

WG21 2025-01 Hagenberg Admin telecon minutes

ISO/IEC JTC1 SC22 WG21 N5005 — 2025-01-29

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SC22/WG21 pre-meeting telecon

Convener: Herb Sutter

Date : Monday 2025-01-27

Time: 16:00 UTC

1 Opening and introductions

Herb Sutter opens the meeting at 16:04 UTC.

Herb Sutter displays the ISO/IEC CoC slide.

1.1 Roll call of participants

Ben Boeckel
Billy Baker
Daisy Hollman
Detlef Vollmann
Erich Keane
Hans Boehm
Herb Sutter
Hubert Tong
Inbal Levi
Jens Maurer
John Spicer
Jonathan Wakely
Marco Foco
Matthias Kretz
Michael Hava
Michael Wong
Nevin Liber
Nina Dinka Ranns
Olivier Giroux
Ran Regev
Roger Orr
Timur Doumler
Tom Honermann
Ville Voutilainen

1.2 Adopt agenda

No objections.

Agenda adopted.

1.3 Approve minutes from previous meeting (deferred to face- to-face meeting)

1.4 Review action items from previous meeting (deferred to face-to-face meeting)

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

- **Meeting logistics:** Jens Maurer

We have ample space in Hagenberg. We have auditorium style rooms available that come with some disadvantages when working on laptops. I'm trying to assign subgroup sessions to normal style rooms, but some EWG sessions might exceed the capacity of such rooms. The rooms with traditional style desks have a capacity of 50 people. We will see on Monday morning what the exact attendance will be for groups, and act accordingly.

- **AG, Admin group:** Nevin Liber

There have been two mailings since Wrocław. The post-Wrocław mailing had 167 papers, 107 of which were P-papers not counting multiple revisions, withdrawn papers, or papers adopted in Wrocław. The pre-Hagenberg mailing had 122 papers, 51 of which were R0.

The post-Hagenberg deadline is scheduled for Monday 2025-03-17 @ 15:00 UTC.

Herb Sutter : we have a draft wiki setup with per user logins that will be the same as isocpp logins. We hope to try it after Hagenberg. We expect to have a read only guest login too.

Nevin Liber : I will have the attendance sheet up this week and it won't be locked until just before the plenary.

- **DG, Direction group:** Michael Wong

Howard Hinnant has retired. We are looking for new candidates.

We had two meetings since the last face to face meeting. We discussed contracts, pattern matching, 8-bit bytes, and profiles. These discussions will continue in DG. We will issue a report in Austria.

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

Nothing to report for the ABI Review Group.

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, Ruslan Arutyunyan

SG1 is expected to meet 3.5-4 days as usual recently. The room will be run by our vice-chair (thank you Ruslan!) at least on Thursday because I will need to leave by then. We will also have Gonzalo auditioning as backup vice-chair at this meeting.

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

SG4 has not held any telecons since Wrocław, but we do plan to meet in Hagenberg to discuss P3185R0.

- **SG5**, Transactional Memory

SG5 (nominally inactive, but reporting anyway) is headed towards converting the long approved but unpublished TM TS v2 into a White Paper. Michael Wong spent much time pursuing publication as a TS. It now seems significantly easier to both get the document published and preserve the readability of the original committee paper by pursuing the less restrictive White Paper route.

Since there is no recent precedent that I'm aware of, we will need to figure out how to make this happen

Herb Sutter : Publishing a TS is a complex process that can take a lot of time. It is not suitable for changes to an existing document. ISO has been encouraging us to use white papers when we can.

Michael Wong : I had to do a lot of work to get aTS through. The TS process is difficult to use for papers that modify an existing standard. It's only suitable to create new things.

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

SG6 plans to meet for two half days. One part will focus mostly on floating point related issues:

- P3375 R2 Reproducible floating-point results
- P3565 R0 Virtual floating-point values
- P3495 R0 Remarks on Basic Statistics, P1708R9

The other part will focus on Quantities and Units:

- P3045 R5 Quantities and units library

For P3045, I intend to invite LEWG(I) regulars so that we have a less numerics-focused review.

With the current (very) tentative room assignments, that first session is planned for Tuesday afternoon and P3045 for Thursday afternoon.

- **SG7**, Compile-time programming: Hana Dusíková, Jeff Snyder

SG7 will meet for half-day on Monday after plenary and will have a bit lighter load than on past meetings as we are slowly moving to C++29 stuff.

I won't be in person at the meeting, but my friendly co-chair Jeff will be there and I will join remotely.

SG7 will have one pre-meeting teleconference before the Hagenberg meeting (note: it was shortly before pre-admin teleconference).

