

WG21 2021-06 Virtual Meeting Record of Discussion

ISO/IEC JTC1 SC22 WG21 P2395 — 2021-06-13

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Chair: John Spicer

Monday 2021-06-07

08:00 N.Am. Pacific Time

1. Opening activities

John Spicer opens the meeting at 08:05 AM N.Am. Pacific Time

1.1 Opening comments (PL22.16)

John Spicer presents.

Thank you to everyone for your continuing efforts in these challenging times.

1.2 Meeting guidelines

John Spicer presents.

Meetings are not public, but are open to visitors. Please refrain from live tweeting, blogging, taking photos or videos.

Every participant is responsible for understanding and abiding by the following:

[The INCITS Antitrust Guidelines \(PL22.16\)](#)

[The INCITS Patent Policy \(PL22.16\)](#)

[The ISO Code of Conduct](#)

[The INCITS Code of Conduct \(PL22.16\)](#)

[The IEC Code of Conduct](#)

[The WG21 Practices and Procedures, and Code of Conduct](#)

John Spicer presents the meeting guidelines. We expect everyone to be familiar with these rules.

These apply to the plenary and to all the subgroup meetings

John Spicer presents the Antitrust guidelines.

If you have any questions or concerns about CoC issues, please approach a committee officer or a NB representative and bring it to their attention. If you have any technical issues or concerns, please bring them up as soon as possible.

1.3 The ISO Code of Conduct

ISO requires that, through 2020, committees provide an opportunity to discuss the code of conduct.

John Spicer presents ISO CoC slides.

Please report any CoC violation to @conduct even if you also report it to the subgroup chair.

1.4 Membership, voting rights, and procedures for the meeting (PL22.16)

John Spicer presents voting rights.

If you are representing an organization that is considering formally joining PL22.16, or your organization is already a member and you wish to change your voting status, please inform an officer.

Hal Finkel presents. When registering for the call, please make sure you use the name that is registered in the global directory.

John Spicer presents how to vote using the telecon client.

1.5 Introductions

Officers introduce themselves.

New members introduce themselves.

John Spicer welcomes new members.

Herb Sutter: We have 17 national bodies present at this virtual meeting.

1.6 Agenda review and approval (PL22.16 motion, WG21 poll)

John Spicer presents.

The meeting goals described above are derived from the schedule adopted in 2020 and described in: [P1000R4](#)

The primary goal of this meeting will be to provide any necessary status updates and conduct straw polls proposed for working draft changes.

John Spicer presents the agenda.

PL22/16 motion to approve the meeting agenda

Aaron Ballman Moves

Nevin Liber seconds.

The motion is unanimously approved by PL22/16.

WG21 motion to approve the meeting agenda, with the changes to the agenda as discussed.

The motion is unanimously approved by WG21.

1.7 Editor's reports, approval of working drafts

Document	Editor's report	Prospective WD
C++23 Standard	N4886	N4885

WG21 motion to approve the working drafts.

The motion is unanimously approved by WG21.

1.8 Approval of the minutes of the previous meetings (PL22.16 motion, WG21 poll)

Meeting	Minutes
WG21 February Virtual	N4884
PL22.16 February Virtual	pl22.16-2021-00002
WG21 pre-June Virtual administrative telecon	N4890

PL22/16 motion to approve the minutes.

Mike Miller moves.

Hubert Tong seconds

The motion is unanimously approved by PL22/16.

WG21 motion to approve the minutes.

The motion is unanimously approved by WG21.

2. Liaison reports, and WG21 study group reports (see pre-meeting WG21 telecon minutes)

No discussion.

3. WG progress reports (Core, Evolution, Library, Library Evolution; see pre-meeting WG21 telecon minutes)

No discussion.

4. New business requiring action by the committee

Aaron Ballman presents an update on the C committee on going work.

