. P1255R11: A view of 0 or 1 elements: views::maybe
10. P1928R8: std::simd - Merge data-parallel types from the Parallelism TS 2
11. P2846R1: size_hint: Eagerly reserving memory for not-quite-sized lazy ranges
12. P2875R1: Undeprecate polymorphic_allocator::destroy For C++26
13. P2769R1: get_element customization point object
14. P0843R10: inplace_vector
15. P3109R0: A plan for std::execution for C++26
16. LWG3988: Should as_const_view and basic_const_iterator provide base()?
17. P2985R0: A type trait for detecting virtual base classes
18. P3055R1: Relax wording to permit relocation optimizations in the STL
19. P3107R1: Permit an efficient implementation of std::print
    (will be seen on 2024-03-05)
20. P2389R0: dextents Index Type Parameter
21. P3005R0: Memorializing Principle-design-based policies

We also had a S/R Info and Q&A session, with high attendance, on which we saw:
1. [Presentation](#) on "[P2300R7](#): std::execution"
2. [Adapting P2300](#) to an existing application framework

Mailing list reviews (led by Corentin Jabot):
1. [P0870R5](#): A proposal for a type trait to detect narrowing conversions
2. [P2827R0](#): Floating-point overflow and underflow in from_chars (LWG 3081)
3. [P2835R2](#): Expose std::atomic_ref's object address
4. [LWG3918](#): std::uninitialized_move/_n and guaranteed copy elision
5. [P2872R2](#): Remove wstring_convert From C++26
6. [P3029R0](#): Better mdspan's CTAD
7. [P3056R0](#): what ostream exception
8. [P3072R0](#): Hassle-free thread attributes
9. [P3142R0](#): Printing Blank Lines with println

Detailed telecon minutes are updated on the Wiki and links are posted both in GitHub issues and on our schedule pages:
- https://github.com/cplusplus/LEWG/wiki/2023-Telecons
- https://github.com/cplusplus/LEWG/wiki/2024-Telecons
- https://github.com/cplusplus/LEWG/wiki/2023-Mailing-List-Reviews
- https://github.com/cplusplus/LEWG/wiki/2024-Mailing-List-Reviews

Status:
We forwarded 17 papers to LWG in our last electronic poll (published on 2023-12-15) and we have 5 more papers polled on the 2024 February electronic poll (running till 2024-03-10).
Poll results and comments can be seen here:
- [P3054R0](#): 2023-12 Library Evolution Poll Outcomes
- [P3124R0](#): 2024-02 Library Evolution Poll Outcomes (yet to be published)
As of LEWG's request, we've restarted the LEWG Incubator group, to help manage the load. The group is chaired by Nevin Liber and Billy Baker (report will be sent separately by them).
LEWGI agenda is published here: https://github.com/cplusplus/LEWG/wiki/2024-LEWGI-Telecons

Plans For the Tokyo 2024 meeting:
- We have a schedule for Tokyo (currently contains 34 papers, mostly on large topics) published here: https://github.com/orgs/cplusplus/projects/23
- We finalized a process for policies in Kona. In Tokyo, LEWG will see the first policy topics (topics are listed here: https://github.com/cplusplus/LEWG/wiki/LEWG-Policies):
  - [[nodiscard]] policy
  - explicit constructors
  - noexcept

On behalf of the library evolution leadership team, thank you to all our paper authors, LEWGI and Mailing List Review chairs, minute-takers, and participants!
Looking forward to seeing you all in person or virtually in Tokyo.

2.3 Pipeline stage 3 groups: Wording subgroup status reports

• **CWG**, Core wording: Jens Maurer

CWG has had teleconferences approximately every two weeks since November, reviewing about 50 core issues in total. Most of them will be brought forward to plenary vote in Tokyo. We continue to cooperate with EWG on issues that need design direction.

We have about 10 papers on the agenda for Tokyo. If contracts make it through EWG, there is still time for a first CWG review pass in the second half of the week.

John Spicer : it's possible that the Contracts review will suck a lot of people out of core during the review process.

Jens Maurer : I have planned around that. There will be an EWG review of core issues that were sent to EWG after plenary, so I will encourage CWG members to attend EWG. CWG will be in session during that time, but we will probably focus on incubator style consulting on wording.

I don't think we have a conflict on Tuesday. We hope to make good progress on Tuesday.

Wednesday has Contracts in EWG, so I expect several key CWG people to be in EWG at the time. The tradition from Kona was to look at tentatively ready issues at that time so that we are as certain as we can that the issues we bring to plenary polls are in good shape. Those who wish to defect CWG to attend Contracts should review those tentatively ready wordings so they bring any issues beforehand.

• **LWG**, Library wording: Jonathan Wakely, Jeff Garland, Dietmar Kühl

LWG has held telecons most weeks, at alternating time to accommodate paper authors. We've been working out way through P2642 (padded mdspan layouts) and P2300 (std::execution). We also prioritize issues by email every week, but I'm very behind on updating the issues lists with the results of those threads. There will be a number of ready issues to vote on in Tokyo. We will meet all week in Tokyo to continue reviewing those two papers, as well as the other work sent to us from LEWG. I will not be in Tokyo, but hope to attend remotely for as much of the week as possible.

2.4 SC22 report

Herb Sutter : C++23 has still not been published. We're working through the ISO issues, and we think we're about to publish. It doesn't matter if the 2024 date is on it, it's still going to be called C++23. We had the same issue with C17.

2.5 SC22/WG14 (C) report (covered in 2.1 / SG22)

3. New business

John Spicer : Tom Plum, member of Plum Hall passed away on February, 29. He was a great contributor. We're very thankful for his contribution.

Bjarne Stoustrup : Tom was at the organisation meeting in 1989, which is the meeting before the first one. He was there from the beginning.

Herb Sutter : Tom is the reason we started regularly meeting in Kona and was the WG21 convenor until 2002. He will be missed.

3.1 Review of priorities and target dates

• Status page
• P1000

Herb Sutter : Feature cut off for C++26 is three meetings after Tokyo, in February next year.
Erich Keane : P1000 link is not up to date so it doesn't have any locations after tokyo.
Herb Sutter : that paper gets approved in the plenary.
Erich Keane : I wouldn't be opposed to making those changes editorial changes.
Inbal Levi : please take advantage of this meeting. If you think the queue is too long, let us know and we can adjust accordingly.
Herb Sutter : thank you to chairs for advertising the deadlines.

3.2 Any other business

Jonathan Wakely : we should be careful about updating the shared calendar for right timezones for plenary.
Herb Sutter : I'm having some issues updating the calendar. If I can ask you, John Spicer and Nevin to make sure the times are correct.

4.1 Review and approve resolutions and issues

4.2 Review action items

Nina Ranns to check with SG chairs about the missing SG reports.

5. Closing process
5.1 Establish next agenda

Herb Sutter : I propose the same agenda with appropriate minor tweaks. Any objections ?
No objections

5.2 Future meetings (deferred to full meeting)
5.3 Future mailings (deferred to full meeting)

5.4 Adjourn

Meeting adjourned at 09:03 N.Am. Pacific Time