Objective is to discuss two new papers about accessibility of private members:

P3547 R0 Modeling Access Control With Reflection

P3587 R0 Reconsider reflection access for C++26

First paper (P3547) is the promised paper from Ville and Dan which worked together on a solution we ask them for in EWG in Wroclaw. Another paper P3587 is a response paper to the discussion arguing against allowing access to private members.

I would like to have the discussion on the teleconference, so we can defer to that discussion in EWG in Hagenberg and not rehash the same discussion.

Just a reminder that the last mailing was a record one so I hope everyone understands why I'm trying to do this. Last time it worked :)

At the in-person meeting we are going to see these papers:

P3385 R3 Attributes reflection (still in SG7 as it didn't get consensus to get forwarded last time, and authors came back with updated paper)

P3420 R1 Reflection of Templates (SG7 last time asked author to continue work on this and to get more implementation experience and some preliminary wording, they did)

There is one new reflection paper (P3560 R0 "Error Handling in Reflection") which SG7 doesn't need to see as it's just allowing reflection to throw exceptions, and it's a feature which was already discussed as the best solution for error reporting in P2996 "reflection for c++26" and it's only a question of design which can be done properly in LEWG.

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

SG9 will meet for a day and a half in Hagenberg—currently scheduled for Monday and Tuesday. We have three R0 papers to look at and 5 revised papers, several of which are quite meaty. The papers we plan to see are tagged on the wiki:

<https://github.com/cplusplus/papers/issues?q=is%3Aissue%20label%3Asg9-hagenberg%20>

We have not had any telecons since Wroclaw.

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

Nothing to report.

- **SG14**, Low latency: Michael Wong

SG14 will not be meeting in Hagenberg.

Last SG14 call was about exception handling. We are continuing to build more papers on gaming. Patrice has been collecting them from all the games companies. We are also focusing on low latency for finance more.

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

SG15 had a telecon in January where we decided to explore using the white paper process to publish the modules ecosystem recommendations. We will meet in Hagenberg for half a day to discuss this.

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

SG16 (Unicode) will not meet in Hagenberg.

We have met twice since the last pre-meeting admin telecon, on [2024-11-06](#) and [2025-01-22](#). The following papers were discussed.

- [P2019R7: Thread attributes](#)
[GH 817](#): SG16 agreed to forward the paper to LEWG with a slight modification.
- [P3258R0: Formatting of charN_t](#)
[GH 1917](#): SG16 did not have consensus for this paper as proposed, but did have consensus for pursuing a related direction.

We will meet one more time prior to Hagenberg, on February 5th, with the intent to review any papers targeting C++26 that we haven't already forwarded. I'm still working with paper authors to finalize an agenda. Candidate papers include:

- [P2758R4: Emitting messages at compile time](#)
- [P2873R2: Remove Deprecated Locale-Category Facets for Unicode from C++26](#)
- [P3560R0: Error Handling in Reflection](#)

I am still behind in publishing proper minutes, but am working towards getting caught up.

Inbal and I are working on prioritising papers for the one meeting before Hagenberg. If you have any input on that, please share.

- **SG17**, EWG incubator: Erich Keane, Hana Dusíková, James Touton

SG17(EWGI) Intends to do business-as-usual for 1 days worth of meetings in Hagenberg. No coordination is necessary between groups, and we suspect that thanks to the P1000 restrictions, that we likely won't see any EWGI papers in EWG from this meeting anyway.

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

SG18 LEWGI does not plan to meet at Hagenberg.

SG23 has agreed to look at P3356 non_invalidating_vector before SG18. Two Zoom calls should be completed by Hagenberg with plans for more calls after Hagenberg.

P3474 std::arguments

P3283 Adding .first() and .last() to strings

- **SG19**, Machine learning: Michael Wong, Phil Ratzloff

We are not meeting in Hagenberg.

We have been having regular meetings. We are still tracking the stats paper. We are hoping that it gets looked at in LEWG again.

We continue to look at the graph paper from Andrew Lumsdaine and Phil Ratzloff. We are aiming for a big review of that in Sofia and Kona. We have broken it down to smaller papers to ease the review.

- **SG20**, Education: JC van Winkel

SG20 (education) will not be meeting in Hagenberg. We continue to run small-group editing sessions for our guidelines.

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

SG21 has had weekly telecons since Wrocław. For Hagenberg, we requested two afternoons mid-week. If any design changes to P2900 (the Contracts proposal heading for C++26) come up during Hagenberg that require SG21 input, or any other SG21 business that may affect C++26 comes up, then we will look at that with priority, otherwise we will continue to make progress on our paper backlog which you can find here (note that most of the stuff in the "Papers targeting C++26" bucket is already scheduled for our two remaining pre-Hagenberg SG21 telecons):

<https://wiki.edg.com/bin/view/Wg21telecons2025/SG21>

One thing to keep in mind for Hagenberg is that since Contracts and Contracts-related things such as Profiles will be discussed by a number of groups (SG21, SG23, EWG, CWG, LWG), we should try to do a better job than we did in Wrocław to ensure that these sessions do not overlap with each other.