All of this is covered in P2391R0:

C23 Major Features :

Attributes (N2335, N2554) (is compatible with C++ syntax and semantics)
TS 18661 integration (N2314, N2341, N2359, N2401) (ISO 60559:2011/IEEE 754-2008 compatible with an eye towards the future; adds new floating-point types and a pile of new functions)

Other Features of Interest :

Fixed about 15 defect reports
Lifting from POSIX (N2349, N2353) (adds memccpy, strdup, and strndup)
Thread-safe time conversion functions (N2417)
Removed support for K&R C-style identifier list definitions (N2432)

C23 Features for C++ Compatibility :

Harmonizing static_assert with C++ (N2265)
Querying attribute support (N2553)
nodiscard attribute (N2267, N2448)
maybe_unused attribute (N2270)
deprecated attribute (N2334)
fallthrough attribute (N2408)
Two's complement sign representation (N2412)
u8 character prefix (N2418)
_Bool definitions for true and false (N2393)
Allowing unnamed parameters in function definitions (N2480)
Binary literals (N2549)
Allow duplicate attributes (N2557)
Remove mixed wide string literal concatenation (N2594)
digit separators (N2626)

Additional (unadopted) Features :

Pointer provenance and correcting the C memory and object models
(Memory Object Model study group)
lambdas (N2736, N2737, N2738)
nullptr (N2692)
type inference (N2735)
typeof (N2685)
bit-precise integer types (N2709)
__has_include (N2673)
integer-safe arithmetic (N2683)
defer and panic (N2589)
#embed (N2592)

5. Discussion and Straw Polls

5.1 CWG Polls

Mike Miller presents.

There is one core issue missing from the list of resolved issues that was there initially. There were some questions raised about resolution for CWG2476, so we pulled it back for further consideration.

1. Accept as Defect Reports all issues in [P2386R0](#) (Core Language Working Group "ready" Issues for the June, 2021 meeting) and apply the proposed resolutions to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

2. Apply the changes in [P1938R3](#) [↗](#) (if **consteval) to the C++ working paper.**

No discussion.

No objection to unanimous consent.

Motion passes.

3. Apply the changes in [P2186R2](#) [↗](#) (Removing Garbage Collection Support) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

4. Accept [P1949R7](#) (C++ Identifier Syntax using Unicode Standard Annex 31) as a Defect Report and apply the changes therein to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

5. Accept [P2156R1](#) (Allow Duplicate Attributes) as a Defect Report and apply the changes therein to the C++ working paper.

Nico Jossutis : Will this be applied as a Defect Report against C++20 ?

John Spicer : Defect Reports are always applied against the current standard. There is no process to apply it to previous standards.

Herb Sutter : Yes, this is going to be applied to C++20.

No objection to unanimous consent.

Motion passes.

6. Apply the changes in [P1401R5](#) (Narrowing contextual conversions to `bool`) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

7. Apply the changes in [P2223R2](#) (Trimming whitespaces before line splicing) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

8. Apply the changes in [P1847R4](#) (Make declaration order layout mandated) to the C++ working paper.

Loïc Joly : I don't see how this change is going to help anyone, but it may prevent further implementation from taking advantage of what we have now.

Herb Sutter : was this concern discussed in EWG ?

JF Bastien : This is a change from a different paper regarding layout of classes, and it was agreed to split this change into its own paper. Doing this change allows us to specify other things about the layout of classes in the future which may be useful for the original proposal.

There are objections in the room

Herb Sutter reminds of the voting procedure.

In favour : 52

Opposed : 2

Abstain : 14

Motion passes.

9. Apply the changes in [P2201R1](#) (Mixed string literal concatenation) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

5.2 LWG Polls

Jonathan Wakely presents

It's been pointed out that Concurrency TS polls are not adding any content to the headers that are in the experimental subdirectory. We want to add these papers to the TS and then handle any further changes as issues.

Concurrency TS

1. Apply the changes in [P1122R4](#) (Proposed Wording for Concurrent Data Structures: Read-Copy-Update (RCU)) to the Concurrency TS working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

2. Apply the changes in [P1121R3](#) (Hazard Pointers: Proposed Interface and Wording for Concurrency TS 2) to the Concurrency TS working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

Issues

3. Apply the changes for all Tentatively Ready issues in [P2385R0](#) (C++ Standard Library Issues to be moved in Virtual Plenary, June 2021) to the C++ working paper.

Nico Jossutis : are any of these issues to be treated as defect reports ?

Jonathan Wakely : all library issues are always intended to be defect reports. Implementers use their judgement and backport all the issues where it makes sense to do so.

No objection to unanimous consent.

Motion passes.

C++23

4. Apply the changes in [P1132R7](#) (out_ptr - a scalable output pointer abstraction) to the C++ working paper.

Objections in the room.

In favour : 36

Opposed : 4

Abstain: 29

Motion passes.

Bjarne Stroustrup : What is the rule of thumb for consensus ?

Herb Sutter : it takes various things into account including whether there are any known NB complaints.

Nico Jossutis : I would like to know the reasons for raising the objection.

John Spicer : this is not the forum for discussing technical issues. Sometimes people are not happy with the resolution. If it's a last minute technical objection, then the person would raise the point of concern.

Bryce Adelstein LeLach: it's useful to know if the reason for objection is a newly found issue or just a procedural objection.

Herb Sutter : Sometimes there are objections because people want their objections heard. The polls are posted a week in advance. If you are interested please search the wiki for discussions

Gabriel Dos Reis : I needed to have a count so there is a record of how the vote went.

5. Apply the changes in [P1328R1](#) (Making `std::type_info::operator==` `constexpr`) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

6. Apply the changes in [P0448R4](#) (A `stringstream` replacement using `span` as buffer) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

7. Apply the changes in [P1425R4](#) (Iterators pair constructors for stack and queue) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

8. Apply the changes in [P1518R2](#) (Stop overconstraining allocators in container deduction guides) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

9. Apply the changes in [P0401R6](#) (Providing size feedback in the Allocator interface) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

10. Apply the changes in [P1659R3](#) (starts_with and ends_with) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

11. Apply the changes in [P1951R1](#) (Default Arguments for pair's Forwarding Constructor) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

12. Apply the changes in [P1989R2](#) (Range constructor for std::string_view 2: Constrain Harder) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

13. Apply the changes in [P2136R3](#) (`invoke_r`) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

14. Apply the changes in [P2166R1](#) (A Proposal to Prohibit `std::basic_string` and `std::basic_string_view` construction from `nullptr`) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

C++20 and C++23

Jonathan Wakely presents

We normally just fix things through the issues list. Some of these issues are larger and because they have been done with papers, they are specifically called out in separate motions.

Bryce Adelstein LeLach : is the scope different or are these changes just large in terms of paper size ?

Jonathan Wakely : These changes came in as papers, as opposed to a few lines of issues resolution, and that's why we decided to handle them as motions.

15. Apply the changes in [P2231R1](#) (Missing `constexpr` in `std::optional` and `std::variant`) to the C++ working paper, as a defect report for C++20.

No discussion.

No objection to unanimous consent.

Motion passes.

16. Apply the changes in [P2216R3](#) (`std::format` improvements) to the C++ working paper, as a defect report for C++20.

Gabriel Dos Reis : is this change going to affect the abi in C++20 ?

Jonathan Wakely : Yes. This is one reason why this change is called out.

Gabriel Dos Reis : In the future, we should consult specific people from Microsoft when it comes to certain changes.

Bryce Adelstein Lelbach : A few months ago I reached out to a Microsoft representative and asked for a point of contact. I believe that we had representation in LEWG discussions.

Jonathan Wakely : if there is representation in the room, it's not the chair's responsibility to chase further contact.

There are objections in the room.

In favour : 45

Opposed : 1

Abstain : 15

Motion passes.

17. Apply the changes in [P2281R1](#) (Clarifying range adaptor objects) to the C++ working paper. This resolves LWG issues 3509 and 3510.

No discussion.

No objection to unanimous consent.

Motion passes.

18. Apply the changes in [P2328R1](#) (join_view should join all views of ranges) to the C++ working paper, as a defect report for C++20.

No discussion.

No objection to unanimous consent.

Motion passes.

19. Apply the changes in [P2325R3](#) (Views should not be required to be default constructible) to the C++ working paper, as a defect report for C++20.

No discussion.

No objection to unanimous consent.

Motion passes.

20. Apply the changes in [P2210R2](#) (Superior String Splitting) to the C++ working paper, as a defect report for C++20.

No discussion.

No objection to unanimous consent.

Motion passes.

21. Apply the changes in [P2367R0](#) (Remove misuses of list-initialization from Clause 24) to the C++ working paper, as a defect report for C++20.

No discussion.

No objection to unanimous consent.

Motion passes.

5.3 WG21 Polls

1. Direct the project editor for the Concurrency Technical Specification V2 to produce an initial working paper based on [P1122R4](#) and [P1121R3](#).

No discussion.

No objection to unanimous consent.

Motion passes.

2. Direct the Convener to request a New Work item for a Technical Specification for C++ Concurrency V2 based on [P1122R4](#) and [P1121R3](#) as an indication of its content.

No discussion.

No objection to unanimous consent.

Motion passes.

6. Closing activities

6.1 Other business

Michael Wong : Is there a deadline for concurrency TS? Is a month ok ?

Herbu Sutter : That's fine.

6.2 PL22.16 motions, if any

John Spicer reminds of voting rights for PL22.16

6.2.1 Systematic Review - TS 19216:2018, C++ Extensions for Networking

Motion: Per PL22.16-2021-00007, PL22.16 APPROVES to Confirm TS19216:2018, C++ Extensions for Networking.

Jonathan Wakely moves.

Bryce Adelstein Lelbach seconds.

In favour : 30

Opposed : 0

Abstain : 4

Total voting members : 40

Motion approved.

6.2.2 Systematic Review - TS 21544:2018, C++ Extensions for Modules

Motion: Per PL22.16-2021-00010-0001, PL22.16 APPROVES to Withdraw TS 21544, C++ Extensions for Modules.

Barry Hedquist moves

Bronek Kozicki seconds

In favour : 32

Opposed : 0

Abstain : 3

Total voting members : 40

Motion approved.

7 Plans for the future (PL22.16)

7.1 Next and following meetings

Herb Sutter presents.

(virtual) 2021-10-04: Zoom virtual plenary meeting

2022-02-07 to 12: Portland, OR, USA; Intel

2022-07: New York, NY, USA; Bloomberg

2022-11-07 to 12: Kona, HI, USA: Standard C++ Foundation

Peter Brett : Have we made arrangements for people to attend virtually in the future ?

Herb Sutter : Sub group chairs used to consider that in the past. We will see if there is more we can do with the experience we have now.

7.2 Mailings

Note: These are the closest regular mailings and not special pre/post meeting mailings.

2021-06-15: Post-Summer

2021-09-15: Pre-Autumn

8. Adjournment (PL22.16 motion)

Jonathan Wakely moves

Bryce Adelstein Lelbach seconds

John Spicer adjourned the meeting at 09:20 AM N.Am. Pacific Time

9. Attendance

Name	Company	Country
Aaron Ballman	Intel Corporation	US
Adam Lach	Bloomberg	
Alicia Klinvex	Naval Nuclear Laboratory	
Alisdair Meredith	Bloomberg	US
Andreas Weis		Germany

Antony Polukhin		Russia
Barry Hedquist	Perennial	US
Barry Revzin	Jump Trading LLC	US
Ben Boeckel		
Billy Baker	FlightSafety International	US
Bjarne Stroustrup	Morgan Stanley	US
Bronek Kozicki		UK
Bruno Cardoso Lopes	Facebook	US
Bryan St Amour		Canada
Bryce Adelstein Leibach	NVIDIA Corporation	US
Casey Carter	Microsoft Corporation	US
Chandler Carruth	Google	US
Christian Trott	Sandia National Laboratories	US
Christof Meerwald		Austria
Christopher Di Bella		UK
Corentin Jabot		France
Damien Lebrun-Grandie	Oak Ridge National Laboratory	US
Daniel Katz		
Daniela Engert		
David Olsen	NVIDIA Corporation	US
David Sankel	Bloomberg	US
Davide Di Gennaro		Italy
Detlef Vollmann		Switzerland
Dietmar Kühl	Bloomberg	US
Ellen Herrick		
Eric Niebler	Facebook	US

Erich Keane	Intel Corporation	US
Espen Harlinn		Norway
Fabio Fracassi		Germany
Florian Sattler		
Frank Birbacher		UK
Gabriel Dos Reis	Microsoft Corporation	France
Glen Fernandes	The C Plus Plus Alliance Inc	US
Graham Lopez	NVidia Corporation	US
Guy Davidson		UK
Hal Finkel	United States Dept of Energy	US
Hana Dusíková		Czech Republic
Hans Boehm	Google	US
Hartmut Kaiser	Louisiana State University	US
Herb Sutter	Microsoft Corporation	US
Howard Hinnant	Ripple Labs	US
Hubert Tong	IBM Corporation	Canada
Inbal Levi		Israel
J. Daniel Garcia	University Carlos III of Madrid	Spain
Jagrut Dave		
Jason Merrill	IBM Corporation	US
JC van Winkel		Netherlands
Jean-Paul Rigault		France
Jeff Garland		
Jeffrey Olkin		
Jens Maurer	Edison Design Group	US
JF Bastien		Canada

Joe Sachs	SAS Institute Inc	US
John Lakos	Bloomberg	US
John Plaice	Grammatech	US
John Spicer	Edison Design Group	US
Jonathan Wakely	IBM Corporation	US
Jorge Silva	SAS Institute Inc	US
Joshua Berne		
Juan Alday	GreenWireSoft	US
Kelly Walker	Stellar Science	US
Larry Lewis	SAS Institute Inc	US
Loïc Joly		France
Louis Dionne	Apple	US
Maged Michael	Facebook	US
Marco Foco		Italy
Mark Hoemmen	Stellar Science	US
Mark Zeren	VMware Inc	US
Matthew Butler	Laurel Lye	US
Matthew Woehlke		
Matthias Kretz		Germany
Matus Chochlik		Slovakia
Michael Adams		Canada
Michael Hava		Austria
Michael Wong		Canada
Michał Dominiak	NVIDIA Corporation	Poland
Mike Herrick	Edison Design Group	US
Mingxin Wang		China
Nat Goodspeed	Linden Research, Inc	US
Nathan Sidwell		
Nemanja Boric	Amazon Corporate LLC	US

Nevin Liber	Argonne National Laboratory	US
Nicolai Josuttis		Germany
Nina Ranns	Edison Design Group	UK
Olivier Giroux	NVidia Corporation	US
Ozan Irsoy		
Pablo Halpern	Halpern-Wight Inc	US
Patrice Roy		Canada
Peter Brett		UK
Peter Kulczycki		Austria
Phil Nash		UK
Phil Ratzloff	SAS Institute Inc	US
Philip Craig		UK
Ran Regev		Israel
Richard Corden	Programming Research Ltd	US
Robert Douglas	Aquatic Group LLC	US
Robert Leahy		Canada
Roger Orr		UK
Rostislav Khlebnikov		
Ruslan Arutyunyan	Intel Corporation	US
Scott Schurr	Ripple Labs	US
Sebastian Büttner		
Sergei Murzin		
Sophia Poirier	Apple	US
Stephen Upton	Programming Research Ltd	US
Steve Downey		
Thomas Köppe	Google	US
Tim Song	Jump Trading LLC	US
Timur Doumler		UK

Tom Honermann	Synopsys Inc	US
Tomasz Kamiński		
Tristan Brindle		UK
Vassil Vassilev		Bulgaria
Victor Zverovich		
Ville Voutilainen	The Qt Company	Finland
Walter E Brown	<Emeritus>	US
Wesley Maness	Schonfeld Tools LLC	US
William Miller	Edison Design Group	US
William Seymour		US
Wyatt Childers		