

WG21 2021-02 Virtual Meeting

Minutes of Meeting

ISO/IEC JTC1 SC22 WG21 N4884 — 2021-03-08

Nina Dinka Ranns, dinka.ranns@gmail.com

Chair: John Spicer
SC22/WG21 pre-meeting telecon

Monday 2021-02-22
08:00 N.Am. Pacific Time

1. Opening activities

John Spicer opens the meeting at 08:03 AM N.Am. Pacific Time

1.1 Opening comments (PL22.16)

John Spicer presents.

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. 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 18 national bodies present at this virtual meeting.

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

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

Barry Hedquist Moves

Jonathan Wakely 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 | N4879 | N4878 |
| Library Fundamentals TS | N4874 | N4873 |

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 November Virtual | N4877 |
| PL22.16 November Virtual | pl22.16-2020-00009 |
| WG21 pre-February Virtual administrative telecon | N4883 |

PL22/16 motion to approve the minutes.
Daveed Vandevoorde moves.
Nevin Liber 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)

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

4. New business requiring action by the committee

No discussion.

5. Discussion and Straw Polls

5.1 CWG Polls

1. Accept as Defect Reports the the following issues (all issues resolved by [P1787R6](#) (Declarations and where to find them), adopted at the November, 2020 meeting):

| | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 36 | 110 | 138 | 191 | 255 | 271 | 279 | 338 | 360 | 386 |
| 399 | 405 | 418 | 536 | 554 | 562 | 563 | 600 | 607 | 852 |
| 952 | 102 | 120 | 125 | 129 | 147 | 150 | 161 | 172 | 177 |
| | 8 | 0 | 2 | 1 | 8 | 0 | 6 | 9 | 1 |
| 181 | 182 | 182 | 182 | 182 | 182 | 183 | 183 | 183 | 184 |
| 8 | 0 | 1 | 2 | 8 | 9 | 5 | 7 | 9 | 1 |
| 188 | 189 | 189 | 189 | 190 | 190 | 190 | 193 | 200 | 200 |
| 4 | 4 | 6 | 8 | 0 | 7 | 8 | 6 | 7 | 9 |
| 205 | 206 | 206 | 207 | 216 | 219 | 221 | 233 | 237 | 239 |
| 8 | 2 | 5 | 0 | 5 | 9 | 3 | 1 | 0 | 6 |
| 241 | | | | | | | | | |
| 3 | | | | | | | | | |

No discussion.

No objection to unanimous consent.

Motion passes.

2. Accept as Defect Reports all issues in [P2313R0](#) (Core Language Working Group "tentatively ready" Issues for the February, 2021 meeting) and apply the proposed resolutions to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

3. Apply the changes in [P1102R2](#) (Down with (!)) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

5.2 LWG Polls

Issues

1. Apply the changes for all Tentatively Ready issues in [P2315R0](#) (C++ Standard Library Issues to be moved in Virtual Plenary, Feb. 2021) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

C++23

2. Apply the changes in [P2259R1](#) (Repairing input range adaptors and counted_iterator) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

3. Apply the changes in [P2212R2](#) (Relax Requirements for time_point::clock) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

4. Apply the changes in [P2162R2](#) (Inheriting from std::variant) to the C++ working paper.

There are objections in the room.

Discussion in the room.

After discussion there are no objections to unanimous consent.

Motion passes.

5. Apply the changes in [P2160R1](#) (Locks lock lockables) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

6. Apply the changes in [P2017R1](#) (Conditionally borrowed ranges) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

7. Apply the changes in [P1682R2](#) (std::to_underlying for enumerations) to the C++ working paper.

No discussion.

No objection to unanimous consent.

Motion passes.

8. Apply the changes in [P0533R7](#) (constexpr for cmath and cstdlib) to the C++ working paper.

There are objections in the room.

Herb Sutter clarifies the rules of voting

John Spicer clarifies how to vote.

In favour : 31

Opposed : 22

Neutral : 18

No consensus. Motion doesn't pass.

5.3 LEWG Polls

Motion 1

Move to apply the changes in [P1919R3](#) (Expanding the Rights in SD-8) to Standing Document 8 (SD-8: Standard Library Compatibility).

No discussion.

No objection to unanimous consent.

Motion passes.

6. Closing activities

6.1 Other business

Jonathan Wakely reminds attendees to update their virtual meeting client.

6.2 PL2.16 motions, if any

John Spicer reminds of voting rights for PL22.16

1. TR 18015 National Review

Barry Hedquist moves.

Davis Herring seconds.

No objection to unanimous consent.

Motion approved.

7 Plans for the future (PL22.16)

7.1 Next and following meetings

Herb Sutter presents.

(virtual) 2021-06-07: Zoom virtual plenary meeting

(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

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)