EWG plans to discuss Contracts on Monday. After that, other subgroups will have a better idea of what they need to discuss.

John Spicer: There are a lot of papers regarding the process. We also expect discussion of ship vehicle. If you care about those issues please look at the EWG page to see what is being discussed when.

Timur Doumler: JF sent around a list of contract related papers he wants to see in EWG, but the paper list will get shorter. Some of them have been seen in Wrocław.

Jens Maurer: My understanding of the overall schedule for contracts is that it's Monday contracts in EWG, Tuesday in CWG, Wednesday afternoon and Thursday afternoon SG21.

Timur Doumler: Library also needs to see it.

Jens Maurer: It's currently scheduled for Monday in library. Please contact the chair to discuss.

Timur Doumler: I really appreciate that we are trying to remove scheduling conflicts. Thank you everybody.

- **SG22**, C/C++ liaison: Nina Ranns, JeanHeyd Meneide, Davis Herring

SG22 met once since Wroclaw to discuss :

P3477R0 There are exactly 8 bits in a byte (JF Bastien)

P3475R0 Defang and deprecate memory_order::consume (Hans Boehm)

P3384R0 COUNTER (Jeremy Rifkin)

We will meet one more time before Hagenberg to discuss :

P2746 Deprecate and Replace Fenv Rounding Modes (Hans Boehm)

P2142 Allow '!' operator to work on pointers (Jim Buckeyne)

P3248 Require [u]intptr_t (Gonzalo Brito Gadeschi)

SG22 will not meet in Wroclaw.

WG14 update: C23 has been published. The next WG14 meeting is in February.

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

SG23 has not met since Wrocław.

We have a day planned in Hagenberg, and have seven papers to be presented there.

Two papers are revisions of ones we have seen before:

- P3402R2 ("A Safety Profile Verifying Class Initialization")

- P3442R1 ("[[invalidate_dereferencing]] attribute")

The others have not been seen before by SG23:

- P3356R0 "non_invalidating_vector"

- P3541R1 "Violation handlers vs noexcept"

- P3558R0 "Prevent Undefined Behavior By Default"

- P3566R0 "You shall not pass char* - Safety concerns working with unbounded null-terminated strings"

- P3578R0 "Language Safety and Grandma Safety"

Ben Craig is unable to continue as co-chair. I'm looking for a new co chair.

We may not be able to see all the papers in SG23 in Hagenberg given the amount of time that is being spent on contracts and the overlap of the paper authors.

Jens Maurer : We have ample meeting space. If you want more time, please tell me. For everybody else, please make sure that your wishes are reflected on the meeting room request page. I have no request from SG4 at the moment. I would like to avoid any last minute surprises.

2.2 Pipeline stage 2 groups: Design subgroup status reports

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

I've put together a preliminary EWG schedule:

<https://wiki.edg.com/bin/view/Wg21hagenberg2025/EvolutionWorkingGroup>

If you have feedback, please respond privately to me and co-chairs.

I haven't assigned days yet, but the order is what I'd expect to see in chronological order.

We have a lot of papers. This week is unfortunately one of those with only 5 work days, and without leap seconds! We're going to have to make the best of our time and focus on what can make C++26.

Per [P1000](#), this is the last EWG meeting where we can forward to CWG. We cannot forward new papers to LEWG (though we can re-forward papers that have already been forwarded to LEWG).

It's unlikely that we will see papers that aren't targeting C++26.

EWG will need to see both:

P3547 R0 Modeling Access Control With Reflection

P3587 R0 Reconsider reflection access for C++26

As there was not clear consensus either way on the second pool we took today.

<https://github.com/cplusplus/papers/issues/2196#issuecomment-2615896568>

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

LEWG have met 4 times since Wroclaw, with an additional meeting set for Tue next week, to a total of 5 meetings between Wroclaw and Austria.

We've seen the following papers:

- [P3179R4](#): C++ parallel range algorithms (design approved)
- [P0260R13](#): C++ Concurrent Queues (feedback given, will be seen again in LEWG)
- [P3137R2](#): views::to_input (forwarded to LWG)
- [P2781R5](#): std::constant_wrapper (forwarded to LWG)
- [P2786R11](#): Trivial Relocatability For C++26 (forwarded to LWG)
- [P3096R5](#): Function Parameter Reflection in Reflection for C++26 (forwarded to LWG)
- [P2758R4](#): Emitting messages at compile time (TBD)
- [P3372R2](#): constexpr containers and adapters (TBD)
- [P3378R1](#): constexpr exception types (TBD)
- [P3125R2](#): constexpr pointer tagging (overflow) (TBD)

We also had ML reviews, results of:

- [P3503R0](#): Make type-erased allocator use in promise and packaged_task consistent (forwarded to LWG)
- [P3475R1](#): Defang and deprecate memory_order::consume (forwarded to LWG)
- [P3477R2](#): There are exactly 8 bits in a byte (Forwarding [Failed](#), added to Hagenberg schedule)

We will be running few more mailing list reviews before Austria, mostly of small features, deprecations, etc.:

<https://github.com/cplusplus/LEWG/wiki/2025-Mailing-List-Reviews>

Our Hagenberg schedule is available:

<https://github.com/orgs/cplusplus/projects/35/views/3>

We are collaborating with:

- SGs chairs, who have been super helpful by updating on paper's statuses, running thorough reviews, prioritizing to help our schedule, keeping detailed minutes, and adding concise reports to help focus our discussions.
- LWG chairs, coordinate final features and fixes for 26, and which has been doing a remarkable job to handle the workload.

Thank you to our Incubator group, SGs, and LWG chairs, for the fruitful work, and for helping get us all in great shape to the last design meeting (feature freeze) of C++ 26!

Looking forward to seeing you (in person or remotely) in Austria! :)

2.3 Pipeline stage 3 groups: Wording subgroup status reports

- **CWG**, Core wording: Jens Maurer, Jason Merrill, Jonathan Caves

CWG had three telecons since Wroclaw to progress P2900 Contracts and P2996 Reflection.

CWG will continue to review P2900 Contracts and P2996 Reflection with priority, with hopes that at least one of these papers can make it to Saturday's straw polls.

Time permitting, other papers targeted at C++26 will be reviewed as well. Core issues processing has fallen behind given the effort invested to review those two large papers.

A tentative agenda is here:

<https://wiki.edg.com/bin/view/Wg21hagenberg2025/CoreWorkingGroup>

We would like to see feedback from Monday's EWG contract discussion as it informs our work for the week.

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

Jonathan Wakely reporting.

LWG held a few telecons since Poland, completing the review of std::hive (which is ready for plenary), and reviewing Reflection and some SIMD changes, which will be seen again by LWG in Hagenberg. Our schedule for Hagenberg also includes Contracts, more SIMD, some senders/receivers updates, and lots more. We also need to revisit a number of papers that were in the plenary polls in Wroclaw, but we polled the wrong revisions of the papers. That needs to be fixed, probably by just putting the right paper in the plenary polls.

We currently have nothing scheduled for Friday, but that's certain to change during the meeting as we get papers forwarded from LEWG and as authors bring new revisions after LWG review during the week. If we somehow still have nothing to do on Friday, we'll spend time on our LWG issues list.

I'm unable to attend in person, but Jeff and Dietmar will be there.

2.4 SC22 report

ISO is encouraging us to use white paper process as it is a lighter process to publishing a TS. SD4 has been updated to talk about the difference between a white paper and TS.

Herb thanked all the current and past subgroup chairs, and everyone else who has helped run WG21, for all their help growing from about 40 people in 3 subgroups back in 2002 when Herb started as convener, to many times that today doing great work in many domain areas and keeping C++ current and shipping regularly at high quality. He plans to continue as convener for another year to the end of his current term and then wants to be able to focus full-time working on WG21 C++ evolution technical proposals, and so during the year we welcome volunteers to start thinking about making themselves available to take on more of the administrative work of organizing meetings.

Michael Wong: Herb, thank you for your years of service. We wouldn't be where we are without you.

John Spicer: I second that. We take Herb for granted sometimes. The train model is working great for us. It's just one of the great things he has contributed to WG21 over the years.

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

3. New business

3.1 Review of priorities and target dates

- [Status page](#)
- [P1000](#)

We are at a last meeting where EWG and LWG are supposed to approve proposals and send them to review. We will be feature-complete at this meeting.
At the Sofia meeting we will be wording-complete.

3.2 Any other business

No discussion.

4.1 Review and approve resolutions and issues

4.2 Review action items

Herb Sutter to update the SG chairs in the agenda.
Nina Ranns to ask for missing SG reports.

5. Closing process

5.1 Establish next agenda

Herb Sutter : I propose the same agenda with the modifications as suggested.
No objections.

5.2 Future meetings (deferred to full meeting)

5.3 Future mailings (deferred to full meeting)

5.4 Adjourn

Meeting adjourned at 16:55 UTC