Daveed Vandevorde moves

Davis Herring seconds

John Spicer adjourned the meeting at 09:22 AM N.Am. Pacific Time

9. Attendance

| Name | Organisation | National Body |
|-------------------------|--------------------------------|----------------|
| Aaron Ballman | Intel Corporation | USA |
| Abraham Berne | | |
| Alexandru Voicu | AMD | USA |
| Alisdair Meredith | Bloomberg | United Kingdom |
| Andreas Weis | | Germany |
| Balint Joo | Oak Ridge National Laboratory | USA |
| Barry Hedquist | Perennial | USA |
| Barry Revzin | Jump Trading LLC | USA |
| Ben Saks | Saks & Associates | USA |
| Bill Ash | INCITS | |
| Billy Baker | FlightSafety International | USA |
| Bjarne Stroustrup | Morgan Stanley | USA |
| Botond Ballo | | Canada |
| Bronek Kozicki | | United Kingdom |
| Bruno Cardoso Lopes | Facebook | USA |
| Bryan St. Amour | | Canada |
| Bryce Adelstein Lelbach | NVIDIA Corporation | USA |
| Christian Trott | Sandia National Laboratories | USA |
| Christof Meerwald | | Austria |
| Damien Lebrun-Grandie | Oak Ridge National Laboratory | USA |
| Damon McDougall | AMD | USA |
| Dan Raviv | | |
| Daniela Engert | GMH Prüftechnik GmbH | |
| Daveed Vandevoorde | Edison Design Group | USA |
| David Olsen | NVIDIA Corporation | USA |
| David Vitek | GammaTech Inc | USA |
| Davide Di Gennaro | | Italy |
| Davis Herring | Los Alamos National Laboratory | USA |
| Detlef Vollmann | | Switzerland |
| Dietmar Kühl | Bloomberg | USA |
| Dounia Khaldi | Intel Corporation | USA |
| Drew Dormann | Aquatic Group LLC | USA |
| Ellen Herrick | Edison Design Group | |
| Eric Niebler | Facebook | USA |
| Erich Keane | Intel Corporation | USA |
| Eugenio Bargiacchi | Vrije Universiteit Brussel | |
| Fabio Fracassi | | Germany |
| Florian Sattler | | |
| Frank Birbacher | | United Kingdom |
| Gabriel Dos Reis | Microsoft Corporation | USA |
| Gašper Ažman | | United Kingdom |
| Graham Lopez | NVIDIA Corporation | USA |

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|------------------------|---------------------------------|----------------|
| Guy Davidson | | United Kingdom |
| Hal Finkel | United States Dept of Energy | USA |
| Hana Dusíková | | Czech Republic |
| Hans Boehm | Google | USA |
| Harish Naik | Aquatic Group LLC | USA |
| Herb Sutter | Microsoft Corporation | USA |
| Howard Hinnant | Ripple Labs | USA |
| Hubert Tong | IBM Corporation | Canada |
| Inbal Levi | | Israel |
| J. Daniel Garcia | University Carlos III of Madrid | Spain |
| Jason Merrill | IBM Corporation | USA |
| JC van Winkel | | Netherlands |
| Jean-Paul Rigault | | France |
| Jeff Garland | Crystal Clear Software | |
| Jeff Snyder | | United Kingdom |
| Jens Maurer | Edison Design Group | USA |
| Joe Sachs | SAS Institute Inc | USA |
| John Lakos | Bloomberg | USA |
| John Spicer | Edison Design Group | USA |
| Jonathan Caves | Microsoft France | France |
| Jonathan Wakely | IBM Corporation | United Kingdom |
| Joshua Berne | Bloomberg | |
| Juan Alday | GreenWireSoft | USA |
| Kelly Walker | Stellar Science | USA |
| Larry Lewis | SAS Institute Inc | USA |
| Loïc Joly | | France |
| Louis Dionne | Apple | USA |
| Lucian Radu Teodorescu | | Romania |
| Łukasz Wojakowski | | Poland |
| Maged Michael | Facebook | USA |
| Marco Foco | | Italy |
| Mark Hoemmen | Stellar Science | USA |
| Mark Zeren | VMware Inc | USA |
| Mateusz Pusz | EPAM Systems Inc | USA |
| Matthew Butler | Laurel Lye | USA |
| Matthias Kretz | | Germany |
| Michael Adams | | Canada |
| Michael Davis | | |
| Michael Hava | | Austria |
| Michael Spencer | Apple | USA |
| Michael Spertus | Amazon Corporate LLC | USA |
| Michael Wong | | Canada |
| Michał Dominiak | NVIDIA Corporation | USA |
| Mike Herrick | Edison Design Group | USA |
| Mitsuhiro Kubota | | Japan |
| Nathan Sidwell | | UK |
| Nemanja Boric | Amazon Corporate LLC | USA |
| Nevin Liber | Argonne National Laboratory | USA |
| Nicolai Josuttis | | Germany |
| Nina Ranns | | United Kingdom |

| | | |
|------------------------|--------------------------|----------------|
| Pablo Halpern | Halpern-Wight Inc | USA |
| Patrice Roy | | Canada |
| Paul Preney | | Canada |
| Peter Brett | | United Kingdom |
| Peter Kulczycki | | Austria |
| Phil Ratzloff | SAS Institute Inc | USA |
| Richard Corden | Programming Research Ltd | USA |
| Rob Douglas | Aquatic Group LLC | USA |
| Robert J. Simpson | Qualcomm Inc | USA |
| Robert Leahy | | Canada |
| Roger Orr | | United Kingdom |
| Samuel Ferreira Santos | | |
| Scott Schurr | | |
| Stephen Upton | Programming Research Ltd | USA |
| Steve Downey | Bloomberg | |
| Thomas Köppe | Google | |
| Tim Song | Jump Trading LLC | USA |
| Tom Honermann | Synopsys Inc | USA |
| Tony Van Eerd | | Canada |
| Vassil Vassilev | | Bulgaria |
| Ville Voutilainen | The QT Company | Finland |
| Vittorio Romeo | | Italy |
| Wesley Maness | Schonfeld Tools LLC | USA |
| William Miller | Edison Design Group | USA |
| Wuping Xin | KLD Engineering P.C. | USA |
| Zhihao Yuan | SimpleRose Inc